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This information was gathered by AZ_Granny aka nw_az_granny, two forum names for the same person.

She freely shared her wealth of prepper knowledge with others and has since passed away.

Thanks you for for generosity Granny. Click here for a [zip file of this collection](#).

Unzipping will leave you with a folder containing 75 html files.

Keep the files in the folder and navigation with a web browser will work the same as here.

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Home

Food Storage for Beginners

Develop a Home Storage Mindset

If you're new to food storage, first prepare by developing a food storage mindset. It's easy to think of lots of reasons why we can't get our food storage started; but we have to remind ourselves that ANY food item that is stored for later use (tomorrow, next week, next year, or years from now) is food storage. In that context, the canned vegetables and packages of pasta in your kitchen cupboard are part of your food storage.

Start Simply

Don't begin your food storage focus with the compulsion to obtain a year's supply of food storage immediately. Start your food storage plan by determining what food items you use regularly that could be bought ahead and stored for future use.

Store What You Will Use

Examine the shelf life of food items your family uses. That will help you to estimate how much you can store. You can only store as much as your family will use before the shelflife of the food item runs out (stored at proper temperature and under proper circumstances in adequate food grade containers, without oxygen if appropriate.)

Back to Basics

You may be able to save money with your food storage by using "back to basics" techniques such as grinding your own grains, sprouting seeds, growing garden vegetables, home canning, etc. Whole grains store well for many years and can be purchased inexpensively in bulk. If your family is not accustomed to eating whole-grain foods, you will need to increase the amount of whole-grains in your diet slowly to allow the body to adjust to the fiber increase. Whole dried herbs can also be purchased in bulk inexpensively. You can grind your herbs with a coffee grinder or mortar and pestle.

Label Carefully

As you package a food item for storage, be sure to label the container plainly with the name of the food item and date it is packed. Place your labels so that you will still be able to see them when containers are stacked or shelved.

Rotate, Rotate, ROTATE!

The MOST IMPORTANT thing I can tell you about food storage is that it is necessary to ROTATE your storage. That means that you use the container that's been stored the longest and replace it with newer stored containers behind the older ones. If you are storing items that you never use, you are wasting space that could be used for food items you need.

Food storage that spoils or lies untouched is garbage. Don't fill your home with garbage. Fill your home with precious healthy food storage that will be a blessing to you and your family on a regular basis and in times of need.

Food Storage is NOT Just for Emergencies

Food storage is not something we set aside for an emergency, although it is a great blessing in such a time. Food storage is a plan for living better, buying less expensively, preserving foods we grow ourselves, developing a healthier lifestyle, and learning ways to use our storage for household uses and natural healing.

Keep Food Storage on Your Mind

As you begin to focus on your home storage, keep your storage in mind as you shop, clip coupons, and browse newspapers for sales. When you find tomato sauce on sale, stock up on enough for a month or two. When canned vegetables are on sale, buy enough for a variety of canned goods in your storage. Pasta, oil, and beans keep well; so store enough for two or three months. As your pantry fills, you will begin to develop an idea of what you want to add to your storage, and you'll keep that in mind as you shop and plan your gardening.

Plan Ahead When Buying in Bulk

When you begin to buy in bulk, you will need to plan ahead to make sure that you have all the containers and equipment you will need for your storage. Reusable containers can be a blessing for those who plan to continue their storage as a way of life.

Tailor Guides for Short-Term Basic Storage and Long-Term Extended Storage

As you develop a home storage mindset, you can devise a plan for short-term basic storage and for long-term extended storage. Food storage guides are meant to be used as general guidelines that can be tailored to your family's needs that serve to give you a better overall picture of home storage. Food storage buying guides generally lay out a plan to obtain a year's supply of food storage with monthly or weekly goals; but these, too, should be tailored to your family's needs. For example, if everyone in your family is allergic to oats, a large supply of oats would be a waste for you. Substitute a similar food item that your family could put to use; such as barley, rice, or quinoa.

Set a Goal, Devise a Plan, and Obtain Your Storage

Set a goal, devise a plan, and obtain the storage you desire. For example, you might begin with a goal to obtain a month's supply of food storage. You might plan to purchase items such as staples, canned goods, dry milk, and pasta, making a chart of how much of each item you will need to store. As you make your grocery purchases over the next month, buy twice the amount you need of each item (one for this month's use, and another for next month's storage.) Buying on sale, using coupons, and growing your own foods can help to reduce the initial cost of storing foods. You might have to make some adjustments to find money for your storage by cutting back on fast food, eating a "cheap" meal once a week,

or fasting for one day a month or more and saving the money you would have spent on food for your storage. You may examine your expenses and find other ways to trim your budget to allow for home storage; such as going out for entertainment one less time a month, giving your own haircuts instead of going to the salon, calling less long-distance, etc. After a few months of storing a month ahead and living off your storage, you will begin to see other ways in which you can obtain your food storage in greater bulk less expensively. You may devise a plan for a 3-month supply, a 6-month supply, a year's supply, etc. as your needs and means permit.

Find Space for Your Storage

As your storage grows, finding storage space can be a challenge. If you are lucky enough to have a root cellar, basement, or spare room with temperature control, you are very blessed. If space is a problem, get creative. Build shelves, store under beds, use an unused corner of a room, store under decorative tables, or store behind couches and other furniture. If you truly have a desire to set aside home storage, there will be a place for your storage.

Make Use of Your Storage

Make use of your food storage and find new uses for it. For example, learn how to use the same herbs as spices for cooking, formulas for healing, and household cleaning. Use salt, vinegar, and baking soda for cooking, healing, and household uses. Learn to grind whole grains and to sprout your grains for fresh sprouts, juices, essene bread, salads, and wheat grass. Proper use of your food storage can help to simplify your life, improve your health, extend your budget, and enlighten your soul.

Put Your Home Storage to the Test

Once you feel confident that your home storage pantry is well-stocked, plan a weekend for your family to put your home storage to the test. Use only your storage to live on for the weekend. For a real emergency preparedness test, turn off the electricity and water, and survive using your alternate sources of heating, cooling, cooking, water, etc. Within the first hour you will think of many things you should have in storage that never occurred to you before. When you live on your food storage, you will become personally aware of the need for a variety of herbs, butter powder, mayonnaise, and a number of things that will make your food storage tastier, more palatable, healthier, and more interesting.

Storage is a Blessing

As you become accustomed to using, rotating, and extending your home storage, you will find that it is a blessing to you and others in many ways. Your home storage is a blessing when your neighbor who has lost a paycheck is in need of groceries, when your loved one who has taken ill needs meals taken to his or her home, when you've run out of commercial cleaners so make your own, when a flood destroys all foods not stored in waterproof containers, when one of the ladies from Church asks if you wouldn't mind making homemade bread for something special, when your friend is in need of a poultice for an insect sting or wound, when power

lines are down and refrigerated items spoil, when your father needs an herbal tea for headache or upset stomach, when a natural disaster destroys homes and food, when your child needs a homemade game to keep him occupied through an emergency situation, and, REGULARLY, every time you prepare a meal for yourself or your family using your home storage. Keep the faith, and always move forward prayerfully.

Home

Water Storage

Quantity

A water ration of as little as a pint per day has allowed life raft survivors to live for weeks, but a more realistic figure is 1 gallon per person per day for survival. 4 gallons per person/day will allow personal hygiene, washing of dishes, counter tops, etc. 5 to 12 gallons per day would be needed for a conventional toilet, or 1/2 to two gallons for a pour flush latrine. For short-term emergencies, it will probably be more practical to store paper plates and utensils, and minimize food preparation, than to attempt to store more water.

In addition to stored water, there is quite a bit of water trapped in the piping of the average home. If the municipal water system was not contaminated before you shut the water off to your house, this water is still fit for consumption without treatment. To collect this water, open the lowest faucet in the system, and allow air into the system from a second faucet. Depending on the diameter of the piping, you may want to open every other faucet, to make sure all of the water is drained. This procedure will usually only drain the cold water side, the hot-water side will have to be drained from the water heater. Again, open all of the faucets to let air into the system, and be prepared to collect any water that comes out when the first faucet is opened. Toilet tanks (not the bowls) represent another source of water if a toilet bowl cleaner is not used in the tank.

Some people have plumbed old water heaters or other tanks in line with their cold water supply to add an always rotated source of water. Two cautions are in order: 1) make sure the tanks can handle the pressure (50 psi min.), and 2) if the tanks are in series with the house plumbing, this method is susceptible to contamination of the municipal water system. The system can be fed off the water lines with a shutoff valve (and a second drain line), preventing the water from being contaminated as long as the valve was closed at the time of contamination.

Water can only be realistically stored for short-term emergencies, after that some emergency supply of water needs to be developed.

Water Collection

Wells

Water can only be moved by suction for an equivalent head of about 20'. After this cavitation occurs, that is the water boils off in tiny bubbles in the vacuum created by the pump rather than being lifted by the pump. At best no water is pumped, at worst the pump is destroyed. Well pumps in wells deeper than this work on one of the following principles:

- 1) The pump can be submerged in the well, this is usually the case for deep well pumps. Submersible pumps are available for depths up 1000 feet.
- 2) The pump can be located at the surface of the well, and two pipes go down the well: one carrying water down, and one returning it. A jet fixture called an ejector on the bottom of the two hoses causes well water to be lifted up the well with the returning pumped water. These pumps must have an efficient foot valve as there is no way for them to self-prime. These are commonly used in shallow wells, but can go as deep as 350 feet. Some pumps use the annular space between one pipe and the well casing as the second pipe this requires a packer (seal) at the ejector and at the top of the casing.
- 3) The pump cylinder can be located in the well, and the power source located above the well. This is the method used by windmills and most hand pumps. A few hand pumps pump the water from very shallow wells using an aboveground pump and suction line. A variety of primitive, but ingenious, pump designs also exist. One uses a chain with buckets to lift the water up. Another design uses a continuous loop rope dropping in the well and returning up a small diameter pipe. Sealing washers are located along the rope, such that water is pulled up the pipe with the rope. An ancient Chinese design used knots, but modern designs designed for village level maintenance in Africa use rubber washers made from tires, and will work to a much greater depth.

Obviously a bucket can be lowered down the well if the well is big enough, but this won't work with a modern drilled well. A better idea for a drilled well is to use a 2' length or so of galvanized pipe with end caps of a diameter that will fit in the well casing. The upper cap is drilled for a screw eye, and a small hole for ventilation. The lower end is drilled with a hole about half the diameter of the pipe, and on the inside a piece of rigid plastic or rubber is used as a flapper valve. This will allow water to enter the pipe, but not exit it. The whole assembly is lowered in the well casing, the weight of the pipe will cause it to fill with water, and it can then be lifted to the surface. The top pipe cap is there mostly to prevent the pipe from catching as it is lifted.

Springs

Springs or artesian wells are ideal sources of water. Like a conventional well, the water should be tested for pathogens, VOCs (Volatile Organic Compounds such as fuel oil or benzene), pesticides and any other contaminants found in your area. If the source is a spring it is very important to seal it in a spring box to prevent the water from becoming contaminated as it reaches the surface. It is also important to divert

surface runoff around the spring box. As with a well, you will want to periodically treat the spring box with chlorine, particularly if the spring is slow moving. The spring may also be used for keeping food cool if a spring-house is built. If this is the case, it is still recommended to build a spring box inside the house to obtain potable water.

Surface water

Most US residents served by municipal water systems supplied with surface water, and many residents of underdeveloped countries rely on surface water. While surface water will almost always need to be treated, a lot of the risk can be reduced by properly collecting the water. Ideal sources of water are fast flowing creeks and rivers which don't have large sources of pollution in their watershed. With the small amounts of water needed by a family or small group, the most practical way to collect the water is through an infiltration gallery or well. Either method reduces the turbidity of the collected water making it easy for later treatment.

Water Purification

Heavy Metals

Heavy metals are only a problem in certain areas of the country. The best way to identify their presence is by a lab test of the water or by speaking with your county health department. Unless you are down stream of mining trailings or a factory, the problem will probably affect the whole county or region. Heavy metals are unlikely to be present in sufficient levels to cause problems with short-term use.

Turbidity

Turbidity refers to suspended solids, i.e. muddy water, is very turbid. Turbidity is undesirable for 3 reasons:

- 1) aesthetic considerations
- 2) solids may contain heavy metals, pathogens or other contaminants,
- 3) turbidity decreases the effectiveness of water treatment techniques by shielding pathogens from chemical or thermal damage, or in the case of UV treatment, absorbing the UV light itself.

Organic compounds

Water can be contaminated by a number of organic compounds such as chloroform, gasoline, pesticides, and herbicides. These contaminants must be identified in a lab test. It is unlikely ground water will suddenly become contaminated unless a quantity of chemicals is allowed to enter a well or penetrating the aquifer. One exception is when the aquifer is located in limestone. Not only will water flow faster through limestone, but the rock is prone to forming vertical channels or sinkholes that will rapidly allow contamination from surface water. Surface water may show great swings in chemical levels due to differences in rainfall, seasonal crop cultivation, and industrial effluent levels

Pathogens

Protozoa

Protozoa cysts are the largest pathogens in drinking water, and are responsible for many of the waterborne disease cases in the US. Protozoa cysts range in size from 2 to 15 μ m (a micron is one millionth of a meter), but can squeeze through smaller openings. In order to insure cyst filtration, filters with an absolute pore size of 1 μ m or less should be used. The two most common protozoa pathogens are *Giardia lamblia* (*Giardia*) and *Cryptosporidium* (*Crypto*). Both organisms have caused numerous deaths in recent years in the US, the deaths occurring in the young and elderly, and the sick and immune compromised. Many deaths were a result of more than one of these conditions. Neither disease is likely to be fatal to a healthy adult, even if untreated. For example in Milwaukee in April of 1993, of 400,000 who were diagnosed with *Crypto*, only 54 deaths were linked to the outbreak, 84% of whom were AIDS patients. Outside of the US and other developed countries, protozoa are responsible for many cases of amoebic dysentery, but so far this has not been a problem in the US, due to better wastewater treatment. This could change during a survival situation. Tests have found *Giardia* and/or *Crypto* in up to 5% of vertical wells and 26% of springs in the US.

Bacteria

Bacteria are smaller than protozoa and are responsible for many diseases such as typhoid fever, cholera, diarrhea, and dysentery. Pathogenic bacteria range in size from 0.2 to 0.6 μ m, and a 0.2 μ m filter is necessary to prevent transmission. Contamination of water supplies by bacteria is blamed for the cholera epidemics which devastate undeveloped countries from time to time. Even in the US, *E. coli* is frequently found to contaminate water supplies. Fortunately *E. coli* is relatively harmless as pathogens go, and the problem isn't so much with *E. coli* found, but the fear that other bacteria may have contaminated the water as well. Nevertheless, dehydration from diarrhea caused by *E. coli* has resulted in fatalities.

Viruses

Viruses are the 2nd most problematic pathogen, behind protozoa. As with protozoa, most waterborne viral diseases don't present a lethal hazard to a healthy adult. Waterborne pathogenic viruses range in size from 0.020-0.030 μ m, and are too small to be filtered out by a mechanical filter. All waterborne enteric viruses affecting humans occur solely in humans, thus animal waste doesn't present much of a viral threat. At the present viruses don't present a major hazard to people drinking surface water in the US, but this could change in a survival situation as the level of human sanitation is reduced. Viruses do tend to show up even in remote areas, so case can be made for eliminating them now.

Physical Treatment

Heat Treatment

Boiling is one guaranteed way to purify water of all pathogens. Most experts feel that if the water reaches a rolling boil it is safe. A few still hold out for maintaining the boiling for some length of time,

commonly 5 or 10 minutes, plus an extra minute for every 1000 feet of elevation. If one wishes to do this, a pressure cooker would allow the water to be kept at boiling without losing the heat to evaporation. One reason for the long period of boiling may be to inactivate bacterial spores (which can survive boiling), but these spores are unlikely to be waterborne pathogens.

African aid agencies figure it takes 1 kg of wood to boil 1 liter of water. Hardwoods and efficient stoves would improve on this.

Water can also be treated at below boiling temperatures, if contact time is increased. A commercial unit has been developed that treats 500 gals of water per day at an estimated cost of \$1/1000 gallons for the energy. The process is similar to milk pasteurization, and holds the water at 161 F for 15 seconds. Heat exchangers recover most of the energy used to warm the water. Solar pasteurizers have also been built that would heat three gallons of water to 65 C and hold the temperature for an hour. A higher temperature could be reached if the device was rotated east to west during the day to follow the sunlight.

Regardless of the method, heat treatment does not leave any form of residual to keep the water free of pathogens in storage.

Reverse Osmosis

Reverse osmosis forces water, under pressure, through a membrane that is impermeable to most contaminants. The most common use is aboard boats to produce fresh water from salt water. The membrane is somewhat better at rejecting salts than it is at rejecting non-ionized weak acids and bases and smaller organic molecules (molecular weight below 200). In the latter category are undissociated weak organic acids, amines, phenols, chlorinated hydrocarbons, some pesticides and low molecular weight alcohols. Larger organic molecules, and all pathogens are rejected. Of course it is possible to have a imperfection in the membrane that could allow molecules or whole pathogens to pass through.

Using reverse osmosis to desalinate seawater requires considerable pressure (1000 psi) to operate, and for a long time only electric models were available. Competing for a contract to build a hand powered model for the Navy, Recovery Engineering designed a model that could operate by hand, using the waste water (90 percent of the water is waste water, only 10% passes through the filter) to pressurize the back side of the piston. The design was later acquired by PUR. While there is little question that the devices work well, the considerable effort required to operate one has been questioned by some survival experts such as Michael Greenwald, himself a survivor of a shipwreck. On the other hand the people who have actually used them on a life raft credit the availability of water from their PUR watermaker for their survival.

PUR manual watermakers are available in two models: The Survivor 06 (\$500) produces 2 pints per hour, and the Survivor 35 (\$1350) produces 1.4 gal/hr. The latter model is also available as the Power Survivor 35

(\$1700), which produces the same water volume from 4 Amps of 12 VDC, and can be disconnected and used as a hand held unit. A number of manufactures, including PUR, make DC powered models for shipboard use. PUR recommends replacing the O rings every 600 hours on its handheld units, and a kit is available to do this. Estimates for membrane life vary, but units designed for production use may last a year or more. Every precaution should be taken to prevent petroleum products from contacting the membrane as they will damage or destroy the membrane. The prefilter must also be regularly changed, and the membrane may need to be treated with a biocide occasionally

Reverse osmosis filter are also available that will use normal municipal or private water pressure to remove contaminates from water, as long as they aren't present in the levels found in sea water.

The water produced by reverse osmosis, like distilled water, will be close to pure H₂O. Therefore mineral intake may need to be increased to compensate for the normal mineral content of water in much of the world.

Distillation

Distillation is the evaporation and condensation of water to purify water. Distillation has two disadvantages: 1) A large energy input is required and 2) If simple distillation is used, chemical contaminants with boiling points below water will be condensed along with the water. Distillation is most commonly used to remove dissolved minerals and salts from water.

The simplest form of a distillation is a solar still. A solar still uses solar radiation to evaporate water below the boiling point, and the cooler ambient air to condense the vapor. The water can be extracted from the soil, vegetation piled in the still, or contaminated water (such as radiator fluid or salt water) can be added to the still. While per still output is low, they are an important technique if water is in short supply

Other forms of distillation require a concentrated heat source to boil water which is then condensed. Simple stills use a coiling coil to return this heat to the environment. These can be improvised with a boiler and tight fitting lid and some copper tubing (Avoid using lead soldered tubing if possible). FEMA suggests that, in an emergency, a hand towel can be used to collect steam above a container of boiling water. More efficient distillations plants use a vapor compression cycle where the water is boiled off at atmospheric pressure, the steam is compressed, and the condenser condenses the steam above the boiling point of the water in the boiler, returning the heat of fusion to the boiling water. The hot condensed water is run through a second heat exchanger which heats up the water feeding into the boiler. These plants normally use an internal combustion engine to run the compressor. Waste heat from the engine, including the exhaust, is used to start the process and make up any heat loss. This is the method used in most commercial and military desalinization plants

Inflatable solar stills are available from marine supply stores, but avoid the WW2 surplus models, as those who have used them have had a extremely high failure rate. Even new inflatable solar stills may only produce from 30-16 oz under actual conditions, compared to a rating of 48 oz/day under optimum conditions.

Jade Mountain also offers the following portable models in travel cases:

Traveler (WC106) 1 gpd, 23 lb., 24x26x10 folded \$ 695

Base Camp (WC107) 2 gpd, 51 lb., 48x48x4 folded \$ 895

Safari (WC10 48x48x5 \$1095

A ruggedized version of the Base Camp above

Microfilters

Microfilters are small-scale filters designed to remove cysts, suspended solids, protozoa, and in some cases bacteria from water. Most filters use a ceramic or fiber element that can be cleaned to restore performance as the units are used. Most units and almost all made for camping use a hand pump to force the water through the filter. Others use gravity, either by placing the water to be filtered above the filter (e.g. the Katadyn drip filter), or by placing the filter in the water, and running a siphon hose to a collection vessel located below the filter (e.g. Katadyn siphon filter). Microfilters are the only method, other than boiling, to remove Cryptosporidia. Microfilters do not remove viruses, which many experts do not consider to be a problem in North America. Despite this the Katadyn microfilter has seen considerable use around the world by NATO-member militaries, WHO, UNHCR, and other aid organizations. Microfilters share a problem with charcoal filter in having bacteria grow on the filter medium. Some handle this by impregnating the filter element with silver such as the Katadyn, others advise against storage of a filter element after it has been used. The Sweetwater Guardian suggests using a freezer for short-term storage

Many microfilters may include silt prefilters, activated charcoal stages, or an iodine resin. Most filters come with a stainless steel prefilter, but other purchased or improvised filters can be added to reduce the loading on the main filter element. Allowing time for solids to settle, and/or prefiltering with a coffee filter will also extend filter life. Iodine matrix filters will kill viruses that will pass through the filter, and if a charcoal stage is used it will remove much of the iodine from the water. Charcoal filters will also remove other dissolved natural or manmade contaminants. Both the iodine and the charcoal stages do not indicate when they reach their useful life, which is much shorter than the filter element. If you are depending on the stage for filtering the water you will have to keep up with how much water passes through it.

New designs seem to be coming out every month. The best selling brands

seem to be the PUR, and Sweetwater Guardian. The Katadyn doesn't sell as well to outdoor enthusiasts due to its high cost, but for years it was state of the art for water purification and still has a loyal following, especially among professionals in relief work. Below is the data on a few of the more common units, for a excellent field test of some common units, see the December 96 issue of Backpacker magazine.

Note that the first price is for the filter, the second for the replacement filter. The weight is from manufacturer s literature if it was not listed in the Backpacker article. Filter life is from manufacturer s literature and should be taken with a grain of salt.

Basic Designs Ceramic Filter Pump (\$29/\$15, 8 oz.) Cheap flimsy filter, claimed to filter up to 500 gallons with a 0.9 m ceramic filter. Not EPA rated, may not have passed independent lab tests, prone to damage, filter element must be submerged in water.

General Ecology- First Need Deluxe (\$70/\$30, 20 oz) This filter uses a structured matrix micro strainer, though General Ecology won't reveal what the structure is. It has survived independent lab tests, and filters particles to 4 m, while actually removing viruses (the only filter capable of doing this) through electrostatic attraction. The filter cartridges can't be cleaned (other than by back flushing), but are good for 100 gallons. Pump design isn't the best. Other models are available from the manufacturer.

Katadyn PF (\$295/\$145, 22.7 oz). The original microfilter using a 0.2 m silver impregnated ceramic candle. An extremely thick filter allows it to be cleaned many times for up to 14,000 gallons capacity. While the Katadyn seems well made, one reader of this list reported breaking the candle, and Backpacker Magazine broke the case during a field test. The pump, while probably indestructible, is somewhat slow and hard to use, requiring 20 lbs. of force on a small handle. The PF also lacks a output hose as the Katadyn engineers felt it would be a source of contamination.

Katadyn Combi (\$185/\$75 (ceramic)/\$19 (carbon), 29 oz) A cheaper version of the PF incorporating both ceramic and carbon stages. Much faster filter than the PF.

Katadyn Minifilter (\$139/\$59, 8.3 oz) A smaller and cheaper version of the PF, easier to pump, but generally not well received. Good for 200 gallons.

Katadyn Expedition (\$680/\$77, 13 lb.) Similar filter to the PF (exact same cartridge as the Drip Filter Below), but designed for much higher production, stainless steel case with spade type D handle, produces 0.75 gpm. Filter good for 26,000 gallons.

Katadyn Drip Style Filter (\$240, \$77, 12.5 lb.) Filter elements similar to those in the PF are mounted vertically in top 3 gallon plastic bucket, water drips through filters into second 3 gallon bucket with faucet. 1

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qt, per hour with the 2 filters included, a third filter can be added to increase rate 50%. Each filter good for 13,000 gallons. The mounting hardware for the filters is available for \$10 to allow you to make your own filter of what ever size is needed. Each mounting kit requires a " hole in the bottom of the raw water container.

Katadyn Siphon Filter (\$92, 2 lb.) Similar design to PF filter element, but a siphon hose replaces the pump, filters 1-2 quarts per hour (allow 1 hour for the filter to "prime" itself via capillary action), but multiple filters can be used in the same container. Collection vessel must be lower than raw water container. Good for 13,000 gallons.

MSR Miniworks (\$59/\$30, 14 oz) MSR's smaller filter, using a 0.3 m ceramic element. Pump is well designed, and easy to use. Main drawback is that the clean water discharge is from the bottom of the filter, and no hose is provided. While the bottom is threaded for a Nalgene bottle, it is a pain in the butt to fill a canteen or 2 liter bottle. Claimed to filter 100 gallons, Backpacker Magazine feels this may be one of the few filters without a grossly inflated rating

MSR Waterworks (\$140/\$30/\$30, 17 oz) MSR's first filter with a 0.2 ceramic and membrane stage and a carbon stage. Other wise similar to the Miniworks.

PUR Pioneer (\$30/\$4, 8 oz), newly introduced low-end microfilter. 0.5 m, 1 lpm filter rate, 12 gallon capacity

PUR Hiker (\$50/\$20, 12 oz) PUR's microfilter only design, filters to .5 m. Well liked, as are the other PUR filters. Very compact. 200 gallon capacity

PUR Scout (\$70/\$35/\$15, 12 oz) Combines a iodine resin stage, a 1.0 m filter, and a activated charcoal filter. 200 gallon capacity

PUR Explorer (\$130/\$45, 22 oz) PUR's top of the line model. Bulky, but well made, with a high output (1.4 lpm, faster than any of the hand held models listed and one of the easiest to pump) Has a 1.0 m filter plus a iodine resin stage, 300 gallon capacity

Sweetwater Walkabout (\$35/\$13, 8.5 oz.) Sweetwater's low end filter, 0.2 m, .7 lpm, 100 gal capacity

Sweetwater Guardian (\$60/\$20, 11 oz) Uses a glass fiber and carbon filter, filters to .2 m, claimed to last for 200 gallons. An iodine resin stage can be added that will kill viruses, and will last for 90 gallons. Pump is well designed, but it takes a few seconds to pull a captive pin to fold for storage. Available in white or OD.

Timberline Eagle (\$20/\$13, 8 oz) At 1 m, this filter only does protozoa, but is much easier to pump, lighter, and cheaper. Filter is attached to pump, and must rest (but doesn't have to be submerged) in water to be

purified. Looks flimsy, but seems to hold up. Claimed to last for 100 gallons.

It is also possible to build your own microfilter using diatomaceous earth, sold for swimming pool filters (DE). Usually pressure is required to achieve a reasonable flow rate. A DE filter will remove turbidity as well as pathogens larger than 1 μm .

NOTE FROM ALAN: This type of diatomaceous earth is NOT the type you want for food storage. Don't get them confused.

Slow Sand Filter

Slow sand filters pass water slowly through a bed of sand. Pathogens and turbidity are removed by natural die-off, biological action, and filtering. Typically the filter will consist of 24 inches of sand, then a gravel layer in which the drain pipe is embedded. The gravel doesn't touch the walls of the filter so that water can't run quickly down the wall of the filter and into the gravel. Building the walls with a rough surface also helps. A typical loading rate for the filter is 0.2 meters/hour day (the same as $.2 \text{ m}^3/\text{m}^2$ of surface area). The filter can be cleaned several times before the sand has to be replaced.

Slow sand filter construction information:

Slow sand filters should only be used for continuous water treatment. If a continuous supply of raw water can't be insured (say using a holding tank), then another method should be chosen. It is also important for the water to have as low turbidity (suspended solids) as possible. Turbidity can be reduced by changing the method of collection (for example, building an infiltration gallery, rather than taking water directly from a creek), allowing time for the material to settle out (using a raw water tank), prefiltering or flocculation (adding a chemical such as alum to cause the suspended material to floc together.)

The SSF filter itself is a large box, at least 1.5 meters high. The walls should be as rough as possible to reduce the tendency for water to run down the walls of the filter, bypassing the sand. The bottom layer of the filter is a gravel bed in which a slotted pipe is placed to drain off the filtered water. The slots or the gravel should be no closer than 20 cm to the walls. again to prevent the water from bypassing the sand.

The sand for a SSF needs to be clean and uniform, and of the correct size. The sand can be cleaned in clean running water, even if it is in a creek. The ideal specs on sand are effective size (sieve size through which 10% of the sand passes) between 0.15 and 0.35 mm, uniformity coefficient (ratio of sieve sizes through which 60% pass and through which 10% pass) of less than 3, Maximum size of 3 mm, and minimum size of 0.1 mm.

The sand is added to a SSF to a minimum depth of 0.6 meters. Additional thickness will allow more cleanings before the sand must be replaced. 0.3 to 0.5 meters of extra sand will allow the filter to work for 3-4 years.

An improved design uses a geotextile layer on top of the sand to reduce the frequency of cleaning. The outlet of a SSF must be above the sand level, and below the water level. The water must be maintained at a constant level to insure an even flow rate throughout the filter. The flow rate can be increased by lowering the outlet pipe, or increasing the water level. One common idea for maintaining the water level is to use an elevated raw water tank or pump, and a ball valve from a toilet.

While the SSF will begin to work at once, optimum treatment for pathogens will take a week or more. During this time the water should be chlorinated if at all possible (iodine can be substituted). After the filter has stabilized, the water should be safe to drink, but chlorinating of the output is still a good idea, particularly to prevent recontamination.

As the flow rate slows down the filter will have to be cleaned by draining and removing the top few inches of sand. If a geotextile filter is used, only the top " may have to be removed. As the filter is refilled, it will take a few days for the biological processes to reestablish themselves.

Activated Charcoal Filter

Activated charcoal filters water through adsorption, chemicals and some heavy metals are attracted to the surface of the charcoal, and are attached to it. Charcoal filters will filter some pathogens though they will quickly use up the filter adsorptive ability, and can even contribute to contamination as the charcoal provides an excellent breeding ground for bacteria and algae. Some charcoal filters are available impregnated with silver to prevent this, though current research concludes that the bacteria growing on the filter are harmless, even if the water wasn't disinfected before contacting the filter. The only filter I know of that uses only activated charcoal, and doesn't require pressurized water is the Water Washer (\$59). Available from the Survival Center.

Activated charcoal can be used in conjunction with chemical treatment. The chemical (iodine or chlorine) will kill the pathogens, while the carbon filter will remove the treatment chemicals. In this case, as the filter reaches its capacity, a distinctive chlorine or iodine taste will be noted.

Activated charcoal can be made at home, though the product will be of varying quality compared to commercial products. Either purchased or homemade charcoal can be recycled by burning off the molecules adsorbed by the carbon (This won't work with heavy metals of course.)

The more activated charcoal in a filter, the longer it will last. The bed of carbon must be deep enough for adequate contact with the water. Production designs use granulated activated charcoal (effective size or 0.6 to 0.9 mm for maximum flow rate. Home or field models can also use a compressed carbon block or powdered activated charcoal (effective size

0.01) to increase contact area. Powered charcoal can also be mixed with water and filtered out later. As far as life of the filter is concerned, carbon block filters will last the longest for a given size, simply due to their greater mass of carbon. A source of pressure is usually needed with carbon block filters to achieve a reasonable flow rate.

Sol-Air Water Treatment

If sufficient dissolved oxygen is available, sunlight will cause the temporary formation of reactive forms of oxygen such as hydrogen peroxide and oxygen free radicals. This form of water treatment is called solar photooxidative disinfection or sol-air water treatment. Sol-Air water treatment has been shown to dramatically reduce the level of fecal coliform bacteria. There is some evidence that other bacteria and viruses may be affected also. While not as reliable as other methods, it does offer a low-tech solution in emergencies. Sol-Air treatment requires bright sunlight, and has been shown to be effective when ever the sun causes a distinct shadow to be cast. Exposure to 4.5 hours of bright sunlight has been shown to cause a thousand fold reduction in fecal coliforms in lab tests

In order for Sol-Air to be effective, oxygen must be present. Experiments have shown that shaking a bottle filled 3/4 with air will restore oxygen levels to near saturation. As the treatment continues, some of the oxygen will come out of solution, while other oxygen will be consumed by the killed pathogens, so the shaking should be repeated every few hours. Data shows that maximum activity occurs when the water temperature is above 50 °C (122 °F), so this method may be unsuitable in colder climates unless special solar collectors are used.

Either glass or plastic bottles may be used. Plastic bottles will allow short wave ultraviolet radiation to pass, increasing the rate of microbial inactivation, but may yellow with age, reducing light transmission, and may leach plasticizers into the water at the elevated temperatures that will occur. The leaching of plasticizers can be reduced by using bottles of PET (polyethylene terephthalate) rather than PVC. Glass bottles on the other hand are more durable. Research has used bottles with 2 liters of capacity, but if the water is free of turbidity, larger containers can be used. Plastic bags, or some sort of flat glass container represent the ideal container as this maximizes the solar energy received per ounce of water.

Bottles should be filled 3/4 full in the early morning with water as free of turbidity as possible. After capping the bottles should be shaken vigorously for a few minutes then placed upright in the sun, where they will be not be shaded later in the day. The shaking should be repeated at least three times during the day. At the end of the day the water should be reasonably freed of bacteria, though it is most practical to let the water cool for consumption the following day. Each day a new batch should be treated due to the lack of a residual disinfected.

After consumption of the water the bottle should be air dried to prevent

algae growth with continual use.

Improvised Mechanical Filter

If the materials aren't available to build a slow sand filter, or some other means of water treatment is preferred, it may still be advantageous to mechanically filter the water before treating it with chemicals or passing through a microfilter. Generally the idea is to allow the water to flow as slowly as possible through a bed of sand. In a municipal water treatment plant this is called a rapid sand filter. The particular design below is included, because the designer, a research engineer at Oak Ridge National Laboratories, found it particularly effective at removing fallout from water. The filter will do little or nothing to remove pathogens, though removing suspended solids allow others water treatment methods to work more effectively.

Expedient water filter, from Nuclear War Survival Skills, Cresson Kearny, ORNL

- 1) Perforate the bottom of a 5 gallon bucket, or similar container with a dozen nail holes even spread over a 4" diameter circle in the center of the container.
- 2) Place a 1.5" layer of small stones or pebbles in the bottom of the can. If pebbles aren't available, marbles, clean bottle caps, twisted coat hangers or clean twigs can be used.
- 3) Cover the pebbles with one thickness of terrycloth towel, burlap sackcloth, or other porous cloth. Curl the cloth in a roughly circular shape about three inches larger than the diameter of the can.
- 4) Take soil containing some clay (pure clay isn't porous enough, pure sand is too porous) from at least 4" below the surface of the ground (nearly all fallout particles remain near the surface except after disposition on sand or gravel.)
- 5) Pulverize the soil, then gently press it in layers over the cloth that covers the pebbles, so that the cloth is held snugly against the walls of the can. The soil should be 6-7" thick.
- 6) Completely cover the surface of the soil layer with one thickness of fabric as porous as a bath towel. This is to keep the soil from being eroded as water is being poured into the filter. A dozen small stones placed on the cloth near its edges will secure it adequately.
- 7) Support the filter on rocks or sticks placed across the top of a container that is larger than the filter can (such as a dishpan)

The contaminated water should be poured into the filter can, preferably after allowing it to settle as described below. The filtered water should be disinfected by some method.

If the 6 or 7 inches of filtering soil is a sandy clay loam, the filter will initially deliver about 6 quarts/hour. If the filter is any faster than this then the fabric layer needs to be removed and the soil compressed more. The filtering rate will drop over time as the filter begins to clog up. When this happens the top 1/2" of soil can be removed to increase the filtering rate. After 50 or so quarts, the filter will need to be rebuilt with fresh soil.

As with any filter, optimum performance will be achieved if sediment in the water will be allowed to settle out before passing the water through the filter

If the water is contaminated with fallout, clay can be added to help the fallout particles to settle out. The procedure is as follows:

Fill a bucket or other deep container 3/4 full with contaminated water. Dig pulverized clay or clayey soil from a depth of four or more inches below ground surface and stir it into the water. Use about 1 inch of dry clay or clayey soil for every 4" depth of water. Stir until practically all of the clay particles are suspended in the water. Let the clay settle for at least 6 hours. This will carry the fallout particles to the bottom and cover them. Carefully dip out or siphon the clear water and disinfect it.

Chemical Treatment

Chlorine: Chlorine is familiar to most Americans as it is used to treat virtually all municipal water systems in the United States. For a long time chlorine, in the form of Halazone tablets, was used to purify small batches of water for campers and military troops. Later questions emerged about the effectiveness of Halazone, and in 1989, Abbot labs pulled it off the market. If Halazone tablets are encountered outside the US, the nominal shelf life is 6 months, and the dosage is 2 tabs per liter. Until recently, there was no chlorine product designed for wilderness/survival use available in the US.

Chlorine has a number of problems when used for field treatment of water. When chlorine reacts with organic material, it attaches itself to nitrogen containing compounds (ammonium ions and amino acids), leaving less free chlorine to continue disinfection. Carcinogenic trihalomethanes are also produced, though this is only a problem with long-term exposure. Trihalomethanes can also be filtered out with a charcoal filter, though it is more efficient to use the same filter to remove organics before the water is chlorinated. Unless free chlorine is measured, disinfection can not be guaranteed with moderate doses of chlorine. One solution is superchlorination, the addition of far more chlorine than is needed. This must again be filtered through activated charcoal to remove the large amounts of chlorine, or hydrogen peroxide can be added to drive the chlorine off. Either way there is no residual chlorine left to prevent recontamination. This isn't a problem if the water is to be used at once.

Chlorine is sensitive to both the pH and temperature of the treated

water. Temperature slows the reaction for any chemical treatment, but chlorine treatment is particularly susceptible to variations in the pH as at lower pHs, hypochlorous acid is formed, while at higher pHs, it will tend to dissociate into hydrogen and chlorite ions, which are less effective as a disinfectant. As a result, chlorine effectiveness drops off when the pH is greater than 8

Chlorine, like iodine, will not kill Cryptosporidia.

Methods of chlorine treatment:

Bleach:

Ordinary household bleach (such as Clorox) in the US contains 5.25% sodium hypochlorite (NaOCL) and can be used to purify water if it contains no other active ingredients, scents, or colorings. Bleach is far from an ideal source due to its bulkiness (only 5% active ingredient), and the instability over time of the chlorine content in bleach. Chlorine loss is farther increased by agitation or exposure to air. One source claims chlorine loss from a 5% solution at 10% over 6 months if stored at 70 F. Nevertheless, this may be the only chemical means available to purify water, and it is far better than nothing. Normal dosage is 8 drops (0.4 ml) per gallon. Allow the treated water to sit for 30 min., and if there isn't a slight chlorine smell, retreat. Note: USP standard medicine droppers are designed to dispense 0.045-0.055 ml per drop. Use of other solvents or some chemicals can change this. The dropper can be calibrated against a graduated cylinder for greater accuracy.

Some small treatment plants in Africa produce their own sodium hypochlorite on site from the electrolysis of brine. Power demands range from 1.7 to 4 kWh per lb. of NaOCL. 2 to 3.5 lbs. of salt are needed for each pound of NaOCL. These units are fairly simple and are made in both the US and the UK. Another system, designed for China, where the suitable raw materials were mined or manufactured locally, used a reaction between salt, manganese dioxide, and sulfuric acid to produce chlorine gas. The gas was then allowed to react with slaked lime to produce a bleaching powder that could then be used to treat water. A heat source is required to speed the reaction up.

AquaCure:

Designed for the South African military, these tablets contain chlorine and alum. The alum causes the suspended solids to flocculate and the chlorine adds 8 PPM chlorine. This is a great way to treat turbid water, though it will leave a lot of chlorine in clear water (The one tablet/liter could be halved for clear water.)

The US distributor for Aqua Cure is:

Safesport Manufacturing
Box 11811
Denver, CO 80211
1 800 433 6506

Bleaching Powder

(Chlorinated Lime): Can also be purchased and used as a purification means if nothing else is available. Bleaching powder is 33-37% chlorine when produced, but loses its chlorine rapidly, particularly when exposed to air, light or moisture.

Calcium Hypochlorite:

Also known as High Test Hypochlorite (HTH). Supplied in crystal form, it is nearly 70% available chlorine. One product, the Sanitizer (formally the Sierra Water Purifier) uses these crystals to superchlorinate the water to insure pathogens were killed off, then hydrogen peroxide is added to drive off the residual chlorine. This is the most effective method of field chlorine treatment. The US military and most aid agencies also use HTH to treat their water, though a test kit, rather than superchlorination, is used to insure enough chlorine is added. This is preferable for large-scale systems as the residual chlorine will prevent recontamination

Usually bulk water treatment plants first dilute to HTH to make a 1% working solution at the rate of 14g HTH per liter of water. While testing to determine exact chlorine needs are preferable, the solution can be used at the dose rate of 8 drops/gallon, or for larger quantities, 1 part of 1% solution to 10,000 parts clear water. Either of these doses will result in 1 PPM chlorine and may need to be increased if the water wasn't already filtered by other means.

When test kits are available, the WHO standard is a residual chlorine level of 0.2 to 0.5 mg/l after a 30 min. contact time. They may require as much as 5 mg/l of chlorine to be added to the raw water.

Iodine:

Iodine's use as a water purification method emerged after WW2, when the US military was looking for a replacement for Halazone tablets. Iodine was found to be in many ways superior to chlorine for use in treating small batches of water. Iodine is less sensitive to the pH and organic content of water, and is effective in lower doses. Some individuals are allergic to iodine, and there is some question about long term use of iodine. The safety of long-term exposure to low levels of iodine was proven when inmates of three Florida prisons were given water disinfected with 0.5 to 1.0 PPM iodine for 15 years. No effects on the health or thyroid function of previously healthy inmates was observed. Of 101 infants born to prisoners drinking the water for 122- 270 days, none showed detectable thyroid enlargement. However 4 individuals with preexisting cases of hyperthyroidism became more symptomatic while consuming the water.

Nevertheless experts are reluctant to recommend iodine for long term use. Average American iodine intake is estimated at 0.24 to 0.74 mg/day, higher than the RDA of 0.4 mg/day. Due to a recent National Academy of Science recommendation that iodine consumption be reduced to the RDA, the

EPA discourages the use of iodized salt in areas where iodine is used to treat drinking water.

Iodine is normally used in doses of 8 PPM to treat clear water for a 10 minute contact time. The effectiveness of this dose has been shown in numerous studies. Cloudy water needs twice as much iodine or twice as much contact time. In cold water (Below 41 °F or 5 °C) the dose or time must also be doubled. In any case doubling the treatment time will allow the use of half as much iodine

These doses are calculated to remove all pathogens (other than cryptosporida) from the water. Of these, giardia cysts are the hardest to kill, and are what requires the high level of iodine. If the cysts are filtered out with a microfilter (any model will do since the cysts are 6 µm), only 0.5 PPM is needed to treat the resulting water .

Water treated with iodine can have any objectionable taste removed by treating the water with vitamin C (ascorbic acid), but it must be added after the water has stood for the correct treatment time. Flavored beverages containing vitamin C will accomplish the same thing. Sodium thiosulfate can also be used to combine with free iodine, and either of these chemicals will also help remove the taste of chlorine as well. Usually elemental iodine can't be tasted below 1 PPM, and below 2 PPM the taste isn't objectionable. Iodine ions have an even higher taste threshold of 5 PPM. Note that removing the iodine taste does not reduce the dose of iodine ingested by the body

Sources of Iodine:

Tincture of Iodine: USP tincture of iodine contains 2% iodine and 2.4% sodium iodide dissolved in 50% ethyl alcohol. For water purification use, the sodium iodide has no purification effect, but contributes to the total iodine dose. Thus it is not a preferred source of iodine, but can be used if other sources are not available. 0.4 cc's (or 8 drops) of USP tincture (2% iodine) added to a liter of water will give the 8 mg/l (same as 8 PPM). If the iodine tincture isn't compounded to USP specs, then you will have to calculate an equal dose based on the iodine concentration.

Lugol's solution:

Contains 5% iodine and 10% potassium iodide. 0.15 cc (3 drops) can be added per liter of water, but 3 times more iodine is consumed compared to sources without iodide.

Betadyne (povidone iodine) Some have recommended 8 drops of 10% povidone iodine per liter of water as a water treatment method, claiming that at low concentrations povidone iodine can be regarded as a solution of iodine. One study indicated that at 1:10,000 dilution (2 drops/liter), there was 2 PPM iodine, while another study resulted in conflicting results. However, at 8 drops/liter, there is little doubt that there is an antimicrobial effect. The manufacturer hasn't spent the money on testing this product against EPA standard tests, but in other countries it has been sold for use in field water treatment.

Kahn-Vassher solution. By adding a sufficient amount of iodine crystals to a small bottle, an almost unlimited supply of saturated iodine solution can be produced. As long as crystals remain in the bottle, the solution is saturated. Concentration of the iodine is dependent of temperature, either condition at ambient temperature can be assumed, or commercial models such as Polar Pure incorporate a liquid crystal thermometer to determine dose

One criticism of this method is the chance of decanting iodine crystals into the water being treated. This isn't that much of a problem as iodine is very weakly toxic, but the Polar Pure incorporates a collar into the neck of the bottle to help prevent this. Another disadvantage to this method is that the saturated iodine solution must be kept in glass bottles, and is subject to freezing, but this is hardly an insurmountable problem. Freezing, of course, doesn't affect the crystals.

This is the method I use, but I do use the commercial Polar Pure bottle, and refill it as necessary with USP crystals. During a crisis, or extended camping trips I would microfilter the water first, so a much lower dose of iodine is needed.

With the Polar Pure bottle, dosage information is provided. Otherwise a 1 oz bottle can be used to carry the solution. The bottle is filled with water after use. At the next use, 1/2 of the supernate (15 cc) is poured off into a liter of water. At 68 F, this will yield a dose of 9 mg/l. To use this method with a microfilter to get a 0.5 PPM concentration, either large batches of water need to be treated (1/2 oz to 4.5 gallons would be 0.5 PPM), or a TB syringe or medicine dropper can be used to measure doses. A USP medicine dropper should give 20 drops per ml.

Iodine can also be dissolved in alcohol to make a solution of known concentration. I am not aware of any commercial products, but a pharmacy could compound one for you, or you could do it your self. One suggested formula is 8g iodine/100 cc ethyl alcohol which yields enough solution to disinfect 250 gallons of water. At the rate of 0.1 cc (2 drops)/liter to give a concentration of 8 mg/l

Tetraglycine hydroperiodide (e.g. Potable Aqua) This is the form of iodine used by the US military for field treatment of water in canteen sized batches. Usual dose in one tablet per quart of water to give a concentration of 8 mg/l. Two tablets are used in cloudy or cold water or contact time is doubled. The major downside of this product is that the product will loose its iodine rapidly when exposed to the air. According to the manufacturer, they have a near indefinite life when sealed in the original bottle, but probably should be discarded within a few months of opening. The tablets will change color from gun metal gray to brown as they lose the iodine, and you should see a brown tint to the water after treating.

Iodine Resin Filter:

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Some commercial microfilters incorporate an iodine resin stage to kill viruses and bacteria, without putting as much iodine in the water as if it had been added to the raw water. A few products rely exclusively on an iodine resin stage. Downside of these filters are their fragile nature, dependency of effectiveness on flow rate and the inability to identify when they need to be discarded. If you are going to use one where the water is known to be contaminated with viruses, then one of the better known brands such as the PUR or Sweetwater Viraguard is recommended. More than one pass through the filter may be necessary in cold weather.

Resins do have the advantage of producing less iodine in the water for the same antimicrobial effect as for the most part, they only release iodine when contacted by a microbe. The downside is that physical contact between the microbe and the resin is needed.

Silver:

Silver has been suggested by some for water treatment and may still be available outside the US. Its use is currently out of favor due to the EPA's establishment of a 50 ppb MCL (Maximum Contaminant Level) limit on silver in drinking water. This limit is set to avoid argyrosis, a cosmetic blue/gray staining of the skin, eyes, and mucous membranes. As the disease requires a net accumulation of 1 g of silver in the body, one expert calculated that you could drink water treated at 50 ppb for 27 years before accumulating 1 g. Silver has only been proven to be effective against bacteria and protozoan cysts, though it is quite likely also effective against viruses.

Silver can be used in the form of a silver salt, commonly silver nitrate, a colloidal suspension, or a bed of metallic silver. Electrolysis can also be used to add metallic silver to a solution.

Some evidence has suggested that silver deposited on carbon block filters can kill pathogens without adding as much silver to the water.

Katadyn markets a silver based water treatment product called Micropur. The manufacturer recommends a 2 hr contact time at a dose of 1 tab per liter and states the product is "For the disinfection and storage of clear water. Reliably kills bacterial agents of enteric diseases, but not worm eggs, ameba, or viruses. Neutral to taste...insure protection against reinfection for 1-6 months."; The following forms are available:

Micropur Tablets MT1 1 tablets/qt 25 gal
MT2 1 tablet/5qts 62.5 gal

Micropur Fluid MF 75 10 drops/gal 75 gals
MF250 " " 250 gals

Micropur Crystal MC250 1 packet/gal 250 gal
MC 2500 1 spoon/25 gal 2500 gal
MC12500 1 spoon/250 gal 12500 gal

Potassium Permanganate:

Potassium Permanganate is no longer commonly used in the developed world to kill pathogens. It is much weaker than the alternatives, more expensive, and leaves a objectionable pink or brown color. If it must be used, 1 gram per liter would probably be sufficient against bacteria and viruses (no data is available on its effectiveness against protozoan cysts).

Hydrogen Peroxide:

Hydrogen Peroxide can be used to purify water if nothing else is available. Studies have shown of 99 percent inactivation of poliovirus in 6 hr with 0.3 percent hydrogen peroxide and a 99% inactivation of rhinovirus with a 1.5% solution in 24 minutes. Hydrogen Peroxide is more effective against bacteria, though Fe^{+2} or Cu^{+2} needs to be present as a catalyst to get a reasonable concentration-time product.

Coagulation/Flocculation agents:

While flocculation doesn't kill pathogens, it will reduce their levels along with removing particles that could shield the pathogens from chemical or thermal destruction, and organic matter that could tie up chlorine added for purification. 60-98% of coliform bacteria, 65-99% of viruses, and 60-90% of giardia will be removed from the water, along with organic matter and heavy metals.

Some of the advantages of coagulation/flocculation can be obtained by allowing the particles to settle out of the water with time (sedimentation), but it will take a while for them to do so. Adding coagulation chemicals such as alum will increase the rate at which the suspended particles settle out by combining many smaller particles into larger floc which will settle out faster. The usual dose for alum is 10-30 mg/liter of water. This dose must be rapidly mixed with the water, then the water must be agitated for 5 minutes to encourage the particles to form flocs. After this at least 30 minutes of settling time is needed for the flocs to fall to the bottom, and then the clear water above the flocs may be poured off. Most of the flocculation agent is removed with the floc, nevertheless some question the safety of using alum due to the toxicity of the aluminum in it. There is little to no scientific evidence to back this up. Virtually all municipal plants in the US dose the water with alum.

In bulk water treatment, the alum dose can be varied until the idea dose is found. The needed dose varies with the pH of the water and the size of the particles. Increase turbidity makes the flocs easier to produce not harder, due to the increased number of collisions between particles.

Treatments requiring electricity:

Ozone:

Ozone is used extensively in Europe to purify water. Ozone, a molecule composed of 3 atoms of oxygen rather than two, is formed by exposing air or oxygen to a high voltage electric arc. Ozone is much more effective as

a disinfectant than chlorine, but no residual levels of disinfectant exist after ozone turns back into O₂. (one source quotes a half life of only 120 minutes in distilled water at 20 °C). Ozone is expected to see increased use in the US as a way to avoid the production of trihalomethanes. While ozone does break down organic molecules, sometimes this can be a disadvantage as ozone treatment can produce higher levels of smaller molecules that provide an energy source for microorganisms. If no residual disinfectant is present (as would happen if ozone were used as the only treatment method), these microorganisms will cause the water quality to deteriorate in storage.

Ozone also changes the surface charges of dissolved organics and colloiddially suspended particles. This causes microflocculation of the dissolved organics and coagulation of the colloidal particles

UV light

Ultraviolet light has been known to kill pathogens for a long time. A low pressure mercury bulb emits between 30 to 90 % of its energy at a wave length of 253.7 nm, right in the middle of the UV band. If water is exposed to enough light, pathogens will be killed. The problem is that some pathogens are hundreds of times less sensitive to UV light than others. The least sensitive pathogens to UV are protozoan cysts. Several studies show that Giardia will not be destroyed by many commercial UV treatment units. Fortunately these are the easiest pathogens to filter out with a mechanical filter

The efficacy of UV treatment is very dependent on the turbidity of the water. The more opaque the water is, the less light that will be transmitted through it. The treatment units must be run at the designed flow rate to insure sufficient exposure, as well as insure turbulent flow rather than plug flow.

Another problem with UV treatment is that the damage done to the pathogens with UV light can be reversed if the water is exposed to visible light (specifically 330-500 nm) through a process known as photoreactivation.

UV treatment, like ozone or mechanical filtering leaves no residual component in the water to insure its continued disinfection. Any purchased UV filter should be checked to insure it at least complies with the 1966 HEW standard of 16 mW.s/cm² with a maximum water depth of 7.5 cm. ANSI/NSF require 38 mWs/cm² for primary water treatment systems. This level was chosen to give better than 3 log (99.9%) inactivation of Bacillus subtilis. This level is of little use against Giardia, and of no use against Crypto.

The US EPA explored UV light for small scale water treatment plants and found it compared unfavorably with chlorine due to 1) higher costs, 2) lower reliability, and 3) lack of a residual disinfectant.

Questionable or Dangerous methods of water treatment

1) Aerobic 07: Also sold as Aerobic Oxygen. The company refuses to release the disinfectant. It maybe chlorine dioxide, a well known, if somewhat unstable, disinfectant. The company has shown company sponsored tests showing effectiveness against viruses and bacteria (but not against Giardia). No independent testing has been performed, nor has anybody provided concentration-time data for the product.

2) Survival Straw: This product claims to destroy and eliminate impurities including bacteria, protozoa, fungi, chemicals and heavy metals using a matrix of metal alloy. The manufacturer claims the product's media meets EPA and FDA specs, which is no indication of the filter's effectiveness. The filter violates a number of laws of physics since it claims that it destroys heavy metals and pathogens without filtering them.

DISCLAIMER: Safe and effective water treatment requires attention to detail and proper equipment and ingredients. The author makes no warranties and assumes no responsibility for errors or omissions in the text, or damages resulting from the use or misuse of information contained herein

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LEGUME VARIETIES

Unless you are willing to spend a great deal of money on preserved meats or dairy products, a food storage program not including a large quantity of legumes is simply incomplete. There are few non-animal foods that contain the amount of protein to be found in dried beans, peas, and lentils. The varieties commonly available in this country have protein contents ranging from 20%-35%. As with most non-animal proteins, they are not complete in themselves for purposes of human nutrition, but become so when they are combined with the incomplete proteins found in grains. It

is for this reason that grains and legumes are so often mentioned together. In cultures all over the world, it is common to find the two served together at a meal, making a complete protein, even when those doing the serving have no scientific understanding of nutrition at all.

The legume family, of which all beans, peas, lentils, and peanuts are a part, is one of the largest in the plant kingdom. Because of this and the many thousands of years of development and cultivation that man has given them on several continents, the variety of edible legumes available to us is huge. Both the appearance and the names of these varieties are colorful and varied. They range from "adzuki beans", a type of soybean from the Orient, to "zipper peas", a commonly found field-pea here in the Southern U.S. Their color can range from a clean white, to deep red, dull green to flat black with thousands of mixtures and patterns of colors.

In spite of this incredible variety of names and colors, legumes are largely interchangeable in cooking usage, although some dishes just wouldn't be the same if a different type were used. Below is a partial list of some of the more commonly eaten bean varieties here in the U.S.

BLACK BEAN: Also known as "turtle beans", these small, dark brownish-black, oval-shaped beans are well known in Cuban black bean soup. They are very commonly used in Central and South America and in China. They tend to bleed very darkly when cooked so they are not well suited to being combined with other beans, lest they give the entire pot a muddy appearance.

BLACK-EYED PEA: Although there is tremendous variation among the many varieties of field-peas eaten throughout the Southern United States, it is black-eyed peas that are the most commonly known nationwide. The coloring of field-peas is as varied as the rest of the legume family, with black-eyed peas being small, oval shaped with an overall creamy color and, of course, their distinctive black-eye. Dried field-peas cook very quickly and combine very tastily with either rice or cornbread.

CHICKPEA: Also known as the "garbanzo bean" or "cecci pea" (or bean), it tends to be a creamy or tan color, rather lumpily roundish and larger than dried garden peas. Many have eaten chickpeas, even if they've never seen a whole one. They are the prime ingredient in hummus and falafel and are one of the oldest cultivated legume species known, going back as far as 5400 B.C. in the Near East. Chickpeas tend to remain firmer when cooked than other legumes and can add a pleasant texture to many foods.

FAVA BEANS: Not as well known in the U.S. as in Europe and the Mediterranean regions they are also known as "broad" or "horse beans." Favas are broad, flat and reddish brown in color. This is one of the oldest legumes species in European culture, but it does require more effort to use it. The hull of the bean is tough and not conducive to being tenderized by cooking so it is often peeled. The skinless bean tends to fall apart so it is most often made into a puree. A small number of people with Mediterranean ancestry have a genetic sensitivity to the

undercooked beans and plant pollens, a condition known as "favism."

KIDNEY BEANS: Just like the rest of the family, kidney beans can be found in wide variety. They can be white, mottled or a light and dark red color in their distinctive kidney shape. Probably best known here in the U.S. for their use in chili, they figure prominently in Mexican, Brazilian and Chinese cuisine.

LENTILS: Lentils are an odd lot. They don't fit in with either the beans or the peas and occupy a place by themselves. Their shape is different from the other legumes being roundish little discs with colors ranging from muddy brown, to green to a rather bright orangish-red. They cook very quickly compared to the larger beans and have a distinctive flavor. They are much used in Far Eastern cuisine from Indian to Chinese.

LIMA BEANS: In the Southern U.S., they are also commonly called "butter beans". They are one of the most common legumes found in this country in all manner of preservation from the young small beans to the large fully mature type. Their flavor is pleasant, but a little bland. Their shape is rather flat and broad with colors ranging from pale green to speckled cream and purple.

MUNG BEANS: Best known here in the States in their sprouted form. They are quite common in Indian and other Asian cuisines and are a close relative of the field peas grown throughout the Southern United States. Their shape is generally round, fairly small with color ranging from a medium green to so dark as to be nearly black. They cook quickly and soaking is not generally needed.

PEANUTS: The peanut, commonly known outside the U.S. as the "groundnut", is not actually a nut at all, but a legume. They are another odd species not much like the more familiar beans and peas. Whatever their classification peanuts are certainly not unfamiliar to U.S. eaters. Peanuts have a high protein percentage and even more fat. They are one of the two legume species commonly grown for oilseed in this country, and are also used for peanut butter, and boiled or roasted peanuts. Many Central and South American, African and Chinese dishes incorporate peanuts so they are useful for much more than just a snack food or cooking oil.

PEAS, GREEN OR YELLOW: More often found as green split peas though whole peas can sometimes be found. The yellow variety is now somewhat uncommon. Probably best well known in split pea soup, particularly with a smoky chunk of ham added. They are also commonly used in Indian cuisine, particularly dals. Whole peas need soaking, but split peas can be cooked without soaking. Split peas and pea meal makes an excellent thickener for soups and stews. Because splitting damages the pea, the more processed variety does not keep for as long as whole peas.

PINTO BEANS: Anyone who has eaten Tex-Mex food has probably had the pinto bean. It is one of the most commonly eaten beans in the U.S.,

particularly in the Southwestern portion of the country. Stereotypically bean shaped, it has a dappled pattern of tans and browns on its shell. Pintos have a flavor that blends well with many foods. When ground together with white or navy beans they make my favorite home-made version of falafel.

SOYBEANS: An entire university could be founded on the culinary and industrial uses of the soybean. It is by far the legume with the highest protein content in commercial production as well as being the other legume oilseed alongside the peanut. The beans themselves are small, and round with a multitude of different shades. Because of their high oil content, they are more sensitive to oxygen exposure than other legumes and precautions should be taken accordingly if they are to be kept for more than a year in storage. Although the U.S. grows a very large percentage of the global supply, we consume virtually none of them directly. Most of them go into cattle feed, are used by industry or exported. What does get eaten directly has usually been processed in some fashion. Soybean products range from tofu, to tempeh, to textured vegetable protein (TVP) and hundreds of other uses. They don't lend themselves well to just being boiled until done and eaten the way other beans and peas do. For this reason, if you plan on keeping some as a part of your storage program (and you should) you would be well served to begin to learn how to process and prepare them now when you're not under pressure to produce. That way you can throw out your mistakes and order pizza, rather than having to choke them down, regardless.

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SHELF LIVES: TIME, TEMPERATURE, MOISTURE, OXYGEN AND LIGHT

Is your food insurance up to date?

Since the entire idea of a food storage program is that it should be available for you and yours in times of need, it is important to understand the conditions that can affect the edibles stored in your pantry.

A storage program is only as good as the quality of the food that goes into it. It cannot get any better than what originally went in, but it can certainly get worse. In the fullness of time, all stored foods will degrade in nutrients and palatability until they reach the inevitable end where even the dog won't eat them. It's because of this eventuality that every article, book, and teacher concerned with putting food by gives the same advice:

Date all food containers and rotate, Rotate,

ROTATE.

Untitled Document

The first food in should be the first food out. This concept is often shortened to the acronym FIFO.

The reason for this emphasis on stock rotation is that when discussing the usefulness of foodstuffs there are really two shelf lives to be considered - the nutritional life and the palatability life. Nutritional content actually begins to fade at the moment of harvest with three major factors influencing nutrient retention: The food's initial nutrient content; the processing and preservation steps the food underwent; and the storage conditions in which it's kept. Given sufficient time, all but the most durable nutrients will dwindle away to nothing. Unfortunately, there is no good way outside of laboratory testing to know how much nutrition is left in a given food, but we can make our own determinations about other criteria which leads us to the palatability life mentioned also mentioned above.

A food's palatability life is the point at which undesirable changes occur to foods taste, texture, color and cooking qualities. This is the reason for the "use by" and "sell by" dates on many foods and for shelf lives in general. It will almost always be in excess of good nutritive life. If you don't have anything to replace old food with, it's not necessary to throw the food out just because it's reached the end of its best palatable storage life. Do, however, keep in mind that advancing age will only further decrease the useful nutrition, increase the foods' unattractiveness to being eaten and enlarge the chances that something may cause the food to spoil.

Within reason, the key to prolonging the shelf life of your edibles lies in lowering the temperature of the area they are stored in. The storage lives of most foods are cut in half by every increase of 18 °F (10 Celsius). For example, if you've stored your food in a garage that has a temperature of 90 °F, you should expect a shelf life less than half of what could be obtained at room temperature (70 °F) this in turn is less than half the storage life that you could get if you kept them in your refrigerator at 40 °F. Your storage area should be located where the temperature can be kept above freezing (32 °F) and, if possible, below 72 °F.

Ideally, your storage location should have a humidity level of 15% or less, but unless you live in the desert it's not terribly likely you'll be able to achieve this. Regardless, moisture is not good for your dry stored edibles so you want to minimize it as much as possible. This can be done by several methods. The first is to keep the area air-conditioned and/or dehumidified during the humid times of the year. The second is to use packaging impervious to moisture and then to deal with the moisture trapped inside. If you are able, there's no reason not to use both.

All containers should be kept off the floor and out of direct contact from exterior walls to reduce the chances of condensation brought on by temperature differences between the container and the surface it's resting against.

Another major threat to your food is oxygen. Chances are that if your foods are sealed in moisture-proof containers the containers are probably air-tight as well. This means that the oxygen can also be kept from doing its damage. If no more can get in, your only concern is the O₂ that was trapped inside the container when it was sealed. Lowering the percentage of O₂ to 2% or less of the atmosphere trapped inside the packaging (called head gas) can greatly contribute to extending its contents shelf life. The three main tactics for achieving this are vacuum sealing, flushing with inert gas or chemically absorbing the oxygen. Any one or a combination of the three can be used to good effect.

Once you have temperature, humidity and oxygen under control, it is then necessary to look at light. Light is a form of energy and when it shines on your stored foods long enough it transfers some of that energy to your food. This has the effect of degrading nutritional content and appearance. Fat soluble vitamins, such as A, D, E, and K are particularly sensitive to light degradation. It certainly is a pretty sight to look at rows and rows of jars full of delicious food, particularly if you were the one that put the food in those jars. However, if you want to keep them at their best, you'll admire them only when you turn the light on in the pantry to retrieve one. If you don't have a room that can be dedicated to this purpose then store the jars in the cardboard box they came in. This will protect them not only from light, but help to cushion them from shocks which might break a jar or cause it to lose its seal. For those of you in earthquake country, it's a particularly good idea. When "terra" is no longer "firma" your jars just might dance right off onto the floor.

Assuming they were properly processed in the first place, canned, dried and frozen (never thawed) foods do not become unsafe when stored longer than the recommended time, but their nutrient quality fades and their flavor, color and texture goes downhill. Following these rules of good storage will keep your food wholesome and nutritious for as long as possible:

#1 - First In, First Out (FIFO) means rotating your storage

#2 - Cooler is better

#3 - Drier is better

#4 - Less oxygen exposure means more shelf life.

#5 - Don't shed light on your food.

Think of rotating your food storage as paying your food insurance premiums -- slacking off on rotation cuts back on your coverage. Is your food insurance up to date?

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A Short Lesson On Oxygen Absorbers

waltonfeed.com/self/upack/oxyintro.html

Oxygen absorbers come in a plastic bag. Each absorber packet has a special barrier to prevent it's contents from making contact with your food.

Within the last ten years the advent of oxygen absorbers has brought a revolution to the food storage industry. Their use has increased the storage life of foods and has made the job of putting away food for long term storage much simpler. There are two types of oxygen absorbers used for the storage of Food, "B" absorbers and "D" absorbers. The "B" absorbers require moisture from the food they are packed with to perform their action. A good example would be beef jerky or dehydrated fruit that hasn't been dried until it is brittle. The "D" absorbers contain their own moisture and are better suited for dry pack canning because there isn't enough moisture in correctly dried food to activate the "D" absorbers. The "B" absorbers will last a year after they are manufactured but the "D" absorbers only last 6 months. This is important for you to know so you won't buy a bunch of absorbers, pack them away for two years, and expect them to do their thing when you finally open them. The "B" absorbers also work much slower as they must first absorb moisture from the food they are packed in before they will absorb any oxygen. You can generally leave them out for 2 hours before they reach their advertised minimum absorbing capacity. Because the "D" absorbers have their own moisture built into them, they start absorbing oxygen immediately when opened and reach their advertised minimum much quicker, generally within 20 minutes.

Oxygen absorbers perform their action through a chemical reaction. They contain iron powder which reacts with the oxygen in the air causing the iron powder to rust. When all the iron powder has oxidized, the oxygen absorbers are "loaded" and the absorbing action stops. Remove the oxygen from an active absorber and the chemical reaction stops. Put them back in the air and the reaction starts again until the iron is gone.

Each bag of oxygen absorbers contains a light pink capsule. This capsule turns to a light blue color when the bag is opened. It's there to tell you if an unopened bag has been compromised. It doesn't automatically mean that all the oxygen absorbers inside are bad as it will change color soon after the bag is opened.

Number of oxygen absorbers needed: We sell 500cc absorbers. They will absorb 500+ cc of oxygen. A #10 can holds 13 cups or very roughly 3300cc. Air is 21% oxygen. So that empty 3300cc #10 can actually has about 683cc of oxygen in it. If you take a full cup of beans it takes about 0.375 cups of water to bring the water level up to the top of the cup. I've found this to be true with most of the whole seeds I've measured including wheat and rice. This figure is important because it also tells you how much air is in the can when it is full of seeds - 37.5%. With a

#10 can full of these products, you now have about 256cc of oxygen left in the can. If you are canning a powder you probably have less air than this but foods like macaroni would have more. Already you can see that one 750cc absorber should do the job nicely, in fact it's a bit of overkill. A 300cc absorber would also do the trick. We use one 500cc absorber in each of our #10 cans as we'd rather have a bit of overkill than a little oxygen left in the can should the absorber become loaded. Actually, on the cans, this is a lot of overkill as the absorbers we use now actually have more than twice as much oxygen absorbing capacity as what they are rated for.

A 6 gal bucket holds 22,740cc. Going through the above calculations, a full 6 gal bucket of grain or beans has about 1791cc oxygen left in the container at sea level. You will need four of our absorbers if you are packing up your food at lower elevations. Our facility is at 6,000 feet and at this altitude there is only an equivalent of 1484 cc of oxygen in the thinner air. Again, because of the oxygen absorber's significant under rating, we only use two 500cc absorbers in the buckets as they will absorb more than twice their rated capacity

Oxygen absorbers are over rated to give you a fudge factor if you should leave them out in the air too long. Generally, you have about 20 minutes before they reach this advertised minimum. There are variables that determine how fast the oxygen absorbers work, so you shouldn't leave them out any longer than you absolutely have to. But why not get every bit of absorption you can out of them? May I suggest you leave only enough out in the air to take care of maybe 1 or 2 minutes of operation? See our Packaging Your Food Using Oxygen Absorbers page for lots of other useful information about the actual packing operation using buckets.

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STORING DRY MILKS

Got milk? In the refrigerator, right? Milk is a great source of essential amino acids and vital calcium, but in its fresh liquid form it is a highly perishable commodity. Fortunately, milk can be found in several forms that lend themselves to food storage. The various types of dry milks are the best suited to the task.

B.1 TYPES OF DRY MILKS

NONFAT

(skim): This is pasteurized skim milk reduced to a powdered concentrate. It can be found in two forms, regular and instant. They are both made from milk in a spray-drying process, but the instant variety has been given further processing to make it more easily soluble in water than regular dry milk. Both types have the same nutrient composition. The regular variety is more compact and requires less storage space than the

instantized variety, but it is more difficult to reconstitute. The most easily found variety is the instant, available in nearly any grocery store. The regular variety has to be sought out from baking and restaurant suppliers and storage food dealers. There is a retail brand by the name of "Milkman" that has a bit of fat content that makes it similar to 1% milk. The fat content means it should be stored like whole milk, described below.

It takes 3.2 oz or about 3 tablespoons of instant nonfat dry milk added to 32 oz of water to make 1 quart of milk you can drink or cook with just like fresh milk. Combining the dry milk with water at least several hours before you plan to use it gives it time to dissolve fully and to develop a fresher flavor. Shaking the fluid milk vigorously will incorporate air and will also help to improve flavor. Add the powder to baked goods, gravies, smoothies, hot cereals, casseroles and meat loaf as a nutrition booster. It can also be used to make yogurt, cheese and most any cultured dairy product that does not require a high fat content.

FLAVORED NONFAT:

This may be found packaged in a variety of forms from a low calorie diet drink (artificially sweetened) to the other end of the scale, as cocoa mix or malted milk. The key ingredient is the dry milk so buy and store these products accordingly.

WHOLE MILK:

This is whole dry milk with all of its fat content and therefore has a shorter shelf life than nonfat. Other than that, it may be reconstituted and used in exactly the same way as nonfat dry milk. Dry whole milk is not often found in retail stores, but many storage food suppliers carry it as well as institutional and restaurant foods businesses. It can also sometimes be found where camping and outback supplies are sold.

BUTTERMILK:

Dry buttermilk is for use in recipes calling for buttermilk. It can be reconstituted into liquid buttermilk, but it's not much like the fresh liquid product and is best used in baked goods. Since it has a slightly higher fat content than nonfat dry milk, it generally does not keep as long.

MILK SUBSTITUTES:

There are a number of products on the market that purport to take the place of regular milk. They range from soy "milk", rice or other grain "milks", and beverages based on milk components such as whey. If there is not a substantial fat content they may all be stored as you would nonfat dry milk. Those products with a significant fat content (above 1% by weight) should be stored as you would whole dry milk. Do keep in mind that nearly all of these products DO NOT have the same nutritional composition as either nonfat or whole milk. In storage food programs dairy products serve as important sources of high quality complete proteins, calcium, vitamin D and possibly vitamin A. If the milk substitute you're storing does not you'll need to find another adequate

source of these important nutrients.

B.1.1 BUYING DRY MILK PRODUCTS

(a) - Be sure the dry milk you are buying has been fortified with vitamins A and D. All of the nonfat dry milks I've seen come fortified with these two vitamins. The dry buttermilk does not come this way, at least the SACO brand does not. I don't know if the dry whole milk is or not. The flavored dry milks vary by manufacturer.

(b) - There should be no artificial colors or flavors. I believe it is illegal to add preservatives to any dry milk sold in the U.S. so a claim of "no preservatives" on the label is of no consequence. Other nations may be different, however.

(c) - "Extra Grade" on the label indicates the manufacturer has held to higher processing and quality standards and the milk is somewhat lower in fat, moisture and bacterial content, is more soluble, and has fewer scorched particles.

There are still some manufacturers of dry milk that sell ordinary Grade A product, but they are becoming fewer. Every brand of instant powdered milk in my local grocery store is the Extra Grade, even the generic store brand. This, too, may vary outside of the States.

(d) - If you'll be buying your milk in bulk from businesses such as restaurant and institutional foods suppliers be sure to specify "low-temperature spray process" dry milk. The high- temperature process dry milks will not give you a very desirable product.

(e) - Try to buy your dried milk in containers of a size that makes sense for the level of consumption in the household. Once it is opened, powdered milk has a short shelf life before undesirable changes in flavor and nutrient content occurs. If you buy large packages and do not use much at one time, consider breaking it down and repackaging into smaller containers at the time of purchase.

(f) - As with any storage food you buy, try to deal only with reputable dealers. It is particularly important to do this with dry milk because of its short shelf life and sensitivity to storage conditions. Check expiration dates, then date and rotate packages.

B.2 STORING OF DRY MILKS

Dry milk products are probably the most sensitive to environmental conditions storage foods there are, particularly to temperature and moisture content. Their vitamins A and D are also photosensitive and will break down rapidly if exposed to light.

The area where your dry milk is stored should be kept as cool as possible. If it is possible to do so, air-conditioning or even

refrigeration can greatly extend the nutrient shelf life.

If the storage container is transparent or translucent then it should be put into a second container opaque to light or stored in a dark room.

Dry milk will absorb moisture and odors from the air so storage containers should be impervious to both air and moisture. The drier it can be kept, the better it will keep. The use of desiccants is an excellent idea. Oxygen also speeds decomposition. Powdered milk canned with nitrogen or carbon dioxide to replace air (which contains oxygen) will keep longer than powdered milk exposed to air. Vacuum canning or oxygen absorbers will also decrease the available oxygen.

If the dry milk purchased was not packaged for long term storage then it should be repackaged right away.

I purchase the instant variety at my local grocery and repack it when I get it home. I've seen a number of methods used for this and any of them should work.

The method I now use is to pour the powder into clean, dry half-gallon canning jars. Once the jars are filled I add a small desiccant pack and seal. They are dated and stored in the ubiquitous cool, dark place. They must be guarded against breakage, but they offer the advantage of not holding odors, thus allowing for reuse after suitable cleaning. Since they are as transparent the contents must be protected against light. Vacuum sealing and then storing in a dark place may be the best method. Larger jars of 1 gallon size could be used and then re-vacuum sealed after each use. An O₂ absorber would take care of any remaining oxygen and would, itself, last longer when used in conjunction with the vacuum sealer. Being glass, the jar can be reused as well as the lid and ring if they're properly cleaned.

Clean, sound plastic one and two liter soda bottles can also be used, but probably should be used just once since the plastic is somewhat permeable and will hold odors.

If you have access to a can sealer, #10 cans make wonderful storage containers for dry milk, particularly if used in conjunction with O₂ absorbers.

Another method I've seen used is to remove the paper envelopes of milk powder from the cardboard box they come from the grocery store in and to put them in dated plastic bags. These bags are not sealed. The unsealed bags are then placed in a larger, air tight, opaque container. I've heard of plastic buckets, fifty cal and 20 mm ammo cans being used for this purpose. A healthy quantity of desiccant was also placed in the container. This would be another area where O₂ absorption packets should serve well. It's important to remember the containers should be clean and odor-free.

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Please see Section IV Specific Equipment Questions for information concerning the proper use of containers, desiccants, compressed gasses, dry ice and oxygen absorbers.

B.2.1 SHELF LIFE OF DRY MILKS

From: SacoFoods@aol.com (Amy Thompson)

To: Dunross@dkeep.com (Alan Hagan)

Subj: SACO Mix'nDrink Instant Pure Skim Milk

Date: May 9, 1996

Dear Mr. Hagan:

Thank you for your e-mail today and for your interest in SACO Mix'nDrink Pure Skim Milk.

Our Mix'n Drink will keep its nutrition value for up to about two years if kept cool and dry, and the only vitamins that actually decrease over time are the vitamins A and D. These are not shelf-stable vitamins and are sensitive to heat and light. A good rule of thumb to follow is that the vitamins A and D will dissipate at a rate of about 20% every year if stored properly. The less heat and moisture the milk is exposed to, the better the vitamins will keep. A freezer could extend the shelf life, as long as the powder does not get moisture in it. If you had to put a time limit on the Mix'nDrink, for rotation purposes, I would date it at two years after the date of purchase.

After opening a package of dry milk, transfer the powder to a tightly covered glass or metal container (dry milk can pick up odors from plastic containers) and keep it in the refrigerator. Unsealed nonfat dry milk keeps for a few months; dry whole milk for a few weeks.

From: SacoFoods@aol.com (Amy Thompson)

To: Dunross@dkeep.com (Alan Hagan)

Subj: SACO Mix'nDrink Instant Pure Skim Milk

Date: May 21, 1996

Dear Mr. Hagan:

Since vitamins A and D are heat and light sensitive, I would say that your 1 1/2 year shelf life is very reasonable. If you are trying to determine when the nutritional value has been affected more than 40%, as you previously indicated, you should be pretty safe with that time

element, as long as it is not exposed to extreme heat.

[Eds note: We were discussing the higher average temperatures found in Florida and other hot climates and the effect that it would have on their dry milk's nutrient content]

C. CANNED GOODS

C.1 CANNED MILK TYPES

Preserved liquid milk comes in a number of forms, none of which are very similar to each other. The most common forms of these packaged milks are as follows:

CANNED MILKS:

These are commonly called UHT milks (Ultra High Temperature) for the packaging technique used to put them up. They come in the same varieties as fresh liquid milks: Whole, 2%, 1% and skim. I've even found whipping cream in UHT packaging (Grand Chef - Parmalat), though this may be offered only in the commercial and restaurant trade. In the U.S. they all have vitamin D added. The lesser fat content milks do not keep as long as whole milk and their use by dates are correspondingly shorter term. This milk is packaged in aseptic containers, either cans or laminated paper cartons. It has the same composition as fresh milk of the same type, and can be stored at room temperature because of the special pasteurizing process used. The milk has a boiled flavor, but much less than evaporated milk. The dates are usually for approximately six months. The milk is still usable past its date, but the flavor soon begins to go stale and the cream separates. I am told by a friend who lived in Germany not long after this kind of canned milk began to come on the market there that they were dated for a year.

With a six-month shelf life this type of canned milk naturally requires a much faster rotation cycle than other types. The only brand name for non-flavored milk I've seen is Parmalat. Several companies sell flavored milks (chocolate, etc.) in this packaging, usually in the smaller single-serving sizes. Parmalat makes excellent yogurt, losing the boiled taste.

EVAPORATED:

This is made from fresh, unpasteurized whole milk. A vacuum-heating process removes 60% of the water; the concentrate is heated, homogenized, and in the States, vitamin D is added. It is then canned and heated again to sterilize the contents. It may also have other nutrients and chemical stabilizers added. A mixture of one part water and one part evaporated milk will have about the same nutritional value of an equal amount of fresh milk. There is generally no date or use by code on evaporated milk. It does not taste like fresh milk but most do not find the flavor to be disagreeable. Both whole and skim milk varieties are available with the higher fat content type having the best storage life.

Health and nutrition food stores often carry canned, evaporated goat's milk, in a similar concentration.

SWEETENED CONDENSED:

This milk goes through much less processing than evaporated milk. It starts with pasteurized milk combined with a sugar solution. The water is then extracted until the mixture is less than half its original weight. It is not heated because the high sugar content prevents spoilage. It's very high in calories, too: 8 oz has 980 calories. Obviously with a greatly reduced water content and a high sugar level it won't taste like fresh milk but it condensed milk has many uses in cooking. This type too is available in whole and skim varieties.

Although it is often hard to find, the label has a stamped date code which indicates the date by which it should be consumed. Sweetened, condensed milk may thicken and darken as it ages, but it is still edible.

C.1.1 SHELF LIFE OF CANNED MILKS

Unopened cans of evaporated milk can be stored on a cool, dry shelf for up to six months. Canned milk (UHT) should be stored till the stamped date code on the package (3 - 6 months). Check the date on sweetened, condensed milk for maximum storage.

Home

Butter Powder

Our butter powder is a fine, free flowing powder. By looking at it you d never guess it s #1 ingredient is butter. Many people say, "I didn t think you could dehydrate fat." And they re right. You can t dehydrate fat as dehydrate literally means to remove the water and fat has none. The small amount of water in butter is removed, however. Then, the powder is made by cleverly processing milk solids with the butter. Reconstituted butter powder looks much like whipped butter and tastes like butter with an added milky flavor to it. Because it does have a milky taste, some people find it takes just a bit of getting used to as a spread on bread. However, the mouth feel is the same as butter and it looks and spreads much like butter after it has been reconstituted. It will even melt into hot toast and pancakes almost as fast as regular butter.

Butter powder s big advantage over regular butter is it s non-perishable qualities. Butter powder also has an antioxidant added to help keep it fresh. The antioxidants coupled with Walton s packaging technology gives you a product that remains fresh and wholesome for years after purchasing it.

Butter powder was originally developed for the processed foods industry. When used in baking, butter powder really shines. As it is mostly butter, the flavor really comes through in your baked goods. Butter powder is extremely handy in mixes. Being in a powdered form, it blends easily with

the other dry ingredients in a mix. Then, weeks or months later when it is reconstituted, the batter acts just as if you had added butter. And of course, the end result is a dish or baked good that has a great flavor. You can use butter powder in many of the same dishes where you would use regular butter. Add butter powder to your cooked vegetables, macaroni and cheese, instant rice or in any cooked dish calling for butter.

Home

Turning Your Non-fat Powdered Milk Into 1%, 2% Or Whole Milk

Powdered Milk

The powdered milk we sell is non-fat milk, or skim milk and only offer this type because of its long storing qualities. If your family pretty much refuses to drink skim milk, there is a relatively easy way to add some fat back into your milk giving it a much closer taste to whole milk. Or, if you like, you can make 1% or 2% milk. Here is how you do it.

The Concept:

Emulsify some vegetable oil then add it to your reconstituted milk.

The word 'emulsify' means 'to suspend small globules of one liquid into a second liquid with which the first will not mix.' Two examples of this are the fat in regular milk and using soap to dissolve grease. In both cases, fat is broken up into millions of microscopic particles which are prevented from coming back together again by the emulsifying agent. Eggs are one of the best known food-safe emulsifying agents. In fact, mayonnaise is nothing more than a lot of oil and a very little bit of egg and vinegar that have been emulsified together. We are going to do the same thing. Caution should be taken using fresh, raw eggs because of the fear of Salmonella. Use powdered eggs instead. The manufacturers claim powdered eggs are Salmonella-free.

The Recipe:

Amount Reconstituted Milk

Milk - Egg Powder - Vegetable Oil

1%

Cup 1/8tsp - 1/4 cup - 1/2 tsp

Quart 1/4tsp - 1/4 cup - 2 tsp

Gallon 1tsp - 1/4 cup - 2 tbsp + 1-1/2tsp

2%

Cup 1/4tsp - 1/4 cup - 1 tsp

Quart 1/2tsp - 1/4 cup - 1 tbsp + 1 tsp

Gallon 2tsp - 1/2 cup - 1/4cup + 1tbsp

Whole

Cup 1/2tsp - 1/4 cup - 1-1/2 tsp

3.4% Quart 1tsp - 1/4 cup - 2tbsp + 1/2tsp

Gallon 1tbsp + 1tsp - 1 cup - 1/2 cup + 2tsp

In a gravy shaker add milk then egg powder. Shake until well dissolved. Add vegetable oil and shake vigorously for 1 to 2 minutes. Your oil should now be in a fine emulsification. Add this to your Amount Milk Desired and shake briefly.

Your oil will stay in suspension for a long time. However, much like cream in raw, unhomegenized milk, over time the fats in the milk will float to the top. The oil will be cream colored, though, and still emulsified with the egg. A quick shake of your milk jug will mix them back up for several hours.

I chose a gravy shaker in these instructions making this possible without electricity. However, under normal conditions, a blender will create a much finer emulsion. Mixed in a gravy shaker, it took about 2 hours for the emulsified fat to raise to the top of the container. It took 6-8 hours for the much more finely emulsified fat to rise in the container that had been processed in a blender. You will have better luck mixing the larger batches than smaller batches. This is because the egg powder and oil won't be so diluted in the milk, permitting the emulsion process to work better.

If you'd like to re-fat your powdered milk with real butterfat, you could also add a small amount of sweet cream to your reconstituted milk and shake it vigorously or quickly blend it. Over time, you can decrease the amount of fat you put in your milk and gradually wean them off the richer milk.

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Cheddar Cheese Powder

Powdered cheese is made by spray drying a cheese slurry, using much the same process as when making powdered milk only it s sprayed into a huge box. Please see our making powdered milk page for more information on this.

Our powdered cheddar cheese contains only 100% cheddar cheese with emulsifiers so it will blend well with water and make a nice, smooth sauce. If you are looking for the ultimate in cheesy flavor, it doesn't get better than this. Virtually, all powered cheese products on the market today actually contain very little cheese. Check the label.

Usually, whey powder is the first ingredient. Sometimes cheese is so far down the list that it makes one wonder if there s even enough in it that it can be tasted. If you want the ultimate in flavor when making your cheese sauces, this undiluted cheese product, usually costing much less than their inferior counterparts in the grocery store, will certainly deliver. You just don't know how much better, real 100% cheddar cheese powder tastes than the competition until you ve tried it. And after you ve tried it, you won't want to go back. And considering our rock-bottom pricing on this product you won't have to. You can enjoy the very best for less instead of paying what the competition wants for their inferior products. ...yup, if you want only the best cheese powder, then

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this product is for you... WaltonFeed.com

Home

2 Week Shopping List for 2 People

Category

Buy food from each category

Quantity

Protein

Canned: tuna, fish, meat, chicken, ham, etc.

14 cans

Meals

Canned: Stew, ravioli, chunky soup, chow mien, chili, hash, etc.

14 cans

Vegetables (low sodium, where available)

Canned: mixed vegetables, corn, carrots, peas, green beans, beets, spinach, hominy, tomatoes, etc.

28 cans

Fruit

Canned or dry: peaches, apricots, pears, apples, prunes, raisins, oranges, pineapple, juices, etc.

28 cans or packages

Starches

Ramen noodles, egg noodles, instant rice, angel hair pasta, crackers, instant mashed potatoes, canned potatoes, yams, stuffing mix, (buy quick cooking style)

Several boxes or cans

Beans

Canned: baked beans, pork and beans, kidney beans, garbanzos, pinto beans, etc.

7-14 cans

Dairy

Evaporated milk, dry milk, Parmalat, non-refrigerated cheeses, etc.

As many servings as you like

Breakfast

Cereal, granola bars, instant oatmeal, Ensure, etc.

Enough for 28 breakfasts

Comfort food/drink

Coffee, tea, cocoa mix, cookies, no bake pie crust and filling, etc.

Miscellaneous

Vitamins, bouillon, salad dressing, vinegar, oil, condiments, sugar, creamer, ketchup, spices, peanut butter, packets of mayonnaise and pickle relish

Important: If you don't have a manual can opener, buy one. Avoid foods that need a lot of water or more than a few minutes of cooking. Water and cooking fuel may be scarce.

Plan no-cook meals. Eat canned vegetables as a salad, with salad dressing or vinegar and oil. You can eat tuna, ham or chicken with a vegetable salad or mixed with mayonnaise packets.

A Sterno Stove is a good solution for warming food. It can be purchased at any store that sells camping supplies (Wal-Mart, K-Mart, Sporting Goods Stores). You cannot do any major cooking on this type of stove, as it does not get hot enough. Heat small quantities at a time.

Store 1 gallon of water per person for each day you are preparing for. You can purchase bottled water or you can bottle it yourself from tap water. You can buy collapsible water containers wherever camping supplies are sold. Another option is to wash out soda bottles and fill them with water. If you store your own water, treat it by adding 4 drops of unscented chlorine bleach to each 2 liter or half gallon bottle of water.

Have plenty of paper plates, paper towels, plastic utensils and plastic garbage bags on hand. Trash pick-up may not be as reliable as you are used to. Stock up on wet wipes or waterless hand sanitizer. They are available where soap is sold. Eyeglass cleaning wet cloths are handy also.

Have several sets of thermal underwear if you live in a cold winter climate. Layer clothing to keep warm. Don't forget gloves. It might get cold indoors. Drape blankets over your dining table and use it as an indoor tent to keep warmth encapsulated.

Keep flashlights, battery operated lights, battery radio and plenty of extra batteries on hand. Retrieve anything you may need from storage before you need it. Have at least one telephone that doesn't need electricity.

Get an extra prescription refill even if you have to pay for it yourself. Buy extra over the counter medications or supplies you will need. Prepare a first aid kit.

Attend an emergency preparedness meeting of neighbors, apartment residents or property managers as soon as possible. If there is no meeting planned, get together with other neighbors and organize one. It is very important to be familiar with your neighborhood or apartment association's emergency plans.

Residents of high rise buildings or senior housing need information on the emergency readiness status of:

Heating and ventilation systems

Electronic access systems

Elevators

Service staff - will they be on duty in case of emergency? What about their families?

Food service - are there plans to store non-perishable food? For how long?

Talk with neighbors and friends. Share ideas and plans. You don't have to do everything yourself when you plan together.

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14 DAYS OF PREPS : Getting started on your Y2K preparations
greenspun.com : LUSENET : TimeBomb 2000 (Y2000) Preparation Forum : One Thread

INTRODUCTION

Preparing for the risks associated with Y2K can be an overwhelming project. If you have just learned about the late start and slow progress of profitable and government organizations in dealing with their Y2K technology problems. Though there is not much time for those who would like to get ready, newbies need to "prep smart"; it is important that they concentrate first on the basics of survival): shelter, heat, water, and food. Without these first things, one's chances of surviving can be reduced to hours (depending on weather and temperature). Focusing on getting the basics done is also a lot easier than thinking about and shopping for everything that might make life more comfortable in an emergency. Once these essentials are completed, proceed quickly to the second order of preparations: light, self-defense, entertainment, investment, etc. In this order, you will proceed from first things to the second order with less anxiety about your safety and the safety of family, friends, and neighbors.

In this message, I cover the following topics and subtopics:

First Things Heat Water Food Mapping out your wishes, goals, and budget
Cheeping As in "being cheap," stretching your budget, and having money for lots of other things that you may want to include in your personal preparations including an Aladdin Oil Lamp, Bug Out Bag, and some other things too.

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There is a total of seven topics and subtopics (including the introduction) and each topic should take less than three (3) minutes to read. Generally speaking, there is a lot to cover in terms of preparing fully for Y2K. In fact, it is too much to cover in one thread (and expect someone to read that in one sitting). This message won't cover everything you need to know. My intention here is to help you think about these topics and develop a plan of action for making preparations or helping someone else make preparations as quickly as possible.

The minimum of preparation should be for 14 days for you, your family, your pets, and whoever you know that may come to depend upon you in hard times. This 14 day recommendation is based on an assumption that in the event that Y2K risks become very real catastrophes, public shelters may be organized by local governments, Red Cross, and Fema within a two week period. You should also check with local Y2K community groups that (1) may help you understand the specific risks of local services and (2) provide information about the robustness or inadequacy of local emergency preparations. Alternately, you may decide to prepare in such a way that you do not need to evacuate to a public shelter in the event that your local area is hit hard. Many people on this forum are making such preparations.

FIRST THINGS

Shelter, Heat, Water, Food, and Health. Without these first things, your chances of survival can be reduced to hours. Most people have a shelter (they can "shelter in place" at their house, apartment, etc. In there is risk of a catastrophe, you should make plans for a fall back shelter. Such plans may include any or several of the following: seeking a public shelter (contact your local Red Cross unit and find out what locations are designated as future Y2K shelters), going to a neighbor or relative's home, or bugging out (leaving your local area and going elsewhere). If the extent of a disaster is such that you will be bugging out, quickly coordinate your bug out plans with others in your local area, outer lying areas, and elsewhere. Another topic that is not well covered in this thread is health. Hopefully, you are aware of potential risks to your life and health that may be effected by failures. If you depend on prescription medicines, machines, or other medical services, plan and act upon your needs. Some suggest that a three month or more supply of critical prescription medicines is prudent.

First Things: Heat: Introduction

Heat may or may not be a serious concern. It depends on several factors. Where do you live now or plan to be and how cold does the weather get, how well insulated is your house, and how much air gets in and out of your house. Where I live it seems to rarely get down to 20 degrees (30 being freezing). Still, I find that my body temperature drops when I sleep and I am uncomfortable to sleep in less than 50 degrees with a good down comforter. I want to stay warm. The solution or solutions you develop will vary according to the duration of potential disruptions. Potentially- How long could the power be out, how long would you weather

persisting power outages in your home, and where will you be? I am told that over time, your body will adjust to colder temperatures (some number of degrees less than you normally prefer). But can you adjust in less than 14 days?

First Things: Heat: Keeping Warm

There are many ways to keep warm: wear warm clothing, wrap yourself in blankets, and fire up a stove or heater that does not rely on natural gas or electricity. Wood stoves are the most expensive option; warm clothes are the cheapest solution. If you get a wood stove, you will also have to get the firewood, chop it up, and stack it. This could be a \$US 2000 or more proposition. A propane stove or kerosene heater are more affordable (usually not more than \$US 250), but require adequate ventilation. Thus, they may reduce the heating effectiveness of the fuel and require more fuel to balance out the loss of heat through ventilation. Some kerosene lamps may keep you warm in a tight space (like a bathroom) such as an Aladdin Incandescent Oil Lamp. Wool blankets (Pendleton and Hudson's Bay Company are among the best) and even medium weight down comforters may help you get through high 20 and 30 degree nights. For clothes, wool is fantastic and the other popular insulating materials used in snow suits (Goretex), winter, ski, and snow mobile jackets, etc. But don't forget long underwear (silk long underwear from L.L.Bean is outstanding), socks (liners and heavy socks), and hats that cover your ears.

First Things: Heat: Links

Brian's Preparation Archives: Posts on Heating

http://www.greenspun.com/bboard/q-an...?msg_id=000rye

Five essentials to getting the most out of your woodpile

<http://hearth.com/what/essentials.html>

Chimney Safety Institute of America <http://www.csia.org>

<http://www.chimneys.com> <http://www.chimneys.com>

<http://www.oillamp.com> <http://www.oillamp.com>

First Things: Water: Introduction

According to the experts, most people can go three days without water. Years ago, I had a hard time of it on a hike in the Sierras. After about 4 hours from my last gulp of canteen water, I realized that I had been dehydrated before starting out. I was so desperate that I drank right out of a stream and was very lucky not to come down with anything. From now on, keep hydrated. That means a minimum of eight cups of water (not including what's in the caffeinated drinks and sodas that you drink). You'll also need to figure out how much water you need to store up, how to have access to it (well or whatever), or how to filter and/or distill potable water. Will you have water for 14 days?

First Things: Water: Health

According to the World Health Organization, contaminated water is the largest health problem in the world. Throughout the world, 50,000 human beings die every day to waterborne disease. The Center for Disease Control estimates that 1,000,000 people in the United States of America suffer health problems caused by microbiologically contaminated water each year. In the U.S., an average 1,000 people die every year from water-related diseases. Furthermore, waterborne gastrointestinal infections account for 80% of all diseases in the world. Health-related problems from chemical contamination is also a serious problem. Biological and chemical water-related health problems are expected to dramatically increase around the world as public water treatment centers seem likely to be temporarily disabled by Y2K technology failures.

The three natural biological water-related health threats are bacteria, viruses, and protozoa-- all of which are generally invisible to the unaided human eye. Bacteria are one-celled organisms that generally vary from 0.2 and 1.5 microns (maximum 10 microns). The most common waterborne bacteria which cause infections include: typhoid, para-typhoid, dysentery, colibacillosis, and cholera. Viruses vary in size from 0.1 to 0.004 microns. While most a virus can pass through the smallest filter, viruses tend to adhere to particles in the water. Many filters can filter out these virus-carrying particles. Common water-borne viral infections include hepatitis, yellow fever, and poliomyelitis. Protozoa are one-celled animals; they vary in size from 10 to 100 microns. They can be carried by insects or in the form of cysts when outside of the human or animal organism. Water-borne protozoans that cause disease include amoeba, giardia, cryptosporidium, and malaria.

Chemicals (found in tap or well water) that may cause health-related problems include toxic chemicals, heavy metals, and common radionuclides. Among the toxic chemicals are trihalomethanes, PCB, PCE, detergents, and pesticides. Some heavy metals to be concerned about may include aluminum, asbestos, cadmium, chromium, copper, lead, and mercury. A common radionuclide such as Radon 222 may be found in some well water in areas where Radon is a problem.

First Things: Water: How much?

The experts say that you need one gallon of water per day. I say that the number of gallons you need will vary according to how long you guess that water will be out, how long you will weather out persisting water outages in your home, and what you'll do if you bug out. Let's start with 14 days of water after which we would assume that the worst was over. Some of you will be amazed at how much water you would want to have stored. Guess how much water you go through in an average day. And just because you don't do the dishes or laundry doesn't mean that your water use isn't many, many gallons.

You'll need water for everyone in your house and whoever joins you for the following: drinking, bathing, washing dishes, flushing toilets, and possibly washing some clothes like undergarments. Figure on one gallon per person per day for drinking and washing dishes, 5 gallons per day per

flush, and about 5 gallons per day for a light load of hand-washed undergarments. Therefore, a party of five flushing the toilet three times per day and washing a small number of undergarments will need to store a total of 350 gallons of water (stored in seven 55 gallon barrels).

70 gallons for drinking and washing dishes 210 gallons for flushing the toilets 70 gallons for clothes washing.

First Things: Water: Water Storage

Depending on where you live (house or apartment and city, suburb, or country), your access to water and storage capacity will vary. 350 gallons of water (stored in 55 gallon barrels in different rooms) will be about the maximum for second or higher floor apartments. Roughly, it is about 2,800 pounds of weight on that floor -- not to mention all your other stuff. If you are in a house or have a house with some yard, storage is less a problem and allows you several options: pond, above ground kiddie pool, well, etc. Let's say that the average cost of very large water storage solutions is about \$US 1.00 per gallon. Generally, 55 gallon barrels for food and water storage can be obtained for less than \$US 10.00 each from a soda, juice, or other beverage bottling plant. You may also want to pick up a PYTHON which is used by aquarium enthusiasts for filling and draining big aquariums. The PYTHON attaches to a kitchen sink spout and comes in a number of different lengths. It can also be rigged to redirect water from a barrel to other things without electricity. However, you will need good water pressure.

First Things: Water: Water Treatment

There is much debate about treating tap water (if you get city water) for storage. So check with your water provider and find out if you need to add bleach. There are also other chemical agents used to treat water for biological contaminants, but I would stick to bleach (chlorine) or use a filter. Dry chlorine, also called calcium hypochlorite has the added benefit of extended shelf life. Providing it is kept dry, cool and in an airtight container, it may be stored up to 10 years with minimal degradation. If you want to keep chlorine in larger quantities, this is the item to store (according to Bingo1). It must be ONLY 65% calcium hypochlorite, no additional anti-fungals

Home

The Seven Major Mistakes in Food Storage

A month or two ago I met a cute little gal who was talking to me about her newly begun food storage. "You know," she began, "I've dreaded doing my food storage for years, its seems so blah, but the way national events are going my husband and I decided we couldn't put it off anymore. And, do you know, it really hasn't been hard. We just bought 20 bags of wheat, my husband found a place to get 60 pound cans of honey, and now all we have to do is get a couple of cases of powdered milk. Could you tell me where to get the milk?" After I suggested several distributors, I asked,

"Do you know how to cook with your wheat?" "Oh," she laughed, "if we ever need it I'll learn how. My kids only like white bread and I don't have a wheat grinder." She had just made every major mistake in storing food (other than not storing anything at all.) But she's not alone. Through 14 years of helping people prepare, I found most people's storage starts out looking just like hers. So what's wrong with this storage plan? There are seven serious problems that may occur trying to live on these basics:

1.) VARIETY - Most people don't have enough variety in their storage. 95% of the people I've worked with only stored the 4 basic items we mentioned earlier: wheat, milk, honey, and salt. Statistics show most of us won't survive on such a diet for several reasons. a.) Many people are allergic to wheat and may not be aware of it until they are eating it meal after meal. b.) Wheat is too harsh for young children. They can tolerate it in small amounts but not as their main staple. c.) We get tired of eating the same foods over and over and many times prefer not to eat than to sample that particular food again. This is called appetite fatigue. Young children and older people are particularly susceptible to it. Store less wheat than is generally suggest and put the difference into a variety of other grains, particularly ones your family likes to eat. Also store a variety of beans. This will add variety of color, texture and flavor. Variety is the key to a successful storage program. It is essential that you store flavorings such as tomato, bouillion, cheese, and onion.

Also, include a good supply of the spices you like to cook with. These flavorings and spices allow you to do many creative things with your grains and beans. Without them you are severely limited. One of the best suggestions I can give you is buy a good food storage cookbook. Go through it and see what your family would really eat. Notice the ingredients as you do it. This will help you more than anything else to know what items to store.

2.) EXTENDED STAPLES - Few people get beyond storing the four basic items, but it is extremely important that you do so. Never put all your eggs in one basket. Store dehydrated and/or freeze-dried foods as well as home canned and store bought canned goods. Make sure you add cooking oil, shortening, baking powder, soda, yeast and powdered eggs. You can't cook even the most basic receipes without these items. Because of limited space I won't list all the items that should be included in a well-balanced storage program. They are all included in the The New Cookin With Home Storage cookbook, as well as information on how much to store, and where to purchase it.

3.) VITAMINS - Vitamins are important, especially if you have children, since children do not store body reserves of nutrients as adults do. A good quality multi-vitamin and vitamin C are the most vital. Others may be added as your budget permits.

4.) QUICK AND EASY AND PSYCHOLOGICAL FOODS - Quick and easy foods help you through times when you are psychologically or physically unable to

prepare your basic storage items. No cook foods such as freeze-dried are wonderful since they require little preparation. MRE's (Meals Ready to Eat), such as many preparedness outlets carry, canned goods, etc. are also very good. Psychological Foods are the goodies - Jello, pudding, candy, etc. - you should add to your storage.

These may sound frivolous, but through the years I've talked with many people who have lived entirely on their storage for extended periods of time. Nearly all of them say these were the most helpful items in their storage to normalize their situations and make it more bearable. These are especially important if you have children.

5.) BALANCE - Time and time again I've seen families buy all of their wheat, then buy all of another item, and so on. Don't do that. It's important to keep well-balanced as you build your storage. Buy several items, rather than a large quantity of one item. If something happens and you have to live on your present storage, you'll fare much better having a one-month supply of a variety of items than a year's supply of two to three items.

6.) CONTAINERS - Always store your bulk foods in food storage containers. I have seen literally tons and tons of food thrown away because they were left in sacks, where they became highly susceptible to moisture, insects and rodents. If you are using plastic buckets make sure they are lined with a food grade plastic liner available from companies that carry packaging supplies. Never use trash can liners as these are treated with pesticides. Don't stack them too high. In an earthquake they may topple, the lids pop open, or they may crack. A better container is the #10 tin can which most preparedness companies use when they package their foods.

7.) USE YOUR STORAGE - In all the years I've worked with preparedness one of the biggest problems I've seen is people storing food and not knowing what to do with it. It's vital that you and your family become familiar with the things you are storing. You need to know how to prepare these foods. This is not something you want to learn under stress. Your family needs to be used to eating these foods. A stressful period is not a good time to totally change your diet. Get a food storage cookbook and learn to use these foods!

It's easy to solve these food storage problems once you know what they are. The lady I talked about at the first of the article left realizing what she had stored was a good beginning, but not enough. As she said, "It's better to find out the mistakes I've made now while there's still time to make corrections." This makes a lot more sense.

If you're one who needs to make some adjustments, that's okay. Look at these suggestions and add the things you're missing.

It's easy to take a basic storage and add the essentials to make it liveable, but it needs to be done. As I did the research for my cookbook I wanted to include recipes that gave help to families no matter what they had stored. As I put the material together it was fascinating to discover what the pioneers ate is the type of things we store. But if you

have stored only the 4 basics, there's very, very little you can do with it. By adding even just a few things it greatly increases your options, and the prospect of your family surviving on it. As I studied how the pioneers lived and ate, my whole feeling for food changed. I realized our storage is what most of the world has always lived on. If it's put together the right way we'll be returning to good basic living with a few goodies thrown in.

HOME

Emergency Food and Water Supplies

If an earthquake, hurricane, winter storm or other disaster ever strikes your community, you might not have access to food, water and electricity for days, or even weeks. By taking a little time now to store emergency food and water supplies, you can provide for your entire family.

This brochure was developed by the Federal Emergency Management Agency's Community and Family Preparedness Programs which provides information to help families prepare for all types of disasters.

WATER: THE ABSOLUTE NECESSITY

Stocking water reserves and learning how to purify contaminated water should be among your top priorities in preparing for an emergency. You should store at least a two-week supply of water for each member of your family. Everyone's needs will differ, depending upon age, physical condition, activity, diet and climate. A normally active person needs to drink at least two quarts of water each day. Hot environments can double that amount. Children, nursing mothers and ill people will need more. You will need additional water for food preparation and hygiene. Store a total of at least one gallon per person, per day.

If your supplies begin to run low, remember: Never ration water. Drink the amount you need today, and try to find more for tomorrow. You can minimize the amount of water your body needs by reducing activity and staying cool.

How to Store Emergency Water Supplies

You can store your water in thoroughly washed plastic, glass, fiberglass or enamel-lined metal containers. Never use a container that has held toxic substances, because tiny amounts may remain in the container's pores. Sound plastic containers, such as soft drink bottles, are best. You can also purchase food-grade plastic buckets or drums.

Before storing your water, treat it with a preservative, such as chlorine bleach, to prevent the growth of microorganisms. Use liquid bleach that contains 5.25 percent sodium hypochlorite and no soap. Some containers warn, "Not For Personal Use." You can disregard these warnings if the label states sodium hypochlorite is the only active ingredient and if you use only the small quantities in these instructions.

Add four drops of bleach per quart of water (or two scant teaspoons per

10 gallons), and stir. Seal your water containers tightly, label them and store them in a cool, dark place.

Hidden Water Sources in Your Home

If a disaster catches you without a stored supply of clean water, you can use water in your hot-water tank, in your plumbing and in ice cubes. As a last resort, you can use water in the reservoir tank of your toilet (not the bowl), but purify it first (described later).

Water beds hold up to 400 gallons, but some water beds contain toxic chemicals that are not fully removed by many purifiers. If you designate a water bed in your home as an emergency resource, drain it yearly and refill it with fresh water containing two ounces of bleach per 120 gallons.

To use the water in your pipes, let air into the plumbing by turning on the highest faucet in your house and draining the water from the lowest one.

To use the water in your hot-water tank, be sure the electricity or gas is off, and open the drain at the bottom of the tank. Start the water flowing by turning off the water intake valve and turning on a hot-water faucet. Do not turn on the gas or electricity when the tank is empty.

Do you know the location of your incoming water valve? You'll need to shut it off to stop contaminated water from entering your home if you hear reports of broken water or sewage lines.

Emergency Outdoor Water Sources

If you need to seek water outside your home, you can use these sources. But purify the water before drinking it.

Rainwater

Streams, rivers and other moving bodies of water

Ponds and lakes

Natural springs

Avoid water with floating material, an odor or dark color. Use saltwater only if you distill it first (described later).

Three Easy Ways to Purify Water

In addition to having a bad odor and taste, contaminated water can contain microorganisms that cause diseases such as dysentery, cholera, typhoid and hepatitis. You should therefore purify all water of uncertain purity before using it for drinking, food preparation or hygiene.

There are many ways to purify water. None are perfect. Often the best solution is a combination of methods. Before purifying, let any suspended particles settle to the bottom, or strain them through layers of paper

towel or clean cloth.

Three easy purification methods are outlined below. These measures will kill microbes but will not remove other contaminants such as heavy metals, salts, most other chemicals and radioactive fallout.

Boiling is the safest method of purifying water. Bring water to a rolling boil for 10 minutes, keeping in mind that some water will evaporate. Let the water cool before drinking.

Boiled water will taste better if you put oxygen back into it by pouring it back and forth between two containers. This will also improve the taste of stored water.

Chlorination uses liquid chlorine bleach to kill microorganisms. (See page 1 for bleach safety information.) Add two drops of bleach per quart of water (four drops if the water is cloudy), stir and let stand for 30 minutes. If the water does not taste and smell of chlorine at that point, add another dose and let stand another 15 minutes.

If you do not have a dropper, use a spoon and a square-ended strip of paper or thin cloth about 1/4 inch by 2 inches. Put the strip in the spoon with an end hanging down about 1/2 inch below the scoop of the spoon. Place bleach in the spoon and carefully tip it. Drops the size of those from a medicine dropper will drip off the end of the strip.

Purification tablets release chlorine or iodine. They are inexpensive and available at most sporting goods stores and some drugstores. Follow the package directions. Usually one tablet is enough for one quart of water. Double the dose for cloudy water.

More Rigorous Purification Methods

While the three methods described above will remove only microbes from water, the following two purification methods will remove other contaminants. Distillation will remove microbes, heavy metals, salts, most other chemicals, and radioactive dust and dirt, called radioactive fallout. Filtering will also remove radioactive fallout. (Water itself cannot become radioactive, but it can be contaminated by radioactive fallout. It is unsafe to drink water that contains radioactive fallout.)

Distillation involves boiling water and then collecting the vapor that condenses back to water. The condensed vapor will not include salt and other impurities. To distill, fill a pot halfway with water. Tie a cup to the handle on the pot's lid so that the cup will hang right-side-up when the lid is upside-down (make sure the cup is not dangling into the water) and boil the water for 20 minutes. The water that drips from the lid into the cup is distilled.

To make a fallout filter, punch holes in the bottom of a large bucket, and put a layer of gravel in the bucket about 1-1/2 inches high. Cover the gravel with a towel cut in a circle slightly larger than the bucket.

Cover soil with a towel, place the filter over a large container, and pour contaminated water through. Then, disinfect the filtered water using one of the methods described above. Change the soil in your filter after every 50 quarts of water.

Family Disaster Supply Kit

It's 2:00 a.m. and a flash flood forces you to evacuate your home--fast. There's no time to gather food from the kitchen, fill bottles with water, grab a first-aid kit from the closet and snatch a flashlight and a portable radio from the bedroom. You need to have these items packed and ready in one place before disaster hits.

Pack at least a three-day supply of food and water, and store it in a handy place. Choose foods that are easy to carry, nutritious and ready-to-eat. In addition, pack these emergency items:

Medical supplies and first aid manual
Hygiene supplies
Portable radio, flashlights and extra batteries
Shovel and other useful tools
Money and matches in a waterproof container
Fire extinguisher
Blanket and extra clothing
Infant and small children's needs (if appropriate)

FOOD: PREPARING AN EMERGENCY STOCKPILE

If activity is reduced, healthy people can survive on half their usual food intake for an extended period and without any food for many days. Food, unlike water, may be rationed safely, except for children and pregnant women.

If your water supply is limited, try to avoid foods that are high in fat and protein, and don't stock salty foods, since they will make you thirsty. Try to eat salt-free crackers, whole grain cereals and canned foods with high liquid content.

You don't need to go out and buy unfamiliar foods to prepare an emergency food supply. You can use the canned foods, dry mixes and other staples on your cupboard shelves. In fact, familiar foods are important. They can lift morale and give a feeling of security in time of stress. Also, canned foods won't require cooking, water or special preparation. Following are recommended short-term and long-term food storage plans.

Storage Tips

Keep food in the driest and coolest spot in the house--a dark area if possible.
Keep food covered at all times.

Open food boxes or cans carefully so that you can close them tightly after each use.

Wrap cookies and crackers in plastic bags, and keep them in tight containers.

Empty opened packages of sugar, dried fruits and nuts into screw-top jars or air-tight cans to protect them from pests.

Inspect all food containers for signs of spoilage before use.

Short-Term Food Supplies

Even though it is unlikely that an emergency would cut off your food supply for two weeks, you should prepare a supply that will last that long. A two-week supply can relieve a great deal of inconvenience and uncertainty until services are restored.

The easiest way to develop a two-week stockpile is to increase the amount of basic foods you normally keep on your shelves. Remember to compensate for the amount you eat from other sources (such as restaurants) during an average two-week period.

You may already have a two-week supply of food on hand. Keeping it fresh is simple. Just rotate your supply once or twice a year.

Special Considerations to Keep in Mind

As you stock food, take into account your family's unique needs and tastes. Try to include foods that they will enjoy and that are also high in calories and nutrition. Foods that require no refrigeration, preparation or cooking are best.

Individuals with special diets and allergies will need particular attention, as will babies, toddlers and the elderly. Nursing mothers may need liquid formula, in case they are unable to nurse. Canned dietetic foods, juices and soups may be helpful for the ill or elderly.

Make sure you have a can opener and disposable utensils. And don't forget nonperishable foods for your pets.

How to Store Your Short-Term Stockpile

Keep canned foods in a dry place where the temperature is fairly cool--not above 70 degrees Fahrenheit and not below freezing. To protect boxed foods from pests and extend their shelf life, store the boxes in tightly closed cans or metal containers.

Rotate your food supply. Use foods before they go bad, and replace them with fresh supplies, dated with ink or marker. Place new items at the back of the storage area and older ones in front.

Your emergency food supply should be of the highest quality possible. Inspect your reserves periodically to make sure there are no broken seals or dented containers.

How to Cook if the Power Goes Out

For emergency cooking you can use a fireplace, or a charcoal grill or camp stove outdoors only. You can also heat food with candle warmers, chafing dishes and fondue pots. Canned food can be eaten right out of the can. If you heat it in the can, be sure to open the can and remove the label first.

Long-Term Food Supplies

In the unlikely event of a military attack or some other national disaster, you may need long-term emergency food supplies. The best approach is to store large amounts of staples along with a variety of canned and dried foods. Bulk quantities of wheat, corn, beans and salt are inexpensive and have nearly unlimited shelf life. If necessary, you could survive for years on small daily amounts of these staples. Stock the following amounts per person, per month: Wheat--20 pounds
Powdered Milk(for babies and infants)*-- 20 pounds

Corn--20 pounds

Iodized Salt--1 pound

Soybeans--10 pounds

Vitamin C**--15 grams

* Buy in nitrogen-packed cans

** Rotate every two years

Storage and Preparation of Food Supplies

Store wheat, corn and beans in sealed cans or plastic buckets. Buy powdered milk in nitrogen-packed cans. And leave salt and vitamin C in their original packages.

If these staples comprise your entire menu, you must eat all of them together to stay healthy. To avoid serious digestive problems, you'll need to grind the corn and wheat into flour and cook them, as well as boil the beans, before eating. Many health food stores sell hand-cranked grain mills or can tell you where you can get one. Make sure you buy one that can grind corn. If you are caught without a mill, you can grind your grain by filling a large can with whole grain one inch deep, holding the can on the ground between your feet and pounding the grain with a pipe.

Nutrition Tips

In a crisis, it will be vital that you maintain your strength. So remember:

Eat at least one well-balanced meal each day.

Drink enough liquid to enable your body to function properly (two quarts a day).

Take in enough calories to enable you to do any necessary work.

Include vitamin, mineral and protein supplements in your stockpile to assure adequate nutrition.

Shelf Life of Foods for Storage

Here are some general guidelines for rotating common emergency foods.

Use within six months:

Powdered milk (boxed)
Dried fruit (in metal container)
Dry, crisp crackers (in metal container)
Potatoes

Use within one year:

Canned condensed meat and vegetable soups
Canned fruits, fruit juices and vegetables
Ready-to-eat cereals and uncooked instant cereals (in metal containers)
Peanut butter
Jelly
Hard candy, chocolate bars and canned nuts

May be stored indefinitely (in proper containers and conditions):

Wheat
Vegetable oils
Corn
Baking powder
Soybeans
Instant coffee, tea
Vitamin C
and cocoa
Salt
Noncarbonated soft drinks
White rice
Bouillon products
Dry pasta
Powdered milk (in nitrogen-packed cans)
Ways to Supplement Your Long-Term Stockpile

The above staples offer a limited menu, but you can supplement them with commercially packed air-dried or freeze-dried foods and supermarket goods. Rice, popcorn and varieties of beans are nutritious and long-lasting. The more supplements you include, the more expensive your stockpile will be.

Following is an easy approach to long-term food storage:

Buy a supply of the bulk staples listed above.

Build up your everyday stock of canned goods until you have a two-week to one-month surplus. Rotate it periodically to maintain a supply of common foods that will not require special preparation, water or cooking.

From a sporting or camping equipment store, buy commercially packaged, freeze-dried or air-dried foods. Although costly, this will be your best form of stored meat, so buy accordingly.

If the Electricity Goes Off...

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FIRST, use perishable food and foods from the refrigerator.
THEN use the foods from the freezer. To minimize the number of times you open the freezer door, post a list of freezer contents on it. In a well-filled, well-insulated freezer, foods will usually still have ice crystals in their centers (meaning foods are safe to eat) for at least three days.

FINALLY, begin to use non-perishable foods and staples.

If you are interested in learning more about how to prepare for emergencies, contact your local or State Office of Emergency Management, or write to the Federal Emergency Management Agency, P.O. Box 70274, Washington, D.C. 20024, and ask for any of the following publications:

Emergency Preparedness Checklist (L-154) Item #8-0872

Are You Ready? Your Guide to Disaster Preparedness (H-34) Item #8-0908

Emergency Preparedness Publications (L-164) Item #8-0822

Your Family Disaster Plan (L-191) Item #8-0954

Your Family Disaster Supplies Kit (L-189) Item #8-0941

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\$5 a week/2 people plan

"The revelation to store food may be as important to our temporal salvation, today, as boarding the ark was to the people in the day of Noah." --Pres. Ezra Taft Benson

January

"When the time of need arrives, the time for preparation is past"

Suggested items--25 lbs. rice, 10 bars soap

72 Hour Kit: Back pack or tote bag and 2 bars of soap With family have an emergency meeting place with map and escape plan.

February

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"There is no royal road to anything. Careful planning, hard work, and determination to reach an objective is the plan to success."

Suggested items--25 lbs. oats, 10 candles

72 Hour Kit: 1 large candle, 3 day supply food (Milk carton with 2 liters of water) Water purifying tablets, supplies for infants

March

"We encourage all Latter-day Saint families to become self-reliant and independent."

Suggested items--25 lbs. dried beans (Variety) 5 boxes matches

72 Hour Kit: Matches, battery powered radio. Finish anything not done in February.

April

"The Lord has warned us of famines, but the righteous will have listened to the prophets, and stored at least a years supply." --Pres. Benson

Suggested items--25 lbs. pasta (variety), 2 flashlights and batteries

72 Hour Kit: Flashlight and extra batteries, paper and pencil, pencil sharpener, 10 one dollar bills

May

"But if any provide not for his own and specially for his own house, he hath denied the faith." The Apostle Paul

Suggested items--5 lbs. yeast, 10 pkg. toilet paper

72 Hour Kit: Toilet paper, paper towels, paper plates and cups, plastic utensils.

Review emergency map and escape plans.

June

"It is easier to keep up than to catch up."

Suggested items--5 lbs. oil or shortening, extra blankets

72 Hour Kit: Change of clothes for each family member--don't forget shoes.

Sleeping bag or blankets. Instruction manuals on Emergency Preparedness and First Aid

July

"Only those who have the patience to do simple things perfectly will acquire the skills to do difficult things easily."

Suggested items--25 lbs. dry milk, First Aid Kit

72 Hour Kit: First Aid Kit, utility knife and can opener

August

"We will see the day when we will live on what we produce." --Pres. Marion G. Romney

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Suggested items--Spices (those most used), feminine items

72 Hour Kit: Feminine items, plastic bags and ties for garbage, plastic baggies

Personal Documents: Scriptures, genealogy, legal papers, checkbook, etc.

September

"Dig a well before you get thirsty."

Suggested items--5 lbs. salt per person, 3 boxes laundry soap

72 Hour Kit: 10 one dollar bills, small ax, single flare, laundry soap

Review emergency plan with family.

October

"Let's be thankful for bread to live. Let's be thankful for bread to give."

Suggested items--10 lbs. peanut butter, medicines

72 Hour Kit: Medicines (Prescription and over the counter--ex. Tylenol, cold medicines)

Add to First Aid kit extra supplies

November

"Thrifty is the person who plans for tomorrow and not just for today."

Suggested items--100 lbs. potatoes, vitamins

72 Hour Kit: Bucket (plastic bucket with tight fitting lid), personal hygiene items (shaving, deodorant, shampoo, razor)

December

"If ye are prepared, ye shall not fear."

Suggested items--25 lbs. sugar or honey, toothpaste

72 Hour Kit: Toothbrush and toothpaste, disinfectant, 10 one dollar bills

Review emergency map and escape plan

Food storage for \$5 a week. What you are supposed to do is set aside \$5 a week and then buy specific items each week. You have a kitty set aside that you put the \$5 in and you can't touch it for any reason but to buy the food storage item for that week. You put in whatever remaining change you have back into the kitty. Some things in the beginning are going to be cheap and then later will be more expensive. In order to pay for the expensive stuff later you need to keep the leftover money in the kitty.

Week 1: Two cans tuna fish, 2 boxes salt

Week 2: 5 boxes of Macaroni and Cheese, 4 cans tomato soup

Week 3: 3 cans mushroom soup, 1 2.5 lb peanut butter

Week 4: 1 bottle vitamins

Week 5: 4 cans tomato soup, 1 10 lb powdered milk

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Week 6: 1 bottle aspirin (500 tablets)
Week 7: 1 100 lb container wheat
Week 8: 1 5 lb powdered milk
Week 9: 1 5 lb honey
Week 10: 4 cans tuna, 4 boxes macaroni and cheese
Week 11: 1 10 lb sugar, 1 box salt
Week 12: 4 cans mushroom soup
Week 13: 1 bottle vitamins
Week 14: 1 100 lb wheat
Week 15: 1 box macaroni and cheese
Week 16: 1 5 lb honey
Week 17: 2 cans tuna, 4 can tomato soup
Week 18: 1 10 lbs sugar
Week 19: 1 100 lbs of wheat
Week 20: 2 10lbs of sugar
Week 21: 1 10lb powdered milk
Week 22: 1 can mushroom soup, 1 10 lb sugar
Week 23: 1 can tuna, 4 cans tomato soup, 1 10 lbs sugar
Week 24: 1 10 lbs sugar
Week 25: 2 cans tuna, 2 cans mushroom soup
Week 26: 1 100 lb wheat
Week 27: 3 10 lbs sugar
Week 28: 1 10 lb sugar
Week 29: 1 10 lb powdered milk
Week 30: 2 10 lb sugar
Week 31: 1 can tuna, 3 cans mushroom soup
Week 32: 1 can tuna, 4 cans tomato soup
Week 33: 1 100 lb wheat
Week 34: 2 cans tuna, 1 box salt
Week 35: 1 10 lb powdered milk
Week 36: 2 10 lb sugar
Week 37: 4 cans tomato soup, 2 boxes salt
Week 38:
Week 39: 1 100 lb wheat
Week 40: 1 10 lb powdered milk
Week 41: 3 10 lb sugar
Week 42: 2 cans tomato soup, 1 10 lb sugar
Week 43: 2 cans tomato soup, 2 cans mushroom soup
Week 44:
Week 45: 1 10 lb powdered milk
Week 46: 4 cans tomato soup, 4 cans mushroom soup
Week 47: 1 10 lb powdered milk
Week 48: 4 cans mushroom soup, 1 10 lb powdered milk
Week 49: 7 cans of tomato soup
Week 50: 7 cans of mushroom soup
Week 51: 2 10 lbs sugar, 1 box salt

A few weeks you will have "off" to replenish the kitty. I haven't figured it out myself, but by the end you should have 700lbs of wheat, 240 lbs sugar, 40 lbs of powdered milk, 13 lbs of salt, 10 lbs of honey, 5 lbs of peanut butter, 45 cans of tomato soup, 32 cans mushroom soup, 15 cans

tuna fish, 10 macaroni and cheese dinners, 500 aspirin, and 730 multiple vitamins plus they suggest adding 6lbs of dried yeast and 6 lbs of shortening and this should be enough to sustain 2 people for a year. For every 2 people you have in your family add \$5 more and double or triple the amount of whatever you are buying that week. I hope this makes sense and if you have any questions let me know. For those of you not in the US, you'll have to figure out the equivalents yourself, sorry.~Contributed by Pam (Not her idea, though)

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Food Storage Plan for One Person for One Year

FOOD STORAGE REQUIREMENTS - ONE PERSON/ONE YEAR

(amounts for adults -- for children, divide by 2, except for milk)

GRAIN: 300-400 lbs.

(wheat, flour, pasta, rice, popcorn, oats, potatoes, baking mixes)

SALT: 5 lbs.

(store iodized rather than plain & in original container)

LEGUMES: 35-60 lbs.

(beans - all sorts, lentils, peanuts, dry soup mixes)

MILK: 17 lbs. per adult.....75 lbs. per child

(instant, regular dehydrated, canned 6 cans=1 lb.)

SUGAR: 100 lbs.

(granulated, brown, syrups, honey, flavored jellios, syrups)

OIL: 25-35 lbs.

(oil, shortening, margarine/butter, mayo, peanut butter)

(1 gal. oil=6 lbs.; 1 qt. mayo=1.5 lbs. oil; 1 lb. peanut butter=.5 lbs. oil)

WATER: 7-14 gal. WEEK (1 to 2gal./day)

FUEL: gas, kerosene, propane, wood, charcoal, candles, matches, starters

EXPANDED FOOD STORAGE - PER PERSON PER YEAR

FRUIT: 80 QUARTS (canned, bottled, dried)

VEGETABLES: 150 lbs.

MEATS: (According to your needs and tastes) 50 lbs., more or less

BAKING SUPPLIES: yeast, baking powder, baking soda, spices/flavorings

DETERGENTS: bleach, laundry soap, cleansers, dish soap

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PERSONAL PRODUCTS: toilet tissue (1 roll/wk), hand soap, shampoo, toothpaste, deodorant razors, feminine hygiene products

INSTANT MEALS: canned soups, canned pastas, canned chili (20 cans or more)

52 WEEK ACQUISITION PLAN TO ACQUIRE ONE YEAR'S STORAGE

MONTH 1

Week 1. Grain (45-50 lbs.)

Week 2. Canned meats: beef, turkey, chicken, tuna (25 cans to 25 lbs.)

Week 3. Baking supplies: yeast, baking soda, baking powder (1 box each)

Week 4. Vegetables: spaghetti sauce, salsa, other tomato products (25 cans to 50 lbs.)

MONTH 2

Week 1. Sugar-granulated, brown, powdered (50 lbs.)

Week 2. Canned/bottled fruits (30 qts.)

Week 3. Salt (5 lbs.)

Week 4. Water purification tablets/bleach - learn to use the method stored

MONTH 3

Week 1. Milk-dry/canned (30 lbs.)

Week 2. Canned/bottled fruits (30 qts.)

Week 3. Sugar-syrups (10 lbs.)

Week 4. Powdered eggs or egg substitute (necessary for most baking) (5 lbs.)

MONTH 4

Week 1. Grain & dehydrated potatoes or other potato items (50 lbs. each)

Week 2. Juice (6 gallons)

Week 3. Oil-veg oil or shortening (20 lbs.)

Week 4. Light source (batteries/flashlights, candles/matches, lanterns, etc.)

MONTH 5

Week 1. Legumes - beans (30 lbs.)

Week 2. Soup - dry mixes or canned (20 cans/10 lbs. dry)

Week 3. Spices, herbs, seasoning, vinegars

Week 4. First aid supplies - basic kit or expand what you have

MONTH 6

Week 1. Grain - pasta (50 lbs.)

Week 2. Pudding mixes (5 lbs.)

Week 3. Gelatin mixes - count toward sugar (5 lbs.)

Week 4. Emergency cooking equipment -- barbecue, propane stove, firewood

MONTH 7

Week 1. Milk - dry/canned (30 lbs.)

Week 2. Jams/jellies - (20 lbs.)

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Week 3. Vegetables - canned (50 lbs.)

Week 4. Personal essentials - hygiene, feminine, baby needs

MONTH 8

Week 1. Grain - oats or rice (50 lbs.)

Week 2. Nuts - dry roasted keep best, or Peanut Butter (5 - 15 lbs.)

Week 3. Canned meats (25 lbs.)

Week 4. Medicinal supplies - basic meds and prescriptions

MONTH 9

Week 1. Sugar - honey (20 lbs.)

Week 2. Vitamins/mineral supplements

Week 3. Dry fruit - raisins, leather, chips, dehydrated (5 lbs.)

Week 4. Detergents/cleansers

MONTH 10

Week 1. Grain - flour (50 lbs.)

Week 2. Oil - peanut butter, mayonnaise, butter powder - (15 lbs.)

Week 3. Baking extras - cocoa, coconut, chocolate chips, nuts, peanut butter

Week 4. Emergency sewing supplies

MONTH 11

Week 1. Grain - wheat (50 lbs.)

Week 2. Dry mixes - pancake, breads, cakes, cookies, other

Week 3. Clothing and bedding - evaluate and update

Week 4. Condiments

MONTH 12

Week 1. Legumes - (30 lbs.)

Week 2. Seeds/sprouting supplies

Week 3. Fruits and/or vegetables (20 qts. each)

Week 4. Paper supplies - toilet tissue, plastics/foils

FIFTH WEEKS

1. WATER

2. WATER

3. WATER

4. WATER

(14 gal. per person is 1 week supply.)

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Monthly Food Storage Purchasing Calendar

January

January 2 - 8

1 case canned fruit

2 #10 cans instant potatoes

January 9 - 15

3 #10 cans dry milk
January 16 - 22
3 #10 cans dry milk
January 23 - 28
9 pounds yeast
January 28 - February 5
Anything you have missed from above

February

February 1-7

Water Storage Containers-buy either 55 gallon drums, 5 gallon water containers (available at all emergency preparedness stores and some super markets) and spigot, or start to save water in pop bottles and plastic juice containers. Also purchase 100 lbs. hard white wheat and three plastic storage buckets with tight fitting lids. Check out the local mills in your area for best prices.

Feb. 8-14

25 lbs of sugar or 20 lbs of honey

5 lbs salt per person

bucket opener

Feb. 15-21

4 #10 cans shortening or 4 - 48 oz bottles oil

2 #10 cans of dry instant milk

Feb. 22-28

2 case canned beans (like refried pinto, black, kidney, white, pink etc.) or 25 lbs dry beans (preferable) and bucket to store them in.

Also one #50 bag dried corn or popcorn (about 10.00 from a mill or food storage company) and a bucket to store it in. (Can be ground into cornmeal as well as for popcorn.)

(All grains and beans can be put into #10 cans if you have access to a cannery. If not, the buckets work well.)

March

(please note that many of these items are repeats because we want to be SURE you have enough of the essentials!)

March 1-6

Enough water containers for 14 gallons per person in the family. (This was mentioned last month-but we want to be sure you have this, water is your most important item!) If you didn't get enough containers last month, you can get them this month.

White Rice, at least 15 pounds per person in the family and if possible buckets to store it in. (Brown Rice goes rancid faster.)

March 7-13

2 jars mayonnaise

1 gallon oil

2 tubs shortening

March 14-20

25 pounds sugar

1- 25 pound bag of legumes (pinto, lentils, white, pink etc.)

March 21-27

Salt 5 more lbs
2 bottles of bleach
1 #10 can or 1 box of dry milk.

March 28-31

Check your list for the last 8 weeks and purchase any items you fell short on. These items are essential ones and you will need to be sure you have enough.

April

April 1-10

100 pounds wheat
10 lbs. brown sugar

April 11-17

2 #10 size cans dried fruit
or 1 case canned fruit
1 pound yeast

April 18-24

1 case tuna or salmon
2 #10 cans milk
3 lbs sprouting seeds -available in the Osmond Network Store
1 80 oz can Rumsford baking powder

April 25-30

2 large jars peanut butter or
1 #10 can peanut butter powder (last longer)
2 cans dried whole egg (keep in a cool dry place)

May

May 2-8

2 to 3 bottles of multi-vitamins
2 #10 cans of rolled oats
(if #10 cans are not available in your area, buy the largest packages available in your local store, and also purchase a small bucket to store it in.)

May 9-15

100 lbs. of wheat
3 buckets

May 16-22

#10 can margarine powder - or shortening if marg. powder is unavailable
2 #10 cans rolled oats
(or equivalent, and a storage bucket)

May 23-29

4 #10 cans instant potatoes
1 bottle black pepper

June

June 1-5

2 cans dry milk, 2 boxes of Rennet (used for making cottage cheese and other dairy products from dry milk.)
1 bottle lemon juice, 1 bottle vinegar. (also used in making dairy products from dry milk)

June 6-12

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100 lbs wheat

25 lbs. white flour

June 13-19

Baking soda (try to buy in bulk in places like Sam's Club or Cosco) Buy about 10 lbs.

25 lbs. or legumes (choose those you are willing to eat. Remember you can sprout legumes and almost quadruple the nutritional value of them.

Buy one large box Knox or other gelatin to be used in place of eggs in baking. Recipes to follow.

June 20-26

Tomato products (try to buy them by the case in normal size cans.

Spaghetti sauce, tomato sauce, and whole and chopped tomatoes. Buy a combination of flavored and not flavored tomatoes. Buy paste if you can get a good deal on it. It is less expensive to add water to paste to make sauce than it is just to buy sauce sometimes. Buy three cases if possible.)

June 27-30

Be on the look out for garden seeds that are NON- Hybrid. That way you can use the seeds from the plants you grow to grow a garden the next season. A good price for them is about \$18-20 per can with about 10 varieties per can.

July

July 4 - 10

200# wheat

(buckets to store it in if needed)

[keep filling pop bottles, Gallon syrup containers, etc. with water - basically no cost to this)

July 11 - 17

20 lbs. Peanut butter

[keep filling those water containers]

July 18 - 24

4 #10 cans shortening

2 # 10 cans dry milk

[keep filling water containers - make this a habit - when you empty something worthy of water storage, wash it and fill it right away]

July 25 - 31

6 #10 cans dry milk

[more water!]

August

August 1 - 7

25# rice

25# sugar

1 # 10 can instant potatoes

5 lbs. salt

August 8 - 14

1 case tuna or salmon or other meat

2 # 10 cans dry milk

August 15-21

2 #10 cans dry milk

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Untitled Document

2 cans shortening

1 #10 can instant potatoes

August 22 - 28

Note* In late August and early September, many stores have sales on canned fruits and vegetables. Ask your local store when these sales will be, and switch the weeks of this calendar as needed.

2 cases fruit

5 lbs. salt

August 29 - September 4

2 cases canned fruit

1 case misc. vegetables (green beans, peas, carrots, etc.)

September

September 5 - 11

2 cases canned fruit

1 case misc. vegetables

September 12 - 18

2 cases canned fruit

2 cans shortening

September 19 - 25

2 cases fruit

1 case vegetables

September 26 - October 2

2 cans shortening

25# rice

buckets to store rice if it did not come in #10 cans

October

October 3 - 9

100 lbs. wheat and 3 buckets

October 10-16

1 case tuna or other meat

October 17-23

25 lbs. Sugar

2 large cans fruit juice powder

October 24-30

3 #10 cans dry milk

October 31-November 6

9 #10 cans potato flakes

November

November 7-13

4 large jars peanut butter

November 14-20

1 case canned fruit

15 pounds rice

November 21-27

7 #10 cans shortening

November 28 - December 4

50 pounds rice and buckets to store

December

December 5 - 11

100 lbs. wheat and 3 buckets

December 12-18

1 large can fruit juice powder

3 large jars peanut butter

December 19 - 25

3 #10 cans dry milk

December 26 - January 1

50 pounds of rice, oats, or barley

buckets to store

If you cannot find some of these items locally,

be sure to check our list of ADDRESSES of several businesses who sell these items.

It is vital to get WATER - STORAGE . If you don't have water, you will not be able to use many of the foods you have that are dehydrated or require water to cook. Many times in natural disasters, the electricity goes down and you will not be able to access your water. Sometimes the water is contaminated from flooding and cross-contamination from sewage. You will need water, at very least, you will need 3 days worth.

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Start your food storage on \$10 a week

by Alan T. Hagan

If Old Mother Hubbard had had a food storage program before she went to her cupboard her poor dog would have gotten his bone. Given the fact that her cupboard was bare it was probably because she didn't have the wherewithal to fill it. Finding the resources to put food by against troubled times is a common problem, but it is solvable, even for those of us on tight budgets. In fact, over the long term, the food storage program you start now will save you money. It is like starting a savings account. You earn interest through greater savings in your grocery budget.

Despite what many believe, you don't have to spend large amounts of money on specially packaged foods to put away a sizable food store. You certainly can do this if you like, but what you're doing is trading money (and a good deal of it) to save effort and time. Turn that equation around and you can save a lot of money if you're willing to spend a bit more time and effort to get what you want.

Depending on what you decide is important to you, everything you will need for a complete food storage program can be had from your local grocer and, perhaps, some other local businesses.

Preparing for what?

Before buying anything you should sit down at the kitchen table with paper and pencil because you have some decision making to do. Ideally, everyone who ll be depending on the food storage should be at the table as well, but the person who will be responsible for the program can do it alone, if necessary.

Your first decision to make is what are you storing food for? What situations and circumstances do you think might occur which would cause you to need your food stores and prevent you from easily being able to get more? Make a list of everything that occurs to you which you think has some significant probability of happening. Just jot them all down as they come to you and then on another sheet reorder them according to how likely you think they are to occur. While you are doing this, make a note beside each one of whether or not you will have some means of cooking or preparing food should it come about. You d really hate to have stored away hundreds of pounds of food only to find yourself with no way to make it into a meal. This process is called scenario planning.

Once you have your list, write next to each scenario the length of time you feel it might last. Chances are, the situations that will concern you most are weather related and some of the more common man-made disasters, but may also cover long term unemployment, Y2K (the millennium computer bug), severe economic depression, war or civil insurrection, or threats even more exotic (cometary impacts, anyone?).

Now that you have a list of probable scenarios and the length of time you think each may last, you are ready to plot the course of your program. Plan your food purchases to meet the needs of the shortest duration scenarios on your list first. As you accomplish each goal set your sights on the next longest and work towards covering that one. In this way you are steadily preparing for one scenario after another while making progress towards your ultimate goal of meeting the needs of your longest lasting concerns.

How do I pay for it?

Right off the bat, I want to say where you should not get the money to pay for your food storage and that is by running up debt. This means that you should not put your food purchases on credit cards. The money lost to credit card interest rates is self-defeating in the long run and will just get you further into a problem rather than getting you out of it. If you are the type who can and does pay off their credit card purchases every month when the bill comes due, then using one might be a real convenience; otherwise it s a temptation to be avoided.

FOODSTUFF QUANTITY/PRICE

white rice 5 lbs./\$1.79

10 lbs./\$3.45

20 lbs./\$6.90
Tang
(Makes six quarts) 21 oz./\$2.99
white sugar 5lbs./\$1.99
powdered milk 25.6 ozs./\$4.39
(8qts@3.2oz./qt.)
64 ozs./\$9.99
(20qts@3.2 oz./qt.)
canned carrots 14.5 oz. can/50
canned pumpkin 15 oz. can/\$1.09
pinto beans 2 lbs./\$1.00
10 lbs./\$4.49
all purpose flour 10 lbs./\$2.10
5 lbs./\$1.19
vegetable shortening 5 lbs./\$2.39
canned tuna 6 oz. can/50
canned spinach 13.5 oz can/69
canned turnip,
kale, mustard or
collard greens 14 oz. can/50

Fortunately, the financial outlay need not be so great that you must spend your children s college fund or sacrifice your retirement account. With a little forethought and research it might be so little as to represent the family foregoing one restaurant meal a month or renting a video to watch at home rather than paying full admission to see a first run film at the theater.

As a matter of fact, unless you are compelled by special circumstances to do otherwise, you are better off to not spend a lot of money at first. Like many other long term projects, there is a learning curve involved with building a good food storage program. Your initial purchases will most likely be small while you re learning more about what you need to do. In this way you are less likely to make expensive mistakes that will have to be corrected later.

If you can afford to spare as little as ten dollars a week then you can make a solid beginning in putting food by against time of need. Just today I made a trip to one of my larger local supermarkets, Albertson s, and wrote down a few prices. (See table.)

Rice, flour, beans, milk, sugar, shortening, Tang, canned greens, carrots, pumpkin, and tuna will make for a pretty bland diet, but for only \$40 and a month s time it will give you a solid start on a good program. In the second month you can begin to expand the variety of foods in your program.

The specific types and amounts of food I ve listed are not meant as rigid rules, but as illustrations of what can be done. Your personal tastes and the circumstances of the scenarios you ll be planning for are what should determine your specific purchases. It is important to only purchase those

foods you are presently already eating or are willing to learn to eat starting as soon as you purchase it. Otherwise, there will be the temptation to leave it in its container and not use it. This is bad planning because it leads to failure to rotate the foods out in a timely fashion as they age or lose nutritional content and palatability. By not using the foods in your storage program you also do not get the experience of how to make them into tasty, attractive meals your family will want to eat. This will leave you at a severe disadvantage when the crunch comes and what's in your larder is all you're going to get.

As I cover each purchase I'll give some considerations you should think about such as: If you don't foresee having a way to bake bread, then buying a lot of flour might not make much sense, but you might make flat breads instead or learn to do your baking in a Dutch oven. If some of your short term plans call for removing to another location on short notice, then the food for that part of your planning needs to be of a type that can be eaten with little preparation or cooking being required. If safe water will be in short supply, then foods that require a lot of it to prepare them might not be a good idea.

The foods that I have chosen all have excellent storage characteristics for the short to medium term, up to about two years. Detailed information and instructions on storing foods may be found in my Prudent Food Storage FAQ. If you have Internet access you may download a copy free from the Providence Cooperative web site at <http://www.providenceco-op.com> or from

one of the host sites that also carry it. Many of them may be found by searching on the term prudent food storage using most any search engine.

The first week

Your first \$10 storage food purchase buys 10 pounds of rice, 2 pounds of beans, a jar of Tang, and 5 pounds of vegetable shortening. The 17 cents change is carried over into the next week.

This amount of rice and beans gives a ratio of 5:1, a perfectly acceptable essential amino acid balance (commonly called making a complete protein) for most healthy adults. An extra \$3.45 expenditure will double the amount of rice and another \$3.49 will buy five times the amount of beans. Purchasing the rice and beans first means you have food that can be made edible with no other foods having to be added to them and needing no preparation other than boiling. If cooking fuel is short, split peas, lentils, and black eyed peas cook quickly. Pre-soaking and/or pressure cooking is even more economical.

The Tang orange drink provides 100% of the US RDA vitamin C requirement in every 8 oz. glass (6 qts. = 24 8-ounce glasses), lesser amounts of other important nutrients such as vitamin A as well as some sweet taste since we have not yet bought anything else with sugar in it. Vitamins A, C, and D are the major nutrients typically lacking in most storage foods. Don't assume that any drink mix or canned juice has vitamin C in it. Read

the nutritional facts label on the side closely to see what the manufacturer claims it contains. An appalling number of juice products, even some canned citrus juices, claim no vitamin C content at all.

The last purchase is the can of vegetable shortening. Fat is actually a necessary nutritional component even if we do tend to eat too much of it in the present day U.S. The shortening allows you to make foods such as biscuits, fry breads, refried beans, pancakes, fried rice and pan breads, and contributes flavor. In a survival diet, fat is an important source of vital calories. This is an important consideration for small children, pregnant women, the elderly, and the ill who might otherwise have trouble eating enough bulky beans, rice, etc., to gain sufficient calories to stave off weight loss and possible malnutrition.

The second week

Your second \$10 nets you 20 pounds of all purpose white flour, 5 pounds of granulated white sugar, 3 cans of carrots, and 3 cans of spinach. The 24 cents left over is carried over into the next week.

You now can make bread to give some variety to your rice and bean diet. If you don't have any store-bought yeast to raise your bread, you can do what your pioneer forebearers did and learn to make sourdoughs to leaven it. If you have a grain mill or can acquire one then you may be able to find a local source of whole grains at a reasonable price to supplement or replace the white flour. The sugar allows you to make sweet breads, puddings from the flour or rice, adds calories, and greatly contributes to taste.

Of all the canned vegetables to be had from the grocer the dark green and the orange vegetables give the most nutritional value for the money. Canned greens such as turnip, mustard, collards, spinach, and kale range in value from 50-110% of the RDA of the important nutrient vitamin A (in the form of carotene) per half-cup serving. Many of them also include a fair amount of calcium and vitamin C as well. The carrots have 100% RDA of Vitamin A per half-cup.

The third week

The third ten spot buys you the 64 oz. box of dry milk. The slim remaining penny is carried over into the next week.

Sixty-four ounces of non-fat dry milk will make 20 quarts of skim milk to provide essential amino acids, necessary calcium, along with vitamin D (30% of the RDA of calcium and 25% of vitamin D per 8 oz. glass of reconstituted milk). Unlike fresh liquid milk, the dry powder is shelf stable and can be stored for long periods of time. It may be drunk as straight milk or used to enhance dishes made from the ingredients purchased in the other weeks. Dry milk can also be used to make excellent yogurt and even non-fat cheese.

The fourth week

Your last purchase of the first month's cycle brings in 10 cans of tuna, 2 cans of pumpkin, and 5 cans of turnip, mustard, kale or collard greens. The remaining 32 cents is added to the surplus from the prior weeks, now totaling 74 cents.

Although the grain, beans, and milk provide all necessary amino acids, most of us will rebel at a purely vegetarian diet, so at least a little meat three or four days out of a week can go a long way towards making matters tolerable. Other canned meats can be substituted, but as a general rule tuna is leanest and cheapest per ounce. Beware of paying canned meat prices for fillers like pasta, rice, or potatoes. They can be added much more cheaply after the fact rather than buying them already in the can with the meat.

The pumpkin (plain solid pack, not pie filling) can be used like any winter squash, carrots, or sweet potatoes and carries a tremendous amount of vitamin A in the form of carotene (300% of the RDA per half-cup). A friend of mine has developed a pumpkin biscuit that I've grown quite fond of. It makes a good baked dish and is very versatile in casseroles, soufflés, puddings, and as either a sweet or savory vegetable. There's more to pumpkin than pies.

The 74 cents left over seems trivial but it will buy 2 1-pound cartons of iodized table salt, or yeast to make bread with, or baking soda for leavening and other uses, or a small can of pepper to season food. You can also hold it over to combine into the next month's surplus.

The purchasing cycle could be repeated month to month until you reach the amounts you desire, or varied to broaden the selection in your cupboard.

If you can afford to use the economies of scale that making larger bulk purchases gives you, then the price per pound of the foods you buy will drop considerably. By taking advantage of sales, bulk food outlets, warehouse groceries such as Sam's Club and Costco, local restaurant and institutional food suppliers, or ethnic grocers (Asian, Hispanic, etc.) you will do considerably better than what I've outlined above.

If you have the time and resources available to you, much of the fruit and vegetable portion of your storage program can be economically acquired by growing it yourself. Not only do you get wholesome food, but by putting it up yourself you get exactly what you want in the way that you want it. If being frugal is of paramount importance though, growing your own will need some careful analysis to be certain you're not spending more in time, labor, and equipment than the value of the food will make up for. This is especially true when it comes to food preservation, but you can at least partially offset this by choosing appropriate preservation methods. Pressure canning requires quite a bit of expensive startup equipment (canner, jars, lids, rings, etc.) which may make the operation uneconomical. However, if you dry the food instead

you can often do this at a much lower cost.

One area of home preservation that generally will be worthwhile to do yourself is canned meats. Beef, pork, and chicken often go on sale and can be had for quite reasonable prices, so even with the price of the jars and equipment necessary to process it, home canned meat will usually be cheaper per pound than any commercially canned meat of equivalent quality.

There are two cardinal rules of successful food storage: The first is store what you eat and eat what you store. The second is to rotate, Rotate, ROTATE! Follow them always, keep a watchful eye on your local grocer's offerings, and be willing to make a moderate investment of time and effort. Do this and you'll have a successful food storage program that your family will look forward to eating in good times or bad without sacrificing your financial well being to get it.

HOME

STORING SUGAR, HONEY AND OTHER SWEETENERS

There are a wide number of sugars to be found for purposes of sweetening foods. Fructose is the primary sugar in fruit and honey; maltose is one of the sugars in malted grains; pimentos are found in olives and sucrose is what we know as granulated or table sugar. Sucrose is a highly refined product made primarily from sugar cane though sugar beets still contribute a fair amount of the world supply. Modern table sugar is now so highly refined as to be virtually 100% pure and nearly indestructible if protected from moisture. Powdered sugar and brown sugar are simple variations on granulated sugar and share its long life.

Liquid sweeteners do not have quite the longevity of dry sugars. Honey, cane syrup, molasses, corn syrup and maple syrup may crystallize or mold during long storage. These syrups are chemically not as simple as table sugar and therefore lose flavor and otherwise break down over time.

D.1 TYPES OF GRANULATED SUGARS

Buying granulated sugar and its close cousins is really a very simple matter. Buy a brand you know you can trust and be certain the package is clean, dry and has no insect infestation. There's very little that can go wrong with it.

GRANULATED: Granulated sugar does not spoil, but if it gets damp it will likely cake up or get lumpy. If it does, it can simply be pulverized again until it regains its granulated texture. Granulated sugar can be found in varying textures, coarser or finer. "Castor/caster sugar" is a finer granulation than what is commonly sold as table sugar in the U.S. and is more closely equivalent to our super fine or berry sugar.

POWDERED, CONFECTIONERS, ICING: All names refer to the same kind of sugar, that is white granulated sugar very finely ground. For commercial use there is a range of textures from coarse to ultra-fine. For home consumption, what is generally found is either Very Fine (6X) or Ultra-Fine (10X), but this can vary from nation to nation. Not all manufacturers will indicate the grind on the package. Sugar refiners usually add a small amount of corn-starch to prevent caking which will make it undesirable for use in sugar syrups or solutions where clarity is needed.

Powdered sugar is as inert as granulated sugar, but it is even more hygroscopic and will adsorb any moisture present. If it adsorbs more than a little it will cake up and get hard. It's difficult to reclaim hardened powdered sugar, but it can still be used like granulated sugar where clarity in solution (syrups) is not important.

BROWN, LIGHT & DARK: In the United States brown sugar is basically just refined white sugar that has had a bit of molasses or sugar syrup and caramel coloring added to it. Dark brown sugar has more molasses which gives it a stronger flavor, a darker color and makes it damp. Light brown sugar has less molasses which gives it a milder flavor, a blonder color and is slightly dryer than the dark variety. For storage purposes you may want to just stock the dark variety. Light brown sugar can be made by combining one fourth to one third white sugar to the remainder dark brown sugar and blend thoroughly.

Both varieties need to be protected from drying out, or they will become very hard and difficult to deal with. Nor do you want to allow them to become damper than what they already are.

There are granulated and liquid brown sugars available, but they don't have the same cooking qualities as ordinary brown sugars. They also don't dry out and harden quite so readily either.

RAW, NATURAL, & TURBINADO: In recent years, sugar refiners have realized that there is a market for less refined forms of cane sugar in the U.S. and have begun to sell this kind of sugar under various names and packagings. None of it is really raw sugar since it is illegal to sell it in the U.S. due to the high impurities level in the truly raw product. All of it has been processed in some form or fashion to clean it, but it has not been subjected to the full refining and whitening processes of ordinary white table sugar. This leaves some of the natural color and a mild flavor in the sweetener. All of these less refined sugars may be stored and handled like brown sugar.

Outside of the United States it is possible to buy truly raw sugar and it can be found under names such as "muscavado", "jaggery" (usually a raw palm or date sugar), "demerara" and others. With all of the molasses and other impurities retained it is quite strong in flavor so would not be suited to general use, but there are recipes that call for it. In spite

of moisture and impurities it can be stored like brown sugar since its sugar content is high enough to inhibit most microbial growth.

D.1.1 STORING GRANULATED SUGARS

All granulated sugars have basically the same storage requirements. They need to be kept in air tight, insect and moisture proof containers. For powdered, and granulated sugar you might want to consider using some desiccant in the storage container if your local climate is damp. Since brown sugars and raw sugars are supposed to be moist, they do not need desiccants. Shelf life is indefinite if kept dry, but anything that you intend to eat really should be rotated over time. Time has a way of affecting even the most durable of foods.

I've used brown sugar that was six years old at the time it was removed from storage and, other than the molasses settling somewhat toward the bottom, it was just fine. A friend to whom I gave a bucket of the brown sugar finished it off three years after I gave it to her which was nine years after it was packaged and it, too, was fine.

D.2 TYPES OF HONEY

Honey is probably the oldest sweetener known to man. Its use predates recorded history and has been found in the Egyptian pyramids. It's typically sweeter than granulated sugar by a factor of 25%-40% depending upon the specific flowers from which the bees gather their nectar. This means a smaller amount of honey can give the same amount of sweetening as sugar. The source flowers also dictate the flavor and the color of the sweetener as well. Honey color can range from very dark (nearly black) to almost colorless. As a general rule, the lighter the color and the more delicate the flavor, the greater the price the honey will bring. As you might expect, since honey is sweeter than table sugar, it also has more calories as well -- an average of 22 per teaspoon compared to granulated sugar's 16 per teaspoon. There are also trivial amounts of minerals and vitamins in the bee product while white sugar has none.

Although the chance is remote, raw honey may also contain minute quantities of *Clostridium botulinum* spores and should not be fed to children under one year of age. PLEASE READ THE POST FROM GERI GUIDETTI CONCERNING THIS BELOW. Raw honey is OK for older children and adults. Honey is not a direct substitute for table sugar however, its use in recipes may call for a bit of alteration to get it to turn out right.

Honey comes in a number of forms in the retail market and they all have different storage characteristics:

WHOLE-COMB: This is the bee product straight from the hive. It is the most unprocessed form in which honey comes, being found as large pieces of waxy comb floating in raw honey. The comb itself will contain many unopened honey cells.

RAW: This is unheated honey that has been removed from the comb. It may contain bits of wax, insect parts and other small detritus.

FILTERED: This is raw honey that has been warmed to make it more easy to filter out small particles and impurities. Other than being somewhat cleaner than raw honey it is essentially the same. Most of the trace amounts of nutrients remain intact.

LIQUID/PURE: This is honey that has been heated to higher temperatures to allow for easier filtering and to kill any microorganisms. Usually lighter in color, this form is milder in flavor, resists crystallization and generally clearer. It stores the best of the various forms of honey. Much of the trace amounts of vitamins, however, are lost.

SPUN or CRYSTALLIZED: This honey has had some of its moisture content removed to make a creamy spread. It is the most processed form of honey.

D.2.1 BUYING HONEY

Much of the honey sold in supermarkets has been blended from a variety of different honeys and some may have even had other sweeteners added as well. Like anything involving humans, buying honey can be a tricky business. It pays to deal with individuals and brands you know you can trust. In the United States you should buy products labeled U.S. GRADE A or U.S. FANCY if buying in retail outlets. However, be aware there are no federal labeling laws governing the sale of honey, so only honey labeled pure is entirely honey and not blended with other sweeteners. Honey grading is a matter of voluntary compliance which means some producers may be lax and sloppy about it. This can be a real nuisance when producers use words like "organic", "raw", "uncooked" and "unfiltered" on their labels, possibly to mislead. Fortunately, most honey producers are quite honest in their product labeling so if you're not certain of who to deal with, it is worthwhile to ask around to find out who produces a good product.

Honey may also contain trace amounts of drugs used in treating various bee ailments, including antibiotics. If this is a concern to you, then it would be wise to investigate with your local honey producer what has been used.

D.2.2 STORING HONEY

Honey is much easier to store than to select and buy. Pure honey won't mold, but may crystallize over time. Exposure to air and moisture can cause color to darken and flavor to intensify and may speed crystallization as well. Comb honey doesn't store as well liquid honey so you should not expect it to last as long.

Storage temperature is not as important for honey, but it should be kept from freezing and not exposed to high temperatures if possible. Either extreme can cause crystallization and heat may cause flavor to strengthen

undesirably.

Filtered liquid honey will last the longest in storage. Storage containers should be opaque, airtight, moisture and odor-proof. Like any other stored food, honey should be rotated through the storage cycle and replaced with fresh product.

If crystallization does occur, honey can be reliquified by placing the container in a larger container of hot water until it has melted.

Avoid storing honey near heat sources and if using plastic pails don't keep it near petroleum products (including gasoline/diesel engines), chemicals or any other odor-producing products.

D.2.3 RAW HONEY AND BOTULISM

From: Geri Guidetti arkinst@concentric.net

Duane Miles wrote:

If I recall correctly, honey contains very, very small amounts of the bacteria that cause botulism. For adults, this seldom causes problems. Our immune system is capable of dealing with small numbers of even nasty bacteria, they do it all the time. The problem is when we get large numbers of bacteria, or when our immune system is damaged or not yet developed.

That is where the problem with honey comes in. Some people used to use honey to sweeten milk or other foods for infants. Infants immune systems sometimes cannot handle the bacteria that cause botulism, and, of course, those infants became seriously ill. So pediatricians now advise strongly against using honey for children under a certain age.

Yes, raw honey can contain the temperature resistant spores of *Clostridium botulinum*, the bacterium that causes botulism. The organism is a strict anaerobe, meaning that it only grows in the absence of molecular oxygen. The problem with infants and honey is that the small, intestinal tract of an infant apparently is sufficiently anaerobic to allow the spores to germinate into actively growing *C. botulinum* organisms. Essentially, the infant serves the same role as a sealed, airtight, contaminated can of beans as far as the organisms are concerned. There in the infant's body the bacteria secrete the dangerous toxin that causes the symptoms of botulism. There have been quite a few documented infant deaths due to honey. As I recall, the studies identifying honey as the source were done in the '80s. Most pediatricians recommend no honey for the first year. It is probably best to check with your own for even later updates...Geri Guidetti, The Ark Institute

EDITOR'S NOTE: The advice not to give raw honey or foods containing raw honey to infants under one year of age still stands. Do please understand, though, that honey is not the only means by which infants can

suffer from botulism, in many of which cases no certain source of contagion could ever be determined. The actual chances of any infant being stricken is actually very, very small but keeping the child's colon open, active and healthy can reduce it even more. Breastfed children seem to be more resistant as well.

D.2.4 HONEY OUTGASSING

Q: My can of honey is bulging. Is it safe to use?

A: Honey can react with the can lining to release a gas especially when stored over a long period of time. Honey's high sugar content prevents bacteria growth. If there is no sign of mold growth, it is safe to eat.

FREQUENTLY ASKED FOOD QUESTIONS, FN250

D.3 TYPES OF CANE SYRUPS.

MOLASSES & CANE SYRUP: These two sweeteners are not precisely the same thing. Molasses is a by-product of sugar refining and cane syrup is simply cane juice boiled down to a syrup, in much the same way as maple syrup is produced. Non-Southerners (U.S.) may know it better as unsulphured molasses even if this is not completely correct. Sulphured molasses is also available on the market and very cheap as well, but it's strong flavor is unattractive and generally not desirable.

SORGHUM SYRUP: This is produced in the same manner as cane syrup, but sorghum cane, rather than sugar cane, is used. Sorghum tends to have a thinner, slightly sourer taste than cane syrup.

TREACLE: This sweetener comes in varying colors from a rather dark version, similar to, but not quite the same as blackstrap molasses, to paler versions more similar to golden syrup.

All of the above syrups are generally dark with a rich, heavy flavor.

GOLDEN SYRUP: This syrup is both lighter and paler in color than any of the above three, more similar to what we would call a table syrup here in the U.S.

TABLE SYRUP: There are many table syrups sold in supermarkets, some with flavorings of one sort or another such as maple, various fruits, butter, etc. A close examination of the ingredients list will reveal mixtures usually of cane syrup, cane sugar syrup or corn syrup along with preservatives, colorings and other additives. Table syrup usually has a much less pronounced flavor than molasses, cane or sorghum syrup or the darker treacles. Any syrup containing corn syrup should be stored as corn syrup.

D.3.1 STORING CANE SYRUPS

All of the above syrups, except for those having corn syrup in their

makeup, have the same storage characteristics. They can be stored on the shelf for about two years and up to a year after opening. Once they are opened, they are best kept in the refrigerator to retard mold growth. If mold growth does occur, the syrup should be discarded. The outside of the bottle should be cleaned of drips after each use. Some pure cane and sorghum syrups may crystallize in storage, but this causes no harm and they can be reliquified using the same method as for honey. Molasses or other sugar refining by-products won't usually crystallize, but will dry into an unmanageable tar unless kept sealed.

D.4 CORN SYRUP

Corn syrup is a liquid sweetener made by breaking down cornstarch by an enzyme reaction. Available in both a light and a dark form, the darker variety has a flavor similar to molasses and contains refiners syrup (a byproduct of sugar refining). Both types often contain flavorings and preservatives. It is commonly used in baking and candy making because it does not crystallize when heated. Corn syrup is very common in the U.S., but less so elsewhere.

Corn syrup stores poorly compared to other sweeteners and because of this it often has a best if used by dating code on the bottle. It should be stored in its original bottle, tightly capped, in a cool, dry place. New unopened bottles can be expected to keep about six months past the date on the label.

After opening, keep the corn syrup four to six months. These syrups are very prone to mold and to fermentation so be on the lookout for bubbling or a mold haze. If these present themselves, throw the syrup out. You should always be certain to wipe off any drips from the bottle after every use.

D.5 MAPLE SYRUP

Maple syrup is produced by boiling down the sap of the maple tree (and a lot of it too) until it reaches a syrup consistency. Maple syrup is slightly sweeter than table sugar and is judged by much the same criteria as honey: Lightness of color, clarity and taste. Making the sweetener is very energy and labor intensive so pure maple is generally expensive and most pancake syrups are corn and cane sugar syrups with either natural or artificial flavorings. Maple flavored pancake syrups should be kept and stored as corn syrups.

New unopened bottles of maple syrup may be kept on a cool, dark, shelf for up to two years. The sweetener may darken and the flavor get stronger, but it is still usable.

After the bottle has been opened, it should be refrigerated. It will last about a year. Be careful to look out for mold growth. If mold occurs, discard the syrup.

note

Regarding maple syrup (the real stuff). If you find mold on it - Do not discard it!!

"Mold found on syrup is harmless. It may be restored to a usable condition by reheating to the boiling point and skimming." - from the back of the traditional metal syrup can.

Syrup doesn't go bad very easily. Usually requires that it get diluted somehow and then it can sour.

HOME

Basic Food (one year supply)

Fruit & Vegetables - 370 lbs per person

(Dried fruits & Vegetables can reduce the weight to about 90 lbs per person)

Grains (Wheat, Rice, Corn, other Cereal Grains) - 300 lbs per person

Nonfat Dry Milk - 75 lbs per person

Dried Legumes - 60 lbs per person

Sugar or Honey - 60 lbs per person

Salt - 5 lbs per person

Fat or Oil - 20 lbs per person

Optional Food (one year supply)

Comfort/stress foods (cookies, candy, breakfast cereals, soda pop, instant coffee, tea bags, cocoa, etc.)

Dried spices (choose the spices your family likes)

Juices (canned or powdered, kool-aid)

Vitamins

Baking powder

Bouillon (beef & chicken)

Pasta (spaghetti, macaroni, lasagna, etc)

Basic & Optional Supplies

Cooking & Eating Utensils (pots, pans, plates, cups, forks, spoons,

knives, etc.)

Can Opener (no electricity required)

Flashlights with Extra Batteries

Swiss Army Knife

Multi-Purpose Tool Box

Matches & Lighters (some waterproof/windproof)

Candles and Oil Lamps

Chemical Light Sticks

Fire Extinguisher

Rope

Aluminum Foil

Plastic Buckets (plenty of extra buckets on hand)

Sewing Kit (needles, thread, scissors, etc)

Smoke Alarms (Extra Batteries)

Shut off Wrenches (Water, Gas, etc.)

Baby Supplies (bottles, bottle liners, wipes, diapers, ointments, etc.)

Rolls of Plastic Sheeting (solar stills, shelter, roof leak repair, many uses)

Toilet Paper

Hygiene Supplies (toothpaste & brushes, floss, deodorant, razors, shave cream, hydrogen peroxide, shampoo, etc.)

Feminine Hygiene Supplies (may want to consider the Keeper)

Cleaning Supplies (soap, detergents, disinfectants, chlorine bleach, garbage bags)

Extra Personal Items (contacts & solution, eyeglasses, dentures, retainers,

Pet supplies (food, litter, vaccines, etc.)

Communications

HOME

CB Radio/walkie-talkies

Radio Frequency Scanners

AM/FM radio with weather band (battery Operated)
(High powered reception)(Plenty of extra Batteries)

First Aid Kit

syrup of ipecac
Band-Aids - assorted sizes
nylon or paper tape
butterfly bandages (3 - make with 1 " adhesive tape)
adhesive tape - 1" wide
gauze - 2" wide
cotton - tipped swabs
telfa sterile pads (4)
gauze sterile pads 4"x4" (10)
sterile eye pads (2)
magnifying glass (remove splinters ~ dirt in eyes)
tweezers
flashlight (light outage ~ check pupils)
needle (remove splinters)
antibacterial ointment (bacitracin ingredient)
sharp, blunt end scissors
ammonia inhalant (fainting)
calamine lotion (insect bites, poison ivy)
children's aspirin & liquid acetaminophen - only as directed by a physician
petroleum jelly (helps prevent nosebleeds, lubricate thermometer)
hydrogen peroxide (cleans wounds after initial cleansing, keep away from eyes)
iodized salt (heat exhaustion, 1tsp. Salt in qt. Water)
plastic drinking cups
ace bandage (3" wide)
safety pins
thermometer (rectal for under 4 years of age)
large clean cloth (to restrain child or for burns)
tape measure (length of wounds)
rubbing alcohol (remove ticks)
bar soap, non-perfumed
insect kit (if history of severe allergies)
baking soda (soothes insect bites)

Medical

Special Equipment (if anyone has special equipment needs gear up)

Special Conditions (if anyone has special conditions gear up on supplies)

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Prescriptions (see if your Doctor will write up extra prescriptions?)

Money

Cash (one month supply)

Power & Heat

Batteries - (plenty of extra batteries for everything you can think of)

Generator & Fuel

Wood Burning Stove

Kerosene Heaters

Warming Pads for hand/body

Other Alternate Heat Sources (battery powered carbon monoxide detector)

Extra blankets & sleeping bags and winter clothing

Dogs are a good heat source

Water

Water Storage Containers (1,5,55 gallon etc.)

Water Filters / Purification Systems

Water Purification Tablets

Bleach for Water Purification

Solar Water Stills

Other

Anything else you can think of that you might need or want!

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FIRST AID: 1 each Basic First Aid Book, in plain language

2 each Bandages (Ace) elastic, 4"

4 each Bandages, gauze, 2" x 2"

2 each Bandages, gauze, 3" x 3" and 4" x 4"

1 each Bandages, gauze, 18" x 36"

2 each Bandages for burns (Second Skin) 3" x 3-1/2"

3 each Triangular Bandages

1 box Band-Aids in assorted sizes, flexible and moisture resistant best

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1 box Bicarbonate of Soda
1 box Butterfly sutures or Leukostrips
1 each Cold/heat Pack, reusable
1 box Cotton Swabs
1 box Dental Floss
1 box Epsom Salts
1 each Eyedropper
2 rolls First Aid Tape, 1/2" x 10 yards and 1" x 5 yards
4 pair Gloves, lightweight rubber, (for medical and hygiene purposes)
1 tube Insect Repellent
1 bottle Isopropyl Alcohol
1 bottle Meat Tenderizer for insect bites and stings
1 box Moistened Towelettes
1 each Nail Clipper
1 box Razor Blades, single edge
1 box Safety Pins, assorted sizes
1 each SAM splint
1 each Scalpel
1 each Scissors, Surgical pointed
1 each Snake bite kit
1 bottle Soap, liquid, antibacterial
6 each Tongue Depressors
2 each Thermometers, disposal OR 1 digital, (no breakables with mercury)
1 each Tweezers

=====

1 tube Analgesic Cream (Camphophenique, Paraderm Plus)
1 box Antacid (Mylanta, Tums, Pepto-Bismal)
1 series Antibiotic (Tetracycline for general infections)
1 box Anti-Diarrheal (Imodium, Diasorb, Lomotil)
1 box Anti-fungal (Desenex, Micatin, Tinactin, Lotrimin)
1 box Antihistamine (Benadryl, Claratyne)
1 tube Antiseptic Ointment (Neosporin, Dettol)
1 each Anti-toxin (DMSO)
1 tube Burns (Hydrocortisone, Derm-Aid)
1 box Cold/Flu Tablets (Nyquil, Repetabs)
1 box Constipation (Ex-Lax, Dulcolax, Durolax)
1 bottle Cough Syrup (Robitussin, Dimetap)
1 box Decongestant (Actifed, Sudafed, Repetabs)
1 bottle Eye Drops (Visine)
1 tube Hemorrhoid Relief (Preparation H, Anusol)
1 box Ibuprofen (Advil, Nurofen, Paracetamol)
1 bottle Itching, Insect/Rash (Caladril, Calamine)
1 tube Itching (Dibucaine, Paraderm, Lanacane)
1 tube Lip Balm (ChapStick, Blistex)
1 tube Lubricant, Water Soluble (K-Y Jelly)
1 bottle Nasal Decongestant (Sinex, Ornex)
1 box Nausea, Motion Sickness (Kwells, Dramamine, Travacalm, Meclizine)
1 box Non-Aspirin Pain Reliever (Tylenol)
1 box Pain, Fever Reducer (Panadeine, Mobigesic)
1 box Pain Reliever with Codeine (Panamax, Tylenol 3)
1 Prescription (A supply of any you are taking)

- 1 jar Petroleum Jelly (Vaseline)
- 1 bottle Poison Ivy/Oak
- 1 packet Poison Absorber (Activated Charcoal)
- 1 bottle Radiation Protection (Potassium Iodide-[KI] or Potassium Iodate-[KIO₃] either is fine)
- 1 can Sunburn Relief (Solarcaine, Paxyl)
- 1 bottle Sunscreen (SPF 15 at least)
- 1 bottle Vomit Inducer (Ipecac, Activated charcoal)
- 1 tube Yeast Infection Treatment (Gyne-Lotrimin, Monistat)

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GENERAL SUPPLIES

Updated September 25, 2001

CAMPING GEAR

- 36 each Candles
- 200 each Fire Starters (jelly, ribbon, tablets, impregnated peat bricks, wax-coated pine cones, magnesium block, flint)
- 1 each First Aid Kit (see list)
- each Fuel Refills (for each type, propane, sterno, diesel, gas)
- 2 each Fishing Kit
- 4 each Foam Mattress Pads (for under sleeping bags, swags, etc.)
- 4 cans Insect Repellent
- 1 each Kettle, huge, with lid (at least lobster pot size) for boiling water
- 18 each Light sticks (12 hour)
- 4 each Lighter (butane)
- 4 bottles Liquid Detergent for clothes and dish washing
- 1 each Mosquito Netting
- 4 each Plastic Sheeting or Tarps (waterproofing between sleeping bag and ground)
- 2 each Propane Lanterns and Extension Poles
- 2 each Propane Tank (20 lb or 9 Kg,)
- 4 each Propane Wicks or Socks
- 1 each Portable Clothes Line and Pegs or Clothes Pins
- 2 each Prescriptions for current medications
- 4 each Sleeping Bag, Bedroll, Swag or Wool Blankets
- 1 each Snake Bite Kit
- 4 each Space Blankets (reflects up to 90% of your body heat and only weighs 20 oz)
- 2 each Tents (2 person)
- 5 each Trash Bags*
- 1 each Wash Board
- 1 each Wash Tub for laundry
- 10 boxes Waterproof Matches

* Purchase the heaviest, largest trash bags available for countless uses like an extra tent, emergency wind/rain protection or keeping pack and contents dry)

CARRYING ITEMS

4 each Backpack for supplies
4 each Fanny pack for short excursions
1 each Five Gallon Pail with Lid
4 each Water Canteen

CLOTHING

24 each Bandanas (inexpensive shield face, head cover, wash cloth, bandage, sanitary pad)
12 each Complete Change of Clothing* (3 for each person)
2 each Current Prescription Glasses
12 each Dust Masks
12 each Extra 3 sets of underwear (3 for each person)

1 each Gas Mask if you are living in one of the top 120 major cities

8 pair Heavy Socks for boots
4 each Rain Poncho OR Rubberized Parka and Rain Pants (oversized to layer clothing underneath - these items are preferable over the Rain Poncho-offers more protection)
4 each Sturdy Boots
4 each Sunglasses
4 pair Tennis Shoes
4 pair Work Gloves, heavy duty
*Most people will need to consider seasonal changes. Every season, update your stored change of clothes for appropriate weather conditions. In winter, include coats, hats, gloves, thermal underwear, snow boots and clothes for layering.

COMMUNICATION ITEMS

1 set \$1000. in cash and change (during times of disaster charge cards and checks will not be honored*)
2 each Compass of good quality
6 each Notepad
2 each Map of your local area
4 each Pen
4 each Pencil
1 set Phone numbers and addresses of friends/family
1 set Pre-addressed, stamped postcards of friends and family out of state (if a disaster is widespread, you'll want to contact someone out of the area)
1 each Radio (solar, hand cranked or battery powered)
8 each Road Flares (these are not legal in Australia)
1 each Short-wave Radio (plus extra batteries)
12 each Signal Flares (these are not legal in Australia)
4 each Signal Mirror
4 each Signal Whistle

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*Money is always hard to tuck away and pretend it isn't there, but in this instance, it is a necessity. One can't depend on merchants accepting credit cards during a crisis. Think about it. Whenever you make a purchase, it is always verified by a telephoned authorization number. If phone lines are down and these numbers are not obtainable, chances are your proposed purchase won't be allowed.

COOKING ITEMS

2 rolls Aluminum Foil, heavy weight
2 each Boning Knife
2 each Bread Loaf Pan
1 each Butcher Knife
1 each Camp Stove
1 each Can Opener, manual, heavy duty
1 each Corkscrew
6 each Dish Cloths
1 each Dutch Oven, large with lid, stainless steel or cast iron best*
Food/Water Supplies (see Long-Term Storage suggestions)
Fuel for Camp Stove (see Propane Tank listed in Camping Gear)
1 each Grater
1 each Grain Grinder, manual
1 each Hot Pad
6 each Melamine Plates and Cups (aluminum gets too hot)
1 each Metal Coffee Maker or Billy Can
1 each Mixing Bowl, Large
1 each Mixing Bowl, Small
2 each Pancake Turners, metal not plastic
1 each Paring Knife
1 roll Plastic Wrap
2 each Quart Containers with Lids (for purifying water, you need 2 so water can be poured back and forth to re-oxygenate)
1 each Sauce Pan, large with lid, stainless steel or cast iron best*
1 each Sauce Pan, small with lid, stainless steel or cast iron best*
1 each Spoons, Metal
2 each Spoons, Wooden
1 each Skillet, large with lid, stainless steel or cast iron best*
5 pkgs Water Purifying Tablets (50 count)
2 each Water Purification System (see article water purifiers)
2 boxes Ziploc Freezer Bags, gallon
2 boxes Ziploc Freezer Bags, quart
*If you elect to cook outside, cover food to guard against insects. In Australia there are nasty blowflies (blowies in OZ speak) which do rather rude things (lay maggot eggs) in any meat, given the chance. Using lids will also expedite cooking and water boiling times which reduces fuel consumption.

INFANT SUPPLIES

3 sets Baby Clothes
2 bottles Baby Powder

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2 bottles Baby Wash
2 each Blankets
3 each Bottles
26 boxes Diapers, disposable (24 count)
1 bottle Diaper Rash Ointment
? cans Formula
2 bottles Lotion
1 each Teething Ring
2 boxes Towelettes, Premoistened
Toys

LATRINE AND GENERAL HYGIENE

12 pair Surgical Gloves (these are inexpensive and can be obtained in discount stores)
1 each Camping Potty
2 bottle s Disinfectant
3 gallons Liquid Bleach and Eye Dropper
4 bottles Liquid Detergent for clothes and dish washing
4 each Sponges
2 boxes Steel Wool Pads like Brillo
40 rolls Toilet Paper, rolls flattened
2 boxes Towelettes, Premoistened (in addition to ones for infants)
120 each Trash Bags, large (for human waste and misc. rubbish)
4 bottles Vinegar

MISCELLANEOUS

1 each Bible
1 each Board Games: Scrabble, Monopoly, Chess, Backgammon, Checkers,
8 each Books for pleasure
1 set Certified Copies of:
wills
birth, death, marriage certificates and divorce decrees
house and life insurance policies
inventory of valuable household items
deeds and contracts
stocks and bonds
charge card account numbers and their "lost or stolen" notification numbers
bank account numbers
medical records including immunizations
social security numbers
passports, where pertinent for each family member

*Keep these items in waterproof containers. Many survival and camping stores sell flat, water tight pouches. If you have a food vacuum sealer, this is another great use for it!

Ammunition, appropriate to and if firearm is selected
1 each Clock, wind-up manually like Big Ben and Baby Ben

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2 each Firearm, (pistol and rifle recommended, personal choice item, see Firearms Page if you don't know where to start))
1 each Hunting Knife
2 decks Playing Cards
1 each Magnifying Glass
1 box Paper Clips, assorted sizes
1 box Rubber Bands, assorted sizes
1 box Safety Pins, assorted sizes
1 each Survival Manual

PERSONAL HYGIENE

1 bottle After Shave
2 months Birth Control
2 bottles Body/Hand Lotion
4 each Comb and Brush
1 set Cosmetics
2 each Dental Floss
4 each Deodorant
3 bottles Liquid Soap for personal washing
1 box Panty Liners
1 bottle Perfume
3 pkgs Razor Blades (10 count)
3 bottles Shampoo
1 box Tampons/Sanitary napkins
4 each Toothbrush
3 tubes Toothpaste
1 each Tweezers, pointed
8 each Wash Cloths & Towels

PET CARE

18 each Chew Bones
10 bags Dog Food, dry (4 Kg or 10 Lb each)
2 each Food Bowl
2 each Leash and Collar
2 each Muzzles
5 bags Litter
1 each Litter Box
1 pkg Litter Box Liners
2 each Toys
1 each Water Bowl
? gallons Water*, one gallon per dog per day. For a cat, it is about 1 pint.

*(Even if it is a small animal, plan on the unexpected. SOMEBODY will undoubtedly spill their day's ration and the pet's water can be used in emergency.)

SENIOR CARE

2 each Batteries for Wheelchairs and Hearing Aids

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- 1 each Crutches or Walkers, Tips and Pads
- 2 boxes Denture Care Items
- 1 spare Eye Glasses
- 2 months Heart or Blood Pressure Medications
- 2 months Prescriptions
- Special Dietary Items
- 3 sets Warmer Clothing (generally the elderly have trouble with poor blood circulation and get cold easier)

TOOLS & HANDYMAN ITEMS

- 2 each ABC Fire Extinguisher (check for expiration date)

- 1 each Axe
- 6 each Bungee Straps (variety of lengths)
- 1 each Bush or Tree Saw
- 1 set Buttons, assorted sizes
- 1 each Crowbar
- 1 each Drill, Hand-operated
- 3 rolls Duct Tape
- 4 each Flashlight (extra batteries, spare bulbs)
- 1 each Generator, diesel preferably 5 KW
- 1 each Hammer
- 1 each Hatchet
- 1 roll Masking Tape (for labeling, etc)
- 1 box Nails, assorted sizes
- 1 pkg Needles and Thread, assorted "eye" sizes
- 1 box Pins
- 1 each Pliers, needle nose
- 1 each Pliers, regular
- 1 each Post Hole Digger, auger type
- 100' (30 meters) Rope, Nylon
- 1 each Scissors
- 1 each Screwdriver, Phillips
- 1 each Screwdriver, Flat Head
- 1 each Shovel, Rounded V-shaped for digging
- 1 each Sledgehammer
- 1 each Staple Gun and Staples
- 1 each Swiss Army Knife
- 100' (30 meters) Twine or Heavy String
- 1 each Vice Grips
- 1 each Wire Cutters
- 1 each Wench and Cable, manual
- 1 each Wrench

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GRAIN VARIETIES

Some of the most important decisions in food storage planning are what kinds of grains to include, but many people do not give this adequate thought. Some just buy however much wheat or corn or rice they think is necessary to meet their needs and leave it at that. Others rely on pre-packaged decisions made for them by their storage food retailer who put together a "year's supply of food" to buy all at once. Either decision could be a major mistake.

There are a number of food storage plans one may use as a guide. Many are based on the so-called "Mormon Four" of wheat, milk, honey and salt, with as many additional foods as the planner found desirable. When it was created in 1937, this plan may have been OK, but we've learned a great deal since then. An unfortunate number of people in our society develop allergies to one kind of food or another. One of the more common food allergens is wheat. Even more unfortunate is the fact that many people who have an allergy to wheat don't even know it. They won't become aware of it until they try to live with wheat as a large part of their diet. For this reason you should store what you eat and eat what you store, so that ugly surprises such as this don't come up when it's too late to easily avoid them.

A second reason to think about storing a selection of different grains is appetite fatigue. There are those who think providing variety in the diet is relatively unimportant and that if and when the time comes they'll eat what they've got and that will be that. For healthy, well-adjusted adults under ordinary circumstances or who have that vital survival mindset this might be possible without too much difficulty. However, the entire reason for having a food storage program is for when circumstances aren't ordinary. Times of crisis produce stress -- possibly physical, but always mental. If you are suddenly forced to eat a diet both alien and monotonous, it is going to add just that much more stress on top of what you are already dealing with. If your planning includes the elderly, young children and/or infants they might just quit eating or refuse to eat sufficient amounts and become unable to survive. This is not a trivial problem and should be given serious consideration. Consider the positive aspects of adding variety and comfort foods to your storage program.

In his book, *Making the Best of Basics*, James Stevens mentions a post-WWII study by Dr. Norman Wright, of the British Food Ministry, which found that people in England and Europe were more likely to reject unfamiliar or distasteful foods during times of stress than under normal conditions. When it's wheat, day in and day out, wheat's going to start

becoming distasteful fast. Far better to have a variety of foods on hand to forestall appetite fatigue and, more importantly, to use those storable foods in your everyday diet so that you'll be accustomed to them.

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Emergency Preparedness(72hr List)

Updated October 24, 2002

This list is whittled to bare essentials for three days' survival. Many other items would certainly be nice, but for those on a strict budget, plan your gear around these core items. Any additional supplies can be added to suit personal taste and budget. Where quantities aren't noted, assume only one of this item is needed. Suggested amounts are for one person only, especially in the area of water consumption. The exception to this rule is the First Aid Kit. These medical items were planned with a small family in mind. They can be divided between the adults or maintained in one central kit.

72-hour survival kits should be packed and kept in your car. If disaster strikes while you are home, chances are you can get to your vehicle. If a crisis occurs while you are traveling, even to the grocery store, your survival supplies are already on board.

If you have a spouse, he or she should be carrying an identical pack in his/her car. Provisions for children and pets need to be included too. If children are not of driving age or don't have their own car, supplies for them should be kept in your vehicle. Many items for children need not be duplicated like a compass, tools or much of the camping gear, but each person must have the daily recommended amount of water and food.

In Colorado, during winter months, meteorologists periodically remind people to always keep in the car: water, candles, matches, chocolate, extra blankets, energy bars and peanut butter. Expecting the unexpected became embedded in our brains. In minutes a heavy, wet "white-out" (snow) can drop from the mountains, blind and strand motorists. Preparation is merely good common sense. This list below is much the same theory with a few embellishments!

General Supplies (72hr List)

Updated October 22, 2001

Camping Gear

Candles, enough for 36 hours use
First Aid Kit (see list)
Foam Pads to go under sleeping bag, bedroll, etc.
Lighter
Light sticks (12 hour,) three
Mosquito Netting
Plastic Sheeting
Prescriptions for current medications
Sleeping Bag, Bedroll, Swag or Wool Blankets
Space Blanket (reflects up to 90% of your body heat and only weighs 20 oz or 500g)
Trash Bags, Extra (heaviest and largest available for extra misc. uses)
Tube Tent
Waterproof Matches, two boxes

Carrying Items

Backpack for supplies
Five Gallon (20 liter) Pail with Lid
Water Canteen with Strap

Clothing

Complete Change of Clothing*
Current prescription glasses
Dust Masks, three Extra

Gas Mask if you are living in one of the top 120 major cities

Rain Poncho OR Rubberized Parka and Rain Pants (oversized to allow for clothes layering)
Sturdy boots and Heavy Socks
Sunglasses
Underwear, 2 sets
Work Gloves, heavy duty

*The majority of people will need to consider seasonal changes. Every season, make sure to update your stored change of clothes for the appropriate weather conditions. For winter, include coats, hats, gloves, thermal underwear, snow boots and clothes for layering.

Communication Items

\$200 in cash and change (during times of disaster, charge cards and checks can't be verified)*
Compass of good quality (these are expensive but necessary)
Map of your local area
Notepad
Pencil, Pen
Phone numbers and addresses of friends/family
Pre-addressed, stamped postcards of friends and family out-of-state (if a disaster is widespread, you'll want to contact someone out of the area)

Signal Flares, three (these are not legal in Australia)

Signal Mirror

Signal Whistle

*Money is always hard to tuck away and pretend it isn't there, but in this instance, it is a necessity. One can't assume to put expenditures on credit cards during a crisis. Think about it. Whenever you make a purchase, it is always verified by a telephoned authorization number. If phone lines are down and these numbers are not obtainable, chances are your purchase won't be allowed.

Infant Supplies (if applicable)

Baby Powder

Blanket , spare

Bottles, spare

Diapers, disposable

Formula

Lotion

Pre-Moistened Towelettes

Teething Ring

Toys

Latrine And General Hygiene

Disinfectant

Liquid Bleach and Eyedropper

Sponge

Surgical Gloves, three pair (these are inexpensive and can be obtained in discount stores)

Toilet Paper, two rolls flattened

Towelettes, pre-moistened, box

Trash Bags (three, for human waste and misc. rubbish)

Miscellaneous

Ammunition if a firearm is selected

Bible

Book for Pleasure Reading

Certified copies of*:

wills

births, deaths, marriage certificates and divorce decrees

house and life insurance policies

inventory of valuable household items

deeds and contracts

stocks and bonds

charge card account numbers and their "lost or stolen" notification

numbers

bank account numbers

medical records including immunizations

social security numbers

passports

*(Keep these items in water tight containers. Many survival and camping stores sell flat, water tight pouches. If you have a food vacuum sealer, this is another great use for it!)

Deck of Playing Cards

Firearm for Protection (personal choice item)

Magnifying Glass

Paper Clips

Rubber Bands

Safety Pins, assorted sizes

Survival Manual

Personal Hygiene

Body/Hand Lotion

Comb and Brush

Dental Floss

Deodorant

Liquid Soap for personal washing

Premoistened Towelettes

Shampoo

Tampons/Sanitary napkins

Toothbrush

Toothpaste

Tweezers, pointed

Wash Cloth and Towel

Pet Care (if applicable)

Food and Food Bowl

Leash and Collar

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Muzzle

Toys or Chew Bone

Water Bowl

Water, one gallon (4 liters) per dog per day. For a cat, it is about 1 pint.*

*(Even if it is a small animal, plan on the unexpected. SOMEBODY will undoubtedly spill their day's ration and the pet's water can be used in extreme emergency.)

Senior Care (if applicable)

Denture Care Items

Batteries, extra (for hearing aids)

Eye Glasses

Heart and/or Blood Pressure Medications

Oxygen, Portable (extra tanks and hoses if this is required)

Prescriptions

Special Dietary Items

Warmer Clothing (generally the elderly have trouble with poor circulation and get cold easier.)

Tools and Handyman Items

Flashlight (extra batteries, spare bulb)

Folding Shovel

Hatchet

Multi-Purpose Tool with knife, pliers, screwdrivers

Needles and Thread, select several needles with large and regular-sized eyes

Nylon Rope (100' or 30 meters)

Radio (solar, hand cranked or battery powered; if battery, include extra batteries)

Roll of Duct Tape (this has innumerable uses)

Swiss Army Knife

Twine/String (100' or 30 meters)
Vise Grips

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First Aid Items (72hr List)

Updated October 22, 2001

- 1 Basic First Aid Book, in plain language
- 2 Bandages (Ace) elastic, 4" (10cm)
- 4 Bandages, gauze, 2" (5cm) x 2"
- 2 Bandages, gauze, 3" (8cm) x 3" and 4" (10cm) x 4"
- 1 Bandages, gauze, 18" (45cm) x 36" (90cm)
- 2 Bandages for burns (Second Skin) 3" (8cm) x 3.5" (9cm)
- 3 Triangular Bandages
- 1 box Band-Aids in assorted sizes, flexible and moisture resistant best
- 1 box Bicarbonate of Soda
- 1 box Butterfly sutures or Leukostrips
- 1 Cold/heat Pack, reusable
- 1 box Cotton Swabs
- 1 box Dental Floss
- 1 box Eyedropper (additional to the one for chlorine bleach)
- 2 rolls First Aid Tape, .5" (1.25cm) x 10 yds (9m) and 1" (2.5cm) x 5 yds (4.5m)
- 3 pair Gloves, lightweight rubber, (for medical and hygiene purposes)
- 1 tube Insect Repellent
- 1 bottle Isopropyl Alcohol
- 1 bottle Meat Tenderizer for insect bites and stings
- 1 box Moistened Towelettes
- 1 Nail Clipper
- 1 bottle Potassium Iodide-[KI] or Potassium Iodate-[KIO₃] (either is fine)
- 1 box Razor Blades, single edge
- 1 box Safety Pins, assorted sizes
- 1 SAM splint
- 1 Scissors, Surgical pointed
- 1 bottle Soap, liquid, antibacterial
- 6 Tongue Depressors
- 2 Thermometers, disposable OR 1 digital, (no breakables with mercury)
- 1 Tweezers

- 1 tube Analgesic Cream (Camphophenique, Paraderm Plus)
- 1 box Antacid (Mylanta, Tums, Pepto-Bismal)
- 1 Antibiotic (Tetracycline for general infections)
- 1 box Anti-Diarrheal (Imodium, Diasorb, Lomotil)
- 1 tube Anti-Fungal (Desenex, Micatin, Tinactin, Lotrimin)
- 1 box Antihistamine (Benadryl, Claratyne)
- 1 tube Antiseptic Ointment (Neosporin, Dettol)

- 1 tube Burns (Hydrocortisone, Derm-Aid)
- 1 box Cold/Flu Tablets (Nyquil, Repetabs)
- 1 box Constipation (Ex-Lax, Dulcolax, Durolax)
- 1 box Cough Syrup (Robitussin, Dimetap)
- 1 box Decongestant (Actifed, Sudafed, Repetabs)
- 1 bottle Eye Drops (Visine)
- 1 tube Hemorrhoid Relief (Preparation H, Anusol)
- 1 box Ibuprofen (Advil, Nurofen, Peracetamol)
- 1 bottle Itching, Insect/Rash (Caladril, Calamine)
- 1 tube Itching (Dibucaine, Paraderm, Lanacane)
- 1 tube Lip Balm (ChapStick, Blistex)
- 1 tube Lubricant, Water Soluble (K-Y Jelly)
- 1 bottle Nasal Decongestant (Sinex, Ornex)
- 1 box Nausea, Motion Sickness (Kwells, Dramamine, Travacalm, Meclizine)
- 1 box Non-Aspirin Pain Reliever (Tylenol)
- 1 box Pain, Fever Reducer (Panadeine, Mobigesic)
- 1 Prescription(s) (A supply of any you are taking)
- 1 jar Petroleum Jelly (Vaseline)
- 1 bottle Poison Ivy/Oak
- 1 packet Poison Absorber (Activated Charcoal)
- 1 can Sunburn Relief (Solarcaine, Paxyl)
- 1 bottle Sunscreen (SPF 15 at least)
- 1 bottle Vomit Inducer (Ipecac Activated charcoal)
- 1 tube Yeast Infection Treatment (Monistat, Gyne-Lotrimin)

Before You Say "Too Hard"...

Many items can be obtained at discount stores like Sam's, Costco, Target, K-Mart and Wal-Mart. Other supply sources are second-hand stores, Salvation Army, Army Surplus stores and garage sales. This does not have to be a "Cadillac" set of gear. Supplies are for survival. Nothing has to be "designer", only functional.

If your first inclination is to say, "I can't AFFORD this!" Think practically where corners can be cut in the weekly budget. If your family goes out to the movies, why not rent a video and "rat-hole" those \$\$ spent for the show? If nothing else, bring your refreshments from home - expensive candy bars, soft drinks and popcorn CAN cut into the wallet! Put those extra dollars toward survival gear. A few less nights of fast food can pay for your 72-hour survival food! In the area of Personal Hygiene, discount stores offer travel sizes which can reduce not only the carrying weight of your backpack, but space taken up and \$\$ spent.

Stored water doesn't have to be Perrier or some other expensive brand. Treated tap water stored in empty 2-litre soft drink bottles suffice nicely. In fact, mineral water will only make a person thirstier. (See our Long Term Storage area for other ideas.)

The most expensive item on this list is the compass. Good hand-held compasses range from US\$50 - \$250. A decent Boy Scout compass can be purchased for around US\$50. If you are completely lost, there can be no

dollar value placed on this item. It is not cheap, but we have several ideas.

Talk to other folks of like mind, possibly you can put together a group purchase and bring down individual cost. Try this approach with Army surplus stores. If you have a Sam's Club or other bulk food warehouse in your area, ask them about supplying some of the desired items for large purchases. Apply this strategy to the First Aid Kit and General Supplies as well as the Food Items.

This information may be used by you freely for noncommercial use only with my name and email address attached.

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HOME

Using Dry Ice To Preserve Your Food.

See the dry ice info web site...

Even though oxygen absorbers are easier, I prefer using dry ice to store my foods because it is so much cheaper and as a fumigant it actively kills bugs as well. All one needs is a bucket with a lid that will make an airtight seal and a little dry ice. Dry ice is a solid and looks much like regular ice - except that it's -110 degrees F. below zero (-78.5C). You have to use a lot of caution when handling this product as it will burn your skin if it makes contact.

1/4 cup dry ice in hot water is great fun. Not to be used without adult supervision.

Actually, dry ice can be a lot of fun. Put a cube in a glass of water and kids will watch the thick cloud that boils off. It will compete with your TV, at least for a while. When I was a kid back in the 50's we used to put dry ice in our home made root beer to make it fizzy.

Dry ice is frozen carbon dioxide. Carbon dioxide is a harmless enough gas as long as it doesn't dissipate all the oxygen in the air you are breathing. Unless you are doing this in an airtight closet, there shouldn't be anything to worry about. But be aware that under unusual circumstances carbon dioxide can kill you. I got an E-mail once from a lady reading this page who said a friend "died while using dry ice during a Halloween haunted house program." Apparently, he was under a card table covered with a blanket, using water and dry ice to make a thick cloud. "It didn't take an airtight closet to kill him," she said. Counter this

with the news story of the woman who put a whole tub of dry ice under her husband's bed trying to 'do him in.' When she was arrested for attempted murder she said, "I don't understand, it worked on Matlock!"

We breath in air containing oxygen and breath out air containing carbon dioxide. There's carbon dioxide in our houses all the time simply because we are breathing. I've heard people say you have to do this outside or the fumes will get you. That's the reason I'm making such a big deal out of this. Just use common sense.

Carbon dioxide, in it's frozen form, is highly compressed compared to it's gaseous state. A pound of it contains enough carbon dioxide gas to make 8.3 cubic feet of carbon dioxide gas. A six gallon bucket contains 1.46 cubic feet of space. Fill the bucket full of beans or wheat and you have about 0.48 cubic feet of air left in the container surrounding your food. So, if you use twice as much dry ice as you actually need to displace the air in the bucket, you will need about .06 lbs, or right at one ounce of dry ice. Heck, be generous and put in two ounces of dry ice if you like. The smallest amount of dry ice I can purchase is 5 lbs which costs me \$5.00. At even 2 ounces per bucket, that's enough dry ice to take care of preserving 40 buckets of food, more than I have ever done at one time. At two ounces per bucket, this is enough dry ice to push the air out of a six gallon bucket four times. You want a little bit of overkill or redundancy here as it's always better to overdo this than under-do it and end up with oxygen left in the container. Realize also that this is a purging operation. Even really good purges generally only get out 90% of the air. As air is about 21% oxygen, this would still leave 2% oxygen in your container. You aren't going to get it all out, just most of it.

Where To Get Dry Ice. I get all my dry ice from a welding supply shop. It's also often available at ice cream places and chemical supply houses. When you get your dry ice you need to bring your own container to put it in. There is one thing you really need to watch for if you are going to be using dry ice to preserve your foods. You must prevent water vapor from freezing on the outside of the dry ice. This moisture would later melt off the dry ice in the bottom of your bucket and increase the water content of your dried foods. As you don't often have a lot of room to play with as far as water content is concerned, it is important to ensure you don't add any moisture to your product with your dry ice. The dry ice you buy from the store should be water free, and that's the way you want to keep it.

Dry ice is always giving off carbon dioxide gas, so it's relatively easy to keep the water moisture from it. Just be sure you don't put it into a container that breaths, like a paper bag or cardboard box. I use a Tupperware container which has it's own lid. This container is just right because it's lid is tight enough to keep water vapor from the ambient air out, but loose enough to permit the carbon dioxide gas to escape as it sublimates. By the time you get it home, there will be a thick layer of frost on the outside of the container - exactly where you want it, on the

Untitled Document

outside - not the inside. The inside will be moisture free because of the continually escaping carbon dioxide gas.

There was one time I purchased dry ice which had a bunch of water crystals mixed in with it. You can tell this because there is a white powder mixed in with the dry ice cubes. Ice is just a tiny bit whiter than the light blue dry ice. You can put a teaspoon or two of this powder in a bowl, wrap plastic wrap around the top, and wait for it to turn into a gas. If it's indeed water, when it melts you will get a little liquid in the bottom of your bowl. If it was 100% dry ice, the bowl will be dry.

You can use dry ice with powders, such as flour, powdered milk, eggs, cheese and things like this. But you need to be a little careful because if you pack it too tightly the expanding carbon dioxide gas will push whatever it is you are packing, up and out the top of the container. I always put the dry ice on the bottom of the container before I add the product. You could put the dry ice on the top of the food when powders are being stored, but this would do nothing to get the oxygen out that is mixed in with the powder. At home I use dry ice to preserve all my seeds. This includes all the grains and legumes. As long as it is a food which air can freely circulate around, dry ice works great. Dry ice will work fine with all the pastas as well.

Before you ever buy it, plan on having your packing operation complete 5-6 hours after you've purchased the dry ice. Otherwise, it may 'sublimate' away on you until it's gone whether you are finished packing your buckets or not.

So, how do you do it?

Materials Needed: A food scale, a measuring cup, dry ice, the food you are planning on preserving, and storage containers.

The process: Zero your food scale with the measuring cup sitting on top of it. Open the container with your dry ice in it and take out about 1/3 cup and measure it. Depending on how your dry ice cubes are shaped, you should have about 2 ounces. (Remember, if you want to be stingy, one ounce will do the trick, that's 28.5 grams.)

Two ounces of dry ice in the bottom of a plastic bucket.

Pour this into the bottom of the bucket in a neat little pile and place a paper towel over the top. Why the paper towel? It keeps the dry ice away from the food, not that it's that important. Now place your product inside the bucket, filling the bucket up to within a 1/2 inch of the top. Set the lid lightly on top and wait. Recently, I have been sealing the lid all the way around except for one small side.

Leave at least part of the lid unsealed until the dry ice has dissipated.

You DO NOT want to seal the lid completely as the carbon dioxide and air must have a place to escape. If the lid makes an airtight seal, the expanding carbon dioxide inside the bucket will continue to increase in pressure until something gives - either the lid will pop off or the bucket will split. Either way you are going to have food all over the

place. How do you know when all the dry ice is gone and it's safe to seal the lid? Simply pick up the bucket and feel the bottom. If it is still icy cold there's still dry ice in the bottom. You may need to be a little patient here. My experience has been that it takes 1 to 2 hours for all the dry ice to change into a gas. I've had others E-mail me saying they had to wait around for 5-6 hours! So you may wish to plan in a certain amount of time for this in case it takes a while. You want to seal the lid just as soon as this has happened, however, because if you don't, air will start circulating back into the container.

After 15 or 20 minutes, I start checking my buckets, and then recheck them every ten minutes or so. After you seal your buckets, it's always a good idea to keep an eye on the lids for the next hour or so. The lids will start bulging up if you sealed them a bit prematurely. If this happens, use a bucket lid remover to crack open the lid on one side to let the excess gas escape, then seal the lid back down. I'm not sure why, as my logical brain tells me it should be otherwise, but over the next several days there will usually be a small vacuum created inside the bucket and the side will pop in a little bit. Don't concern yourself with this. Your bucket will store just fine.

Amaranth Rose, with an advanced degree in Biology and a person who understands these things answered the perplexing question why the buckets preserved with dry ice develop a partial vacuum after a few days. She says, "I've used dry ice and liquid carbon dioxide in electron microscopy work. Liquid carbon dioxide is used to dehydrate samples, as it is miscible in water in all proportions. I suspect the CO₂ left in the atmosphere of the bucket is dissolving into the very small percentage of water in the food. It can also slip in between starch molecules and lipids, effectively dissolving into them. This will have the effect of reducing the pressure and volume of CO₂ in the exclusion volume of the bucket, until an equilibrium is reached between the pressure of the CO₂ in the bucket and the concentration of CO₂ in the food stored in the bucket. This would account for the denting of your buckets. Be aware that this is not a chemical reaction and won't affect the food in any way." Mystery solved.

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Mylar bags - Strong like an egg. When one of the customers told me these bags full of air would support a person, I had to try it to believe it. Yes, it's strong enough to stand on, but a pin will go through it with no trouble at all.

All plastic breaths a small amount. If you want the best, use mylar bags which cut this air transfer down to almost nothing. These 4 mil thick bags have an outer layer of aluminum and 3 different plastic layers on the inside designed for a wide range of products including long term food storage. For all practical purposes they are light proof, air proof and water proof.

These bags are strong enough to hold a partial vacuum, the main reason,

in my opinion, you need them if you are going to use oxygen absorbers and plastic buckets. This is because as the oxygen absorbers absorb the oxygen in the container they don't put anything back in, but rather create a partial vacuum. If you didn't use the bag, your bucket would collapse instead of the bag. The buckets just aren't strong enough to hold this vacuum without being seriously deformed. But the mylar bags can, even though they are thin. For those wanting the very best, these bags will protect your food inside the bucket even if for some reason the lid on the bucket didn't make an airtight seal which seldom happens.

Several people have ask me if they can store food in these bags without putting them in a protective bucket. The answer is no. And that's because they are not in the least puncture resistant. They really need that bucket for support. The bags we sell fit a 6 gallon plastic bucket perfectly. Before you start your operation, you may wish to cut a bag into strips beforehand to test making a few seams in order to get the temperature set correctly on your iron. You want to get the temperature of the iron set so after the bag is ironed closed you can't pull the bag open without destroying the bag. It is also easy to get the temperature set too high which destroys the strength of the bag. It is also possible to set the iron temperature too cool, where the bag looks like it is sealed but the seam can still be pulled apart fairly easily. With our clothes iron at home, the wool setting works just great. But as not all irons are the same, you ought to make a test strip or two to be sure. Even though I have not tried the Eurosealer myself, I've been told it also works great in sealing these bags. To seal the bag shut, place a planed or smooth board across the opening of the bucket, lay the bag across it, and iron the bag shut. More on this later.

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Storing Your Food Using Compressed Gas Such As Nitrogen or Argon

For the person who is just preserving a few buckets, this is the most expensive way to go as there is so much equipment involved. However, the gas itself is cheap, and if you are planning on preserving hundreds of buckets of food, this method will become the cheapest. This method will also prove to be less of a hassle than dry ice as you will be able to seal the buckets immediately after inserting the nitrogen and won't have to wait for the dry ice to melt.

Equipment needed:

Nitrogen Bottle

Pressure reducing valve and gauges

Hose

Wand (a hollow, rigid tube connected to the end of the hose which is pushed to the bottom of the bucket for the actual nitrogen purging.)

Hand held valve at the top of the wand (optional: You could use the valve

on top of the bottle but this would be a real pain).

You should be able to get the majority of the equipment you need at a welding supply store.

After you get your nitrogen apparatus set up, adjust your output pressure to between 60 and 70 PSI. Fill your bucket with the product, set the lid on top, off-centered just a bit so there is access for the wand, then stick the wand to the bottom of the bucket and open the valve. Stick a lit match, cigarette lighter or candle over the top of the bucket where the gas will escape, then open the valve, starting the purging operation. It's a pretty good indication that most of the oxygen has been removed when the flame goes out. If you time this, you should only have to use this flame technique for four or five buckets until you get a pretty good feeling for how long you will need to leave the nitrogen on for each bucket. After you have inserted the nitrogen, immediately remove the wand, slide the lid over onto the bucket and seal the lid. If you want the best job you can get, you can always seal one oxygen absorber inside the bucket to capture any residual oxygen left in the container. In my opinion, a mylar bag isn't needed as there will only be such a small amount of oxygen absorbed that the vacuum created by this will be minimal.

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Oxygen Absorbers: How to Use Products

What Are Oxygen Absorbers?

What Do Oxygen Absorbers Do?

Benefits Of Oxygen Absorbers

How To Use Them

Conversion Table

How To Measure Volume of Containers

Your oxygen absorbers come in a vacuum sealed bag so that the activity of the absorber does not have a chance to work on any oxygen before you are ready to use them.

We also have available an oxygen bag clip ([click here to order](#)) which will allow you to store the oxygen absorber packets without having to worry about them being exposed to the oxygen in the air. This clip can also be used to keep any type of bag extremely airtight.

There are two types of oxygen absorbers.

A. The types that we most commonly use that you have seen is beige. It turns a bluish/green tint when the maximum moisture level has been reached. Blue/green is bad. Beige or white is good. See the following

example:

Good
Bad

B. There is another type which is a bright pink when good. When this type goes bad, it turns a deep dark blue. This is the type that is show below:

Good
Bad

When packaging food for long-term storage, it would be most optimum for you to use the entire contents of one sealed vacuum packet bag within 30 to 60 minutes.

We realize that this is not always possible. We suggest that the following preliminary steps be followed to ensure you are getting the most out of your products.

Before you open your bag of oxygen absorbers:

1. Assemble your containers of food and fill them with your food product.
2. If you need to determine the volume of your container, do this now.
(Click here for full details on how to measure volume).
3. Once you have the volume of your containers, you will know what size of oxygen absorber to use and how many absorbers you will need for the session.
4. Determine how many absorbers you will need for this session. Note: Different sizes of absorbers come in different quantities of absorbers per bag. You will need to know how many absorbers are in the bag you will be using.
5. Prepare a clean, small sealable jar to store the absorbers you will not be needing for this packaging session.
6. Now open your bag of absorbers and count out how many absorbers you will not be needing. Place these in your sealable jar and tighten the lid.

Tip: If your jar is a little too large, after placing your absorbers in the jar, pour a food product such as a small grain over your absorbers, to fill the jar. This will reduce the residual air volume in the jar, and will minimize the amount of oxygen your absorbers will be working on.
7. Place your oxygen absorbers in the prepared food containers.
8. Seal your containers within 30 minutes.

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STORAGE LIFE OF DRY FOODS

In Consultation with Stephen Portela

Determining the storage life of foods is at best an inexact science as there are so many variables. These range from the condition your food was in when you first purchased it and many other factors. This page was written with input by Mr. Stephen Portela who has over 30 years of professional food storage experience. This information should be used as a general guide only, and should not be followed "as the gospel truth" because your results may be different.

FOUR FACTORS THAT AFFECT FOOD STORAGE

Factor #1: The Temperature Temperature has more to do with how long well dried foods store than anything else. The USDA states, "Each 5.6oC. (10.08oF) drop in temperature doubles the storage life of the seeds". Obviously, there is a limit as to how far this statement can be taken. However I expect it basically holds true from room temperature down to freezing. No doubt, the inverse could also be considered true. "Each 5.6oC. (10.08oF) rise in temperature halves the storage life of seeds." This theory holds true for non-garden seeds as well.

Storage Life Depending on CONSTANT Temperature Note: this chart is not for a specific food but shows the relationship between temperature and storage life. Let's look at a couple of real life examples of good and poor food storage practices:

About a year ago we got an unopened paper bag of white flour which had been stored at 70oF, in a dry climate. It had been sitting for 3 years in a closet. It made fine looking bread but had such an 'old' and bad flavor that it was difficult to eat.

For another example, a couple of years ago in the Puget Sound area we were given a 4 gallon can of wheat that had been stored up high in a garage for about 30 years. This part of the country is not as hot as some places, yet in the summers the average garage still gets up into the 90's. Even though wheat will store for 30+ years under good conditions, the bread from this particular wheat was very bad tasting and after a few batches we ended up throwing the wheat away (something I always dislike doing).

oF oC Storage Life in Years

37.6 3.1 40

48.4 9.1 30

59.2 15.1 20

70.0 21.1 10

80.8 27.1 5

91.6 33.1 2.5

102.4 39.1 1.25

Counter these stories with several examples told by Mr. Stephen Portela, Walton Feed's manager: He stores his long term food storage in his basement where the temperature hovers around 60oF. The experts give brown rice a 6 month storage life because of all the oils in it that go rancid. Yet, Mr. Portela has been eating from a supply of brown rice that has been in his basement over 10 years. It is still wholesome! In another example, there is a family living near him who purchased a supply of food in #10 cans 30 years ago. Their basement hovers around 58oF. After 28 years, Mr. Portela took a sample of many of these items to the Benson Institute at BYU to have it tested. The results can be seen at the bottom of <http://waltonfeed.com/portela.html> Mr. Portela's welcome page. You will see everything tested had a 'good' to 'satisfactory' rating except for the eggs which had a 'minimum passing' rating. After 28 years I think it is most interesting that it passed at all. Mr. Portela tells me as 30 years have now passed, their storage is still in very good condition.

The bottom line is even with the very best packaging methods, if you are planning on storing your food in a warm environment, it will only last a fraction of the time it would last if stored in a cool, dry place. It is important you also find a place where the temperature remains constant. Frequent temperature changes shorten storage life. If you don't have a cool place for your food storage, plan on rotating your storage quickly enough to prevent food loss.

Factor #2: Product Moisture Content

By looking at the USDA nutritional tables, dry beans, grains, and flours contain an average of 10% moisture. Although it is very difficult and unnecessary to remove all moisture from dry foods, it is imperative that any food be stored as dry as possible. Foods with excess moisture can spoil right in their containers. This is an important consideration when packing food with dry ice as moisture condenses and freezes on the outer surface of the dry ice. For long term storage, grains should have a moisture content of 10% or less. It is difficult to accurately measure this without special equipment.

Factor #3: Atmosphere the product is stored in

Foods packed in air don't store as well as in oxygen free gasses. This is because air contains oxygen which oxidizes many of the compounds in food. Food storage companies have a couple of different processes for removing the oxygen:

Displacing the oxygen: This is done by purging out all the air in the product with an inert gas. Nitrogen is almost always used because it is the most inert gas known. People doing their own packing occasionally use dry ice which gives off carbon dioxide gas, and probably works just about as well.

Absorb the oxygen: Oxygen absorber packets do just that. Air contains

about 78% nitrogen and 21% oxygen, leaving about 1% for the other gasses. If the oxygen is absorbed, what remains is 99% pure nitrogen in a partial vacuum.

If oxygen absorber packets are used, care must be taken to use a storage container that can stand some vacuum. As air is sucked into your container as the oxygen is absorbed, it reintroduces more oxygen that must be absorbed. Before long, the oxygen absorbers will have absorbed all the oxygen they can. Obviously, your product won't be oxygen free under these circumstances. Walton Feed gets around this problem with their plastic Super Pail buckets by purging the product first with nitrogen before tossing in the two oxygen absorber packets. This way the absorbers have little or no oxygen to absorb and don't create a vacuum within the pail. As cans work well under a partial vacuum, purging them with nitrogen isn't necessary before inserting the oxygen absorber packet and sealing the lid. Large seeds store better in nitrogen. On the other hand, small seeds, like many garden seeds store better in air. For this reason Walton cans their garden seed packs in air.

Factor #4: The container the product is stored in

To get the best storage life out of your product it must have a hermetic (air tight) seal. Containers that do this well are:

#10 Cans

Sealable food storage buckets

Sealable food quality metal or plastic drums

Whatever container you use, be sure it is food grade as your product can be tainted with whatever the container is made from. Plastic sacks are not good air tight containers, for even if they are sealed, the relatively thin plastic 'breathes,' allowing air to pass through. Paper sacks are of course even worse.

There is some concern as to how good a seal is made by the lids on plastic buckets used by food storage companies. Manufacturer studies show an extremely small amount of air transfer. This amount is so small, however, that it can be considered a hermetic seal. It has also been found that the lids can be re-used several times without dramatically degrading the performance of the seal.

People who purchase products from food storage providers are often concerned about receiving their buckets bulging or with one side collapsed in. Collapsed buckets occasionally occur when ordering from Walton's as the elevation of their packing facility is above 6,000 feet. As the buckets are shipped to a lower elevation, the increased ambient air pressure can sometimes push in one side. If a side is popped in, it is a great indication that the bucket is indeed sealed. And this also holds true for buckets that might be under a slight amount of pressure. If either condition concerns you, crack the lid to equalize the air pressure. You can do this without seriously degrading the storageability of the product within the bucket. Remember to re-seal the lid after doing

this.

Bulging cans: Some bulging cans have been returned to Waltons. In almost every case, these cans held mixes that contained baking powder or soda. These cans were sent off for bacteria analysis and came back negative. It is believed that occasionally the extremely small amount of moisture found in the product interacts over time with the baking powder or soda and creates a small amount of carbon dioxide gas.

STORAGE LIFE NOTES ABOUT SPECIFIC FOODS

The Soft Grains

Barley

Hulled or Pearled Oat

Groats

Rolled Oats

Quinoa

Rye

Soft Grains have softer outer shells which don't protect the seed interior as well as hard shelled seeds and therefore won't store as long. Hermetically sealed in the absence of oxygen, plan on a storage life of 8 years at a stable temperature of 70oF. They should keep proportionately longer if stored at cooler temperatures.

The Hard Grains

Buckwheat

Corn, Dry

Flax

Kamut

Millet

Durum wheat

Hard red wheat

Hard white wheat

Soft wheat

Special bake wheat

Spelt

Triticale

The Hard Grains all store well because of their hard outer shell which is nature's near perfect container. Remove that container and the contents rapidly deteriorate. Wheat, probably nature's longest storing seed, has been known to be edible after scores of years when stored in a cool dry place. As a general rule for hard grains, hermetically sealed in the absence of oxygen, plan on a storage life of 10-12 years at a stable temperature of 70oF. They should keep proportionately longer if stored at cooler temperatures.

Beans

Adzuki Beans
Blackeye Beans
Black Turtle Beans
Garbanzo Beans

Great Northern Kidney Beans
Lentils
Lima Beans
Mung Beans

Pink Beans
Pinto Beans
Small Red Beans
Soy Beans

As beans age they lose their oils, resist water absorption and won't swell. Worst case, they must be ground to be used. Storing beans in nitrogen helps prolong the loss of these oils as does cool temperatures. Hermetically sealed in the absence of oxygen, plan on a storage life of 8-10 years at a stable temperature of 70oF. They should keep proportionately longer if stored at cooler temperatures.

Dehydrated Vegetables

Broccoli

Cabbage

Carrots

Celery
Onions

Peppers
Potatoes

Dehydrated vegetables store well if hermetically sealed in the absence of oxygen. Plan on a storage life of 8-10 years at a stable temperature of 70oF. They should keep proportionately longer if stored at cooler temperatures.

Dehydrated Dairy Products

Cheese
Powder
Cocoa

HOME

Powder
Powder Eggs
Butter/margarine Powder

Powder Milk
Morning Moo Whey Powder

Dehydrated dairy products generally store very well if stored dry in hermetically sealed containers. Plan on a storage life of 15 years if stored at a stable temperature of 70oF. They should keep proportionately longer if stored at cooler temperatures. One exception is Morning Moo. As a new whey based product, it hasn't been tested for long term storage. Plan on rotating this product after 5 years.

Flours and Other Products Made From Cracked/Ground Seed

All Purpose Flour
Bakers Flour
Unbleached Flour
White Flour

Whole Wheat Flour
Cornmeal Mixes
Refried Beans

Cracked Wheat
Germade Gluten
Granola Wheat Flakes

After seeds are broken open their outer shells can no longer protect the seed contents and seed nutrients start to degrade. Don't try to store unprotected flours longer than a year. Hermetically sealed in the absence of oxygen, plan on a storage life of 5 years at a stable temperature of 70oF. They should keep proportionately longer if stored at cooler temperatures.

Pasta

Pasta
Macaroni
Noodles

Ribbons
Spaghetti

Pasta will store longer than flour if kept dry. Hermetically sealed in the absence of oxygen, plan on a storage life of 8 - 10 years at a stable temperature of 70oF. Pasta should keep proportionately longer if stored at cooler temperatures.

Dehydrated Fruit

Fruit doesn't keep as well as many dehydrated items. Hermetically sealed in the absence of oxygen, plan on a storage life of 5 years at a stable temperature of 70oF. They should keep proportionately longer if stored at cooler temperatures.

Honey, Salt and Sugar

Honey, salt and sugar should keep indefinitely if stored free of moisture. Watch out for additives in the honey. It is possible to buy honey with water and sugar added. This honey generally doesn't crystallize like pure 100% honey does when stored for a long time. If there are additives, there is no saying how long it will last.

Peanut Butter Powder

Peanut butter powder will not store as long as wheat flour. Hermetically sealed in the absence of oxygen, plan on a storage life of 4-5 years at a stable temperature of 70oF. It should keep proportionately longer if stored at cooler temperatures.

Brown and White Rices

Brown and white rices store very differently. Brown rice is only expected to store for 6 months under average conditions. This is because of the essential fatty acids in brown rice. These oils quickly go rancid as they oxidize. It will store much longer if refrigerated. White rice has the outer shell removed along with those fats. Because of this, white rice isn't nearly as good for you, but will store longer. Hermetically sealed in the absence of oxygen, plan on a storage life for white rice of 8-10 years at a stable temperature of 70oF. It should keep proportionately longer if stored at cooler temperatures.

Seeds or Sprouting Seeds

All viable seeds are hibernating tiny living plants that only need moisture and warmth to sprout. And much like a chick in an egg, all the nutrients this little life needs to spring into existence is contained within it's shell.

Like boiling an egg, heating a seed will kill that little life within it. However, unlike an egg, a seed can withstand cold temperatures. As seeds usually remain edible after the life within it dies, we must use different criteria when determining sproutable seed storage life. And

again the big deciding factor is temperature. The big seed companies freeze their seed between seasons to promote long life. Of course, you can also do the same thing. Plan on a storage life of 4 years at a stable temperature of 70oF. They should keep proportionately longer if stored at cooler temperatures. <http://waltonfeed.com/mim.html#book2> Rita Bingham's Sprouting Book suggests that "Vacuum sealed or nitrogen treated seeds store longest, with a shelf life of up to 15 years." This is presupposing they are kept very cool or frozen.

Alfalfa is a unique seed as it actually germinates better if the seed is 2 or 3 years old. Most any sample of alfalfa contains 'hard' seed and 'soft' seed. Soft seed germinates within two days while hard seed germinates in about a week. The problem is, by the time the soft seed sprouts are ready to harvest, the hard seed may not have germinated yet. As storage time draws on, the hard seed turns into soft seed. Older seed germinates closer together. Stored in good conditions, alfalfa seed should have a good percentage of germination up until it is 8 years old.

Total Vegetable Protein, made from soy beans, has an unusually long storage life. Hermetically sealed in the absence of oxygen, plan on a storage life of 15-20 years at a stable temperature of 70oF. TVP should keep proportionately longer if stored at cooler temperatures.

Yeast, a living organism, has a relatively short storage life. Keep yeast in the original metal foil storage containers. If the seal remains intact, yeast should last 2 years at 70oF. However it is strongly recommended that you refrigerate it, which should give you a storage life of 5 years. Frozen yeast should store for a long time.

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Jump Start Your Personal Contingency Plan
For Apartment Residents and Seniors
by Sally Strackbein

Everyone needs a personal contingency plan. Remember the last hurricane that caused power failures. How long did the power outages last? Multiply that amount of time by a factor of two or more and stock enough food, water and supplies to sustain you for that length of time. You may need to stay at home for that long. My 82 year old mother was without electricity for 6 days after Hurricane Floyd, even though her area suffered only moderate wind and rain.

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This list below should sustain two adults. Cans and packages normally contain more than one serving. Preparing meals for just one person when there is no electricity for refrigeration is wasteful. Sharing with another person makes sense. In times of emergency, cooperate with others. Try to find at least one other person to plan with. You will each provide things the other forgot.

2 Week Shopping List for 2 People

Category

Buy food from each category

Quantity

Protein

Canned: tuna, fish, meat, chicken, ham, etc.

14 cans

Meals

Canned: Stew, ravioli, chunky soup, chow mien, chili, hash, etc.

14 cans

Vegetables (low sodium, where available)

Canned: mixed vegetables, corn, carrots, peas, green beans, beets, spinach, hominy, tomatoes, etc.

28 cans

Fruit

Canned or dry: peaches, apricots, pears, apples, prunes, raisins, oranges, pineapple, juices, etc.

28 cans or packages

Starches

Ramen noodles, egg noodles, instant rice, angel hair pasta, crackers, instant mashed potatoes, canned potatoes, yams, stuffing mix, (buy quick cooking style)

Several boxes or cans

Beans

Canned: baked beans, pork and beans, kidney beans, garbanzos, pinto beans, etc.

7-14 cans

Dairy

Evaporated milk, dry milk, Parmalat, non-refrigerated cheeses, etc.

As many servings as you like

Breakfast

Cereal, granola bars, instant oatmeal, Ensure, etc.

Enough for 28 breakfasts

Comfort food/drink

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Coffee, tea, cocoa mix, cookies, no bake pie crust and filling, etc.

Miscellaneous

Vitamins, bouillon, salad dressing, vinegar, oil, condiments, sugar, creamer, ketchup, spices, peanut butter, packets of mayonnaise and pickle relish

Important: If you don't have a manual can opener, buy one. Avoid foods that need a lot of water or more than a few minutes of cooking. Water and cooking fuel may be scarce.

Plan no-cook meals. Eat canned vegetables as a salad, with salad dressing or vinegar and oil. You can eat tuna, ham or chicken with a vegetable salad or mixed with mayonnaise packets.

A Sterno Stove is a good solution for warming food. It can be purchased at any store that sells camping supplies (Wal-Mart, K-Mart, Sporting Goods Stores). You cannot do any major cooking on this type of stove, as it does not get hot enough. Heat small quantities at a time.

Store 1 gallon of water per person for each day you are preparing for. You can purchase bottled water or you can bottle it yourself from tap water. You can buy collapsible water containers wherever camping supplies are sold. Another option is to wash out soda bottles and fill them with water. If you store your own water, treat it by adding 4 drops of unscented chlorine bleach to each 2 liter or half gallon bottle of water.

Have plenty of paper plates, paper towels, plastic utensils and plastic garbage bags on hand. Trash pick-up may not be as reliable as you are used to.

Stock up on wet wipes or waterless hand sanitizer. They are available where soap is sold. Eyeglass cleaning wet cloths are handy also.

Have several sets of thermal underwear if you live in a cold winter climate. Layer clothing to keep warm. Don't forget gloves. It might get cold indoors. Drape blankets over your dining table and use it as an indoor tent to keep warmth encapsulated.

Keep flashlights, battery operated lights, battery radio and plenty of extra batteries on hand.

Retrieve anything you may need from storage before you need it.

Have at least one telephone that doesn't need electricity.

Get an extra prescription refill even if you have to pay for it yourself. Buy extra over the counter medications or supplies you will need. Prepare a first aid kit.

Attend an emergency preparedness meeting of residents and property managers as soon as possible. If there is no meeting planned, get together with other residents and organize one. It is very important to be familiar with your building or association's emergency plans. Get information on the emergency readiness status of:

Heating and ventilation systems

Electronic access systems

Elevators

Service staff - will they be on duty in case of emergency? What about their families?

Food service - are there plans to store non-perishable food? For how long? Is there any vulnerability in preparation or storage equipment?

Talk with neighbors and friends. Share ideas and plans. You don't have to do everything yourself when you plan together.

www.y2kkitchen.com Y2K Kitchen, The Book sally@y2kkitchen.com

12030 Sunrise Valley Dr., Suite 300, Reston, VA 20191

HOME

52 Week List Of Item to Buy Amount Comments

1 Nuts 2 lbs (1 kg) per person Buy them on sale after Christmas. Drug stores are often a good source. Dry roasted keep best. Freeze bagged ones.

2 Detergents, Bleaches, Cleansers Bleach - 1 gal (4 lt) per person, Laundry soap - 20 lbs (9 kg) per person.

3 Medicine Chest: Feminine Products, Pepto Bismol, Cough Syrup, Tylenol, Calamine Lotion, Kaopectate, Ipecac, Sunscreen, etc. -- Dispose of all outdated medications

4 Canned Meats: Tuna, Spam, Dried Beef

5 First Aid Supplies: Band-Aids, Antibiotic Ointment, Ace Bandages, Steri-strips, etc.

6 Fill your water jugs

7 Peanut Butter 10 lbs (4.5 kg) per person

8 Solid Vegetable Shortening 12 lbs (5.5 kg) per person

9 Juices -- Avoid watered products. Get 100% juice.

10 Toothpaste, Floss, Razors, Shaving Cream

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11 Mixes: Cake, Pancake, Muffin, etc You need an annual total of 300 lbs (136 kg) of grain products per person. Purchase or make your own. Counts for part of grain requirement.

12 Spices and Herbs -- Look for bargains at health food stores or ethnic food stores.

13 Rice Buy 10, 15, or 20 pounds (4.5, 7 or 9 kg). Counts toward grain total

14 More First Aid: Gauze Patches, Swabs, Cotton Balls, Tape, etc.

15 Pasta -- Select a variety. Counts toward grain total

16 Dry Milk 100 lbs (45 kg) per person per year

17 Sewing Kit: Thread, Pins, Needles, Buttons, Snaps, Zippers, Tape Measure, Scissors -- Consider your family's needs.

18 Flour 50 lbs (23 kg) per person. Counts toward grain requirement

19 Dry or Canned Soup

20 Gelatin or Pudding Mixes

21 Garden Seeds -- Buy locally, if you haven't mail- ordered them. Get only what you will plant and eat. Consider what you can preserve and eat.

22 More Flour 50 lbs (23 kg) per person. Counts toward grain

23 Cord, Twine or Light Rope; Flashlights and Batteries

24 Cheese -- Grate and freeze for casseroles or soups.

25 Paper Towels, Aluminum Foil, Garbage Bags, Freezer Bags, etc

26 Vinegar -- If you make pickles, have several gallons on hand

27 Condiments: Mustard, Mayo, Relish, Worcestershire

28 Jams and Jellies -- Buy what you will not make yourself

29 Canned Goods Vegetables: 150 lbs (68 kg) per person Fruits: 80 qts (76 lt) per person Buy what you eat

30 Canned Milk 100 lbs (45 kg) per person per year

31 Back to school and office supplies

32 Baking Powder, Soda, Cornstarch, Baking Soda 2 lbs (1 kg) per person each item except soda - buy 3 lbs (1.5 kg) per person

33 Tomatoes: Juice, Sauce, Whole or Paste Buy or make it. Counts as part of vegetables

34 Canned Fruit 80 quarts (76 lt) per person Buy or can it yourself

35 More Canned Fruits and Vegetables Vegetables: 150 lbs (68 kg) per person

Fruits: 80 qts (76 lt) per person

36 Sugar, extra 100 lbs (45 kg) per person Buy an extra 25 lbs (11.5 kg)

37 Vegetables 150 lbs (68 kg) per person per year Can or freeze from garden or purchased fresh, or buy more canned

38 Dried Beans, Peas 100 lbs (45 kg) per person

39 Sweeteners: Honey, Molasses, etc -- Counts toward sugars

40 Iodized Salt Ten or more containers For canning, get canning salt.

41 Personal Products: Soap, Deodorant, Toilet Paper, Shampoo, etc Hand soap -15 per person, Toilet Paper - one roll per week

42 Canned Soup -- Counts toward vegetables

43 Can something with apples

44 Hard candy for Halloween -- Leftovers will make a good addition to your 72 hour emergency kit.

45 Vitamins 365 vitamins per person. Get extra C and Calcium

46 Baking Items: Cocoa, Coconut, Nuts, Chocolate Chips, etc

47 Rolled Oats, Corn Meal, Cream of Wheat -- Counts as grains

48 Sugars: Brown, White, Powdered -- Counts toward 100 lbs (68 kg) per person total

49 Vegetable and Olive Oils 12 lbs (5.5 kg) per person Get good quality

50 Candles and Matches -- Put in a sturdy box (preferably fireproof) and in a cool place you can locate in the dark.

51 Popcorn -- Purchase large bags. Counts toward grains

52 Merry Christmas! -- Give yourself a great gift--security.

Mormon Month-by-Month List Month Item Amount

January

Salt

Water

Bedding

5 lbs (2.25 kg) per person

14 gallons (53 lt) per person

Enough for each person

February

Fat or Oil

Flashlights

First Aid Supplies

20 lbs (9 kg) per person

March

Grains

Garden Seeds

300 lbs (136 kg) per person (wheat, rice, corn, other)

April

Grains

Clothing/Sewing Supplies 300 lbs (136 kg) per person (wheat, rice, corn, other)

May

Dry Milk

Matches, Candles 75 lbs (35 kg) per person

June

Dry Milk

Kerosene Containers or

Other Fuel Containers

July

Sugar/Honey

Kerosene or Other Fuel

60 lbs (27 kg) per person

August

Sugar/Honey

Wood/Kerosene

Cleaning Supplies

September

Dried Legumes

Personal Hygiene Supplies

60 lbs (27 kg) per person

October

Dried Legumes

Baby items, if applicable

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November

Emergency Kits

Catch up on previous items

December

Emergency Kits

Catch up on previous items

HOME

Family Disaster Supplies Calendar

Week 1

Grocery Store

- o 1 gal. water *
- o 1 sm jar peanut butter*
- o 1 lrg can juice*
- o 1 can meat*
- o hand-operated can opener
- o instant coffee, tea, powdered soft drinks
- o permanent marking pen
- o 1 gallon of water per pet

Week 2

Hardware Store

- o Crescent wrench
- o Heavy rope
- o Duct tape
- o 2 flashlights with batteries
- o bungee cords

Week 3

Grocery Store

- o 1 gal. water *

- o 1 can fruit*
- o 1 can meat*
- o sanitary napkins
- o video tape
- o 1 gallon of water per pet

Week 4

Hardware Store

- o Plumber s tape
- o Crowbar
- o Smoke detector with battery

Week 5

Grocery Store

- o 1 gal. water *
- o 1 can fruit*
- o 1 can meat*
- o 1 can vegetables*
- o 2 rolls toilet paper*
- o extra toothbrush*
- o travel size toothpaste

Week 6

First Aid Supplies

- o Aspirin and/or acetaminophen
- o Compresses
- o Rolls of gauze or bandages
- o First aid tape
- o Adhesive bandages- assorted sizes

Also: pet food, diapers and/or baby food if needed.
To Do:

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Also: a leash or carrier for your pet, if needed.

To Do:

Also: pet food, diapers and/or baby food if needed.

To Do:

Also: extra medications or a prescription marked emergency use if needed.

To Do:

Also: special food for special diets, if needed.

To Do:

Also: extra hearing aid batteries, if needed.

To Do:

- o Make a family plan

- o Date each perishable food item using marking pen.

- o Check your house for hazards. Secure loose objects that may fly.

- o Locate your gas meter and water shutoffs and attach a wrench near them for emergency use.

- o Use a video camera to tape the contents of your home for insurance purposes.

- o Store tape with friend/family member who lives out of town.

- o Install or test your smoke detector.

- o Tie water heater to wall studs using plumber s tape.

- o Have a fire drill at home.

- o Check with your child s day care or school to find out about their disaster plans.

Week 7

Grocery Store

- o 1 gal. water *

- o 1 can ready to eat soup*

- o 1 can fruit*

- o 1 can vegetables*

Week 8

First Aid Supplies

- o Scissors

- o Tweezers

- o Antiseptic

- o Thermometer
- o Liquid hand soap
- o Disposable hand wipes
- o Sewing kit

Week 9

Grocery Store

- o 1 can ready to eat soup*
- o Liquid dish soap
- o Plain liquid bleach
- o Heavy duty garbage bags

Week 10

Hardware Store

- o Waterproof portable plastic container (with lid) for important papers
- o Portable am/fm radio (with batteries)

Week 11

Grocery Store

- o 1 lrg can juice*
- o large plastic food bags
- o 1 box quick energy snacks
- o 3 rolls paper towels

Week 12

First Aid Supplies

- o Anti-diarrhea medicine
- o Rubbing alcohol
- o Latex gloves
- o Ipecac syrup and activated charcoal
- o Vitamins

Also: extra plastic baby bottles, formula and diapers, if needed.

To Do:

Also: extra eyeglasses, if needed.

To Do:

Also: saline solution and a contact lens case, if needed.

To Do:

Also: blankets or sleeping bag for each family member

To Do:

Also: sunscreen, if needed.

To Do:

Also: items for denture care, if needed.

To Do:

- o Establish an out-of-state contact to call in case of emergency.
- o Place a pair of shoes and a flashlight under your bed so that they are handy during an emergency.
- o Send some of your favorite family photos (or copies) to family members out of state for safekeeping.
- o Make photocopies of important papers and store safely.
- o Store a roll of quarters or phone card for emergency phone calls.

- o Go on a hunt with your family to find a pay phone near home.
- o Take your family on a field trip to gas and water meter shut off valves. Show them what to do in an emergency.

Week 13

Hardware Store

- o Whistle

- o ABC fire extinguisher

- o Pliers

- o Vise grips

To Do:

Week 14

Grocery Store

- o 1 can fruit*

- o 1 can meat*

- o 1 can vegetables*

- o Paper plates

- o Eating utensils

- o Paper cups

To Do:

Week 15

Hardware Store

- o Extra batteries
- o Masking tape
- o Hammer
- o Assorted nails
- o Wood screws
- o L brackets to secure furniture to walls

To Do:

Week 16

Grocery Store

- o 1 can meat*
- o 1 can vegetables*
- o heavy duty garbage bags
- o Kleenex
- o Quick energy snacks (raisins, granola bars)

To Do:

Week 17

Grocery Store

- o Graham crackers
- o Assorted plastic containers with lids
- o Dry cereal
- o Safety pins

To Do:

Week 18

Hardware Store

- o Child-proof latches for your cupboards

HOME

- o Double sided tape or Velcro-type fastener to secure moveable objects

To Do:

- o Take a first aid/CPR class.
- o Make a plan to check on a neighbor who might need help in an emergency.
- o Brace shelves and cabinets.
- o Find out if you have a neighborhood safety organization and join it!
- o Arrange for a friend or neighbor to help your children if you are at work.
- o Pack a go-pack in case you have to evacuate.

Week 19

Grocery Store

- o Heavy duty garbage bags

- o Quick energy snacks

(raisins, granola bars)

To Do:

Week 20

Hardware Store

- o Camping or utility knife

- o Extra radio batteries

Also: purchase an emergency escape ladder for second story bedrooms, if needed.

To Do:

Week 21

Hardware Store

- o Heavy work gloves

- o Disposable dust masks

- o Screwdriver

- o Plastic safety goggles

Week 22

Grocery Store

- o Extra hand operated can opener

HOME

- o 3 rolls paper towels
- o FRS radios for each family member

Week 23

Hardware Store

- o Battery powered camping lantern with extra battery or extra flashlights
- o Weather Radio with Specific Area Messaging Encoder set for your County

Week 24

Grocery Store

- o Large plastic food bags
- o Plastic wrap
- o Aluminum foil
- o Have an earthquake, hurricane or tornado drill at home.
- o Find out about your workplace disaster plans.

The Family Disaster Supplies Calendar is intended to help you prepare for disasters before they happen. Using the calendar, your family can assemble an emergency kit in the small steps over a six-month period. Check off each week as you gather the contents. Supplies may be stored all together in a large plastic garbage can or food may be kept on kitchen shelves. Remember to rotate your perishable supplies and change water every six months.

To get started:

Select foods based on your family s needs and preferences. Pick low-salt, water-packed varieties when possible. Canned meats may include tuna, chicken, raviolis, chili, beef stew, Spam, corned beef, etc.

Information provided free by Mayes County Emergency Management
(<http://www.geocities.com/mccem>)

877-263-0280

Feel free to copy this for your friends and family

Check your house for supplies that you already have on hand.

Decide where you will store supplies.

Meet with your family to plan.

Explain how to prepare; explain when and how to respond.

Discuss what to do if you need to evacuate.

Practice your plan.

HOME

INSECT INFESTATIONS

A.1 PESTS OF STORED GRAINS, LEGUMES AND DRY FOODSTUFFS

Insect infestations can occur in a wide variety of foodstuffs such as flours, meals, pastas, dried fruits and vegetables, nuts, sweets, whole grains, beans, sugars, TVP, jerky, bird seed and pet foods.

Naturally, the best way to deal with an insect infestation is not to have one in the first place. Try to purchase from suppliers who are clean and have a high volume of turnover of their products. This will mean the products you purchase will be less likely to have bugs in them.

When you buy foodstuffs examine them closely to be sure they are insect free. Check for any packaging or use by dates to insure their freshness. Don't shake the package, most adult insects will be found in the top couple of inches of the product and shaking the package will mix them into the contents and disguise them. If the package does turn out to be infested, return it for replacement.

Once you have purchased the product you should store it in an air- and moisture-tight container so it cannot be invaded after you have brought it home. With sufficient time, adult and some larval insect forms can penetrate paper, cardboard and thin plastic packaging. Your containers should be either heavy plastic, glass or metal with tight fitting lids. As with everything in food storage, you should use older packages before newer ones and opened packages before unopened ones.

The storage area should be kept clean. Don't allow grain, flour, beans, bits of pasta or other food particles to accumulate on shelves or the floor. Cracks and crevices should be sealed or otherwise blocked. Unless it is a sticky spill, vacuuming is the best method of cleaning since cleaning with soap and water can wash food particles into the cracks.

Insects may also get their start in chairs, sofas and carpets where food is dropped and not cleaned up. Don't forget to replace the filter bag on the vacuum as some insects can survive and reproduce in the bag after they've been sucked in.

Bags of dry pet food and bird seed can also harbor insect infestation. Decorative foodstuffs such as ears of colorful Indian corn, colored beans and hard squashes can carry insects that can infest your edible food.

Even poison baits can harbor flour beetles.

A.2 CONTROL OF INSECT INFESTATIONS

Should you find that in spite of buying fresh products and using careful packaging techniques you have an insect infestation, you can try some of the following steps:

1. If the food is too heavily infested to try to save it should be disposed of as soon as possible. Remove it from the kitchen or food storage area immediately so it won't infest other foods.
2. Large bugs can be sifted or winnowed out if the food's not too heavily infested and you want to try to save it. Then treat it by placing into a deep freezer at 0 F (-18 C) for three to seven days depending upon the size of the package. Refrigerator freezers usually do not freeze low enough to effectively kill all of the life stages of insects, but if left there, will slow their development. If freezing is not workable then the product could be spread on baking sheets and heated to 150 F for fifteen to twenty minutes, cooled and repackaged. Heat treated foods should be consumed shortly thereafter.
3. The surface areas where the food containers are stored can be treated with an insecticide. This is not a replacement for clean storage habits and good containers, but it can supplement it. This will not control insect infestations already in your stored foods.

Spray the shelf surface with 0.5% chlorpyrifos (Dursban), 1% propoxur (Baygon), 0.5 percent diazinon, or 0.25 percent resmethrin. You can find any of these in the hardware store in ready to apply packages. If a sprayer isn't feasible then they can be applied with a paint brush. Allow the solution to dry thoroughly. Cover the shelves with clean, untreated shelf paper and put properly packaged foods back on shelves. **READ THE PRODUCT LABEL FOR SAFETY INFORMATION CONCERNING CHILDREN AND PETS**

Household bleach, Lysol and other sterilizers will not control insect infestation, though they can be used for mold, mildew and algae.

You may continue to find some insects after the cleanup is finished. This could be for several reasons. The first being they escaped from the packages they were infesting and did not get cleaned up. There may be more packages infested than were originally realized or, there may be hiding places in the storage area that need attention. Once you have carefully eliminated all food sources, the bugs should disappear in three to four weeks.

HOME

BACTERIAL SPOILAGE

Just like the fungi, bacteria are everywhere. They're in the water, soil,

air, on you, your food and your food storage containers. Fortunately, the vast majority of the bacteria we encounter are relatively harmless or even benign and only a few represent a danger to us and our stored foods.

Bacteria can be very much more difficult to kill off than molds and insects. Some of them are capable of continued growth at temperatures that would kill other spoilage organisms. When conditions are such that they are unable to grow, some bacteria can go dormant and form spores. These spores can be quite hardy, even to the point of surviving a rolling boil.

In order to grow, bacteria need moisture, some as little as a 20% moisture content. For dry grains, legumes, powdered milk and other low moisture foodstuff bacterial spoilage will seldom be a problem so long as the moisture level in the foodstuff remains too scant to support its growth. For this reason, it is imperative that such products be drier than 20% and preferably below 10% to ward off mold growth as well. The botulism bacterium needs moisture in the 35% range to grow. Thus, making being sure of the moisture content of the food products you want to store, and appropriately using desiccants in your food packaging are also excellent ideas.

WARNING: It is in wet pack canned goods (where the container has free liquid in it) and fresh foods we must be the most concerned about spoilage bacteria. It is here that a little bad luck and a moment's inattention to what you are doing could kill or seriously injure you or some other person who eats the foods you've put by. In both home-canned and commercially-canned goods, **IF THE CAN IS BULGING, LEAKING, SMELLS BAD, OR SPEWS LIQUID WHEN YOU OPEN IT THEN THROW IT OUT!** But, throw it out safely so that children and animals cannot get into it.

C.1 BOTULISM

Clostridium botulinum is one of the oldest life forms found on the planet. Like the gangrene bacteria, it is an anaerobic organism meaning it lives and grows in the absence of free oxygen. It forms spores when conditions are not suitable for it to grow and these spores are commonly found in the soil. This means that *C. botulinum* can be brought into your life on raw produce, tools, hands or anything else that came into contact with dirt. To further complicate matters, botulinum spores are extremely heat-hardy. The bacteria itself can be killed by exposing them for a short time to boiling water (212 F AT SEA LEVEL PRESSURE), but their spores can not. To kill them, the food product and container must be exposed to temperatures of 240 F (AGAIN AT SEA LEVEL PRESSURE) for a long enough period of time to allow all of the food in each container to come completely up to the proper temperature. Only a pressure-canner can reach the necessary temperature.

It's not the bacteria or its spores which are directly deadly, but the toxin the bacteria creates when it grows and reproduces. In its pure form, botulism toxin is so potent that a mere teaspoon of it would be

enough to provide a fatal dose to hundreds of thousands of people. It is this lethality that is why every responsible book on canning, food preservation, food storage, and the like hammers constantly on the need for care in technique and method and why spoilage must be taken so seriously.

C. botulinum, like any other life form, must have suitable conditions for it to grow and become a danger to you. One of the conditions it must have is a suitable pH range in its environment. pH is the measure of the acidity or alkalinity of a substance and is measured on a scale of 1-14 with anything above 7 being considered alkaline and everything below 7 being considered acid. If the pH of your wet pack food is BELOW 4.6 then botulism is unable to grow. Keep in mind pH is not eternal in foods and it is possible for it to change. If it should change to a lesser acidity than 4.6 pH your previously botulinum proof food may start allowing the lethal spoiler to grow (see B.2, molds in canned goods). This is why it is vital to use proper technique, even for acid foods like tomatoes. It has been found that when this occurs and botulinum becomes active and produces its lethal toxin it also produces minute amounts of acid which can lower the pH of the poisoned food back into what should have been the safe zone had the pH not jumped up and allowed the bacteria to grow. Again and again -- use good technique and pay attention to what you are doing.

Botulinum toxin, unlike fungal mycotoxins, can be destroyed by boiling the food briskly in an open vessel for fifteen minutes. Because of this, if your canned food shows any safety problems you should follow this procedure. If the food shows even the slightest mold growth, keep in mind that mycotoxins are not for the most part broken down by heat and dispose of the food safely.

I don't intend to go into the hows of home canning here. For that I strongly recommend that you read the r.f.p. FAQ, the Ball Blue Book and most especially the book Putting Food By for in depth information on this subject.

HOME

A word on moisture content...

It seems to be the 'in' thing now days among the Internet crowd to throw a desiccant packet or two into their food storage container before putting on the lid. Here at Walton Feed we don't do this, now let me tell you why.

Desiccant packs won't even start to get this job done. Let me explain: First, let's do the math. For the bean/grain seeds I've checked, the specific gravity is between 1.0 and 1.2. As water has a specific gravity of 1.0 we can use the weight of the seeds themselves to determine how much water is in the seeds at a given moisture content.

Let's use a 6 gallon bucket of wheat with a 15% moisture content for our

example. The wheat weighs 45 lbs. To figure how much water by weight is in this sized sample, multiply the weight of the wheat by it's water content. So let's figure it: $45 \text{ lbs} \times 15\% = 6.75 \text{ lbs}$ of water. But we only want to remove 1/3 of this water, ($6.75 \times 0.33 = 2.23$ pounds of water) or about 2 1/4 lbs water as we don't want to take out all of the water, but rather only bring it down to a 10% moisture level. As one cup of water weighs 1/2 lb, that 2 1/4 lbs of water has a volume measurement of 4.5 cups water (just a bit over 1 Liter). Good, dry desiccant can absorb 40% it's weight in moisture. To absorb this much water you'd need at least 6 lbs of desiccant.

Now, there's no way that a small moisture absorber packet, or several for that matter, are going to remove that much water.

Suzanne Ashworth in her book, *Seed to Seed*, explains the right way of how to do this using desiccant. "...Color indicating silica gel is an excellent "desiccant" (moisture absorbing material) for drying seeds... The [silica gel] beads are deep blue when completely dry, but gradually change to light pink as moisture is absorbed... The drying process requires a glass jar with an airtight lid... Determine the total weight of the seeds and packets, and then measure out an equal weight of dark blue silica gel. Place both the packets [of seeds] and silica gel into the jar and screw the lid on tightly. The silica gel will immediately start absorbing moisture from the seeds...

"Both large and small seeds reach optimum moisture levels for storage after seven or eight days in the container... Open the container and separate the packets of seeds from the silica gel then repack the seeds in airtight containers."

Ms. Ashworth suggests using equal parts of seeds and desiccant. This is not practical considering the large amounts of food we are storing at one time. So, what do you do? You don't want to put your food in the oven as this will destroy the storageability of your food. I only know one other way - you have to air dry them. Farmers have big fans that pull outside air into their storage bins and circulate it up through the seeds. The fan goes on when the humidity conditions are low, and is turned off as the humidity rises either because of wet weather or dropping temperatures. Even this isn't really practical for the average person as he doesn't have the equipment. The easiest thing to do is make sure the food you get is already at 10% moisture or less, then pack it up for long term storage before it has a chance to sit around in moist conditions and gain moisture. If you live in a dry climate like we do here in the Intermountain West - Don't Worry!

Let me repeat Geri Guidetti's seed dryness test you can do at home. "...ten percent is good. Don't fret about needing instruments to measure this. Longer seeds should snap smartly, cleanly in half when bent if they are this dry. Wheat and corn seeds should shatter and powder when hit with the head of a hammer (That's the Geri Guidetti Dry Seed Test--you won't find it in a book. It is very reliable, though.) Beans, peas and

other large seeds will shatter....Geri Guidetti, Non-hybrid Gardening
Forum moderator

Alan T. Hagan in his food storage FAQs also has a way of determining moisture content. Don't confuse his method of checking for seed moisture as an acceptable method for drying your seeds for long term storage, however.

HOME

MOLDS IN FOOD

Molds are fungi just like mushrooms and yeast. Also like mushrooms, they reproduce by releasing spores into the air that land on everything, including your food and food storage containers. If those spores begin to grow, they create thin threads that spread through out their growing medium. These threads are the roots of the mold fungus, called mycelium. The stalk of a mold fungus is the portion above or on the surface of the food. It produces the spores and gives the mold its color. We've all seen examples of this when we discover a dish of something or other left way-y-y too long in the refrigerator and has become covered in mold fuzz.

Molds can grow anywhere they have a growing medium (their food), sufficient moisture and enough warmth. Some can even grow at refrigerator temperatures, albeit more slowly than they would if it were warmer. They can also withstand much more salt and sugar than bacteria, which is why you sometimes find mold in jellies and jams with their high sugar content and on cured products like ham or bacon with their high salt content.

In the past, it was felt a slight amount of mold was harmless and the food could be consumed anyway. For molds that were intentionally introduced into the food, such as the mold in bleu cheese, this is just fine. For the unintentional molds, it can be a very serious error in judgment. These unwanted molds might just be producing a toxic substance called a mycotoxin which can be very bad indeed. Mycotoxins are produced around the root or mycelium of the mold and the mold roots can penetrate very deeply into the food. These mycotoxins can survive for a long time in foods, and unfortunately most are not destroyed by cooking. The molds probably best known for this are the various *Aspergillus* varieties which produces a mycotoxin known as aflatoxin, but there are other dangerous molds as well, such as the *Fusarium* molds. Both of the above affect grain and some legumes. See B.3 Molds In Grains and Legumes.

IMPORTANT NOTE: In wet pack foods such as your home canned goodies, molds can do something else as well, possibly leading to lethal consequences. If they find their way into wet pack acid foods canned by the boiling water bath method, whether by reasons of improper procedure or contamination after the fact, they can consume the natural acids present in the food. The effect of this is to raise the pH of the food in the container, perhaps to the point that it becomes possible for spores of *Clostridium botulinum*, better known as botulism, to become active and

reproduce. If you're not already aware of the consequences of botulism poisoning, please read the bacterial spoilage section below where it has an entry all its own. This is the most deadly kind of food poisoning there is. For this reason, moldy wet pack foods should be safely discarded.

Molds in low acid foods canned by the pressure canning method are equally dangerous and should also be discarded in a safe manner.

B.1 MINIMIZING MOLDS

You can do a number of things to minimize unwanted mold growth in your kitchen, food storage areas and refrigerators. If your kitchen is at all like mine, it is the refrigerator that is going to collect the most fungal growth. This can be dealt with by washing the inside every couple of months with a tablespoon of baking soda dissolved in a quart of warm water. Rinse clean and allow to dry. The black mildew that grows on the rubber door gaskets and other places can be dealt with by wiping down with a solution of three tablespoons of household bleach in a quart of water. I generally use a soft bristle brush for this.

The rest of the kitchen can be kept mold free by keeping it clean, and dry and by spraying occasionally with a product such as Lysol. Patches of mold growing in spots can be eliminated with the bleach solution used on the refrigerator doors.

Try not to purchase more fresh food than you'll be able to eat in a short period of time. This will keep you from having to deal with the moldy remains that didn't get eaten. If food does go moldy, don't sniff it. This is a good way to give yourself respiratory difficulties if you are at all susceptible to mold allergies. Moldy food should be disposed in such a manner that your animals and children won't be able to get into it. Mycotoxins are every bit as bad for your animals as they are for you.

Obviously, you don't have to throw out everything that shows a spot of mold on it. Some foods can be safely dealt with and still partially saved if they show signs of fungal growth. Below is a set of guideline from M. Susan Brewer, Ph.D., R.D., a specialist in food safety. Her articles and works are found in many state university extension services publications lists.

If the food shows even a tiny mold spot, follow these guide lines:

1. Hard or firm foods with tiny mold spots can be trimmed; cut away the area around the mold (at least an inch) and rewrap in clean wrap. Make sure that knife does not touch the mold.

TRIM:

Hard Cheese (Cheddar, Swiss, etc.)

Bell Peppers, Carrots, Cabbage

Broccoli, Cauliflower, Brussels Sprouts

Garlic, Onions

Potatoes, Turnips

Zucchini

Apples, Pears

2. Soft foods such as cheese slices, cream cheese, sour cream and yogurt should be thrown away.

TOSS:

Soft Cheeses, (Mozzarella, Brie, etc.)

Sour Cream, Yogurt, Cottage cheese

Bacon, Hot dogs, Sliced lunch meats

Meat pies

Opened canned ham

Most left-over food

Bread, Cakes, rolls, flour, pastry

Peanut butter

Juices, berries

Jam, Jellies, Syrups

Cucumbers, Tomatoes

Spinach, Lettuce, other leafy vegetables

Bananas, Peaches, Melons

Corn-on-the-cob

Stored nuts, whole grains, rice

B.2 MOLDS IN CANNED GOODS

If good equipment and proper technique are used, then it is unlikely you will ever have mold growth in your unopened canned goods. If you do have

such, then there was either a flaw in the procedure you used, or something affected the jar or can after the fact to break its seal. In any event, once the food has molded, it is past saving and should be discarded in such a way that children and animals will not be able to get into it. The most likely home canned products to show mold growth are jams and jellies sealed with paraffin wax.

There are a number of points in the canning process where this can occur:

- (1) In the time after the jar is taken out of its boiling water bath, but before it is filled.
- (2) In the time between when the jar is filled and covered with the melted wax.
- (3) When the wax cools, if it pulls away from the side of the jar, leaving an opening for the mold to get in.
- (4) If bubbles form in the paraffin, which break and leave holes.

It is for this reason that most canning authorities no longer recommend using this technique. If you must use it, the jelly jars should be boiled for at least 10 minutes before the jelly is poured into the jars. The filled and wax capped jars should then be covered with some sort of protective lid. The book, *Putting Food By* has excellent instructions on this or see the applicable section of the [rec.food.preserving FAQ](#).

B.3 MOLDS IN GRAINS AND LEGUMES

It's long been known that eating moldy grain is bad for your health. The ugly consequences of eating ergot-infected rye probably make the best known example. It's only been for about thirty years, though, that intensive study of these grain fungi have been carried out on other varieties of molds and their respective mycotoxins. Fortunately, for those of us in the U.S., the USDA and the various state departments of agriculture go to a great deal of trouble to detect grain and legumes infected with these toxic fungi. In some of the less developed countries, the citizenry are not so lucky. Still, it is good to have something of an understanding of what one should do to prevent mold growth in one's stored grains and to have an idea of what to look for and ask about when purchasing grains and legumes.

The one fungal type that has caused the most commotion in recent history are the various *Aspergillus* species of molds. Under certain conditions with certain grains, legumes, and to a lesser extent, nuts, they can produce a mycotoxin called aflatoxin. This is a serious problem in some parts of the world, most especially in peanuts, occasionally in corn. I am not aware of any documented deaths in the United States from aflatoxicity, but other nations have not been so fortunate. What makes aflatoxin so worrisome in this country is that it is also a very potent carcinogen (cancer causing agent).

In addition to the Aspergillus molds, there is also a very large family of molds called Fusarium and these can produce a wide variety of mycotoxins, all of which you do not want to be eating directly or feeding to your food animals where you will get the toxins back indirectly when the animal is slaughtered and eaten.

The Federal government and the various state governments continuously monitor food and forage crops. Those products which are prone to mold growth and toxin production are not allowed to be sold for food. Once purchased however, it is up to you to keep your food safe from mold growth. If you have already found mold growth in your whole grains, meals, flours or other grain products, they should be discarded. Most mycotoxins are not broken down or destroyed by cooking temperatures and there is no safe way to salvage grain that has molded.

B.3.1 PREVENTING MOLD GROWTH IN STORED GRAINS AND LEGUMES

The easiest method to prevent mold growth in your stored grains and legumes is simply to keep them too dry for the mold to grow. The Aspergillus and Fusarium molds require moisture contents of 18% and above to reproduce. This is subject to some variability, but in all grains and soybeans, they must have a moisture content of that level. If you are storing raw (not roasted) peanuts, in the shell or shelled, you want to get the moisture content to less than 8% as peanuts are particularly susceptible to mold growth. The recommended moisture content for all other grain and legume storage is no more than 10%. Please see part 2.A.3.1 Grains and Legumes for a method to determine moisture content. At 10% moisture, it is simply too dry for fungi to grow.

HOME

ABOUT GLUTEN:

As you read through the grains descriptions below you will come across frequent mention of "gluten". Gluten is the protein in grains that enables the dough made from them to trap the gasses produced by yeast fermentation or chemical reaction of baking powder or soda and in turn causes it to rise. The amount of this protein to be found in species of grains and varieties within a species can vary radically. Some grains such as rice have virtually no gluten at all and will not produce a raised loaf by itself while others like hard winter wheat have a great deal and makes excellent raised bread. Whether gluten content is of importance to you will depend upon the end uses you intend for your grain.

Some of the common and relatively uncommon types of grains and their varieties are listed below.

AMARANTH: Amaranth is not a true cereal grain at all, but is a relative of the pigweeds and the ornamental flowers we call "cockscomb". It's

grown not only for its seed, but for its leaves that can be cooked and eaten as greens. The seed is high in protein, particularly the amino acid lysine which is limited in the true cereal grains. It can be milled as-is, or toasted to provide more flavor. The flour lacks gluten, so it's not suited for raised breads, but can be made into any of a number of flat breads. Some varieties can be popped much like popcorn, or can be boiled and eaten as a cereal, used in soups, granolas, and the like. Toasted or untoasted, it blends well with other grain flours.

NOTE: Like some other edible seeds, raw amaranth contains biological factors that can inhibit proper absorption of some nutrients. For this reason amaranth seeds or flour should always be cooked before consumption, whether for human food or animal feed.

BARLEY: Barley is thought by some to be the first grain ever grown by man. It has short, stubby kernels with a hull that is difficult to remove. Excluding barley intended for malting or animal feed, this grain is generally consumed by humans in two forms. Most common is the white, highly processed pearl barley with much of its bran and germ milled off along with its hull. It is the least nutritious form of barley. The second offering is called pot or hulled barley and it has been subjected to the same milling process as pearled, but with fewer trips through the polisher. Because of this, it retains more of the nutritious germ and bran, but does not keep as well as the more refined product without special packaging. Unless you are prepared to try to get the hulls off I don't recommend buying unhulled barley. Although it can be milled into flour, barley's low gluten content will not make a good loaf of raised bread. It can be combined with other flours that do have sufficient gluten to make leavened bread or used in flat breads. Barley flour and flakes have a light nutty flavor that is enhanced by toasting. Whole barley is commonly used to add thickness to soups and stews.

Recently, a hull-less form has become available on the market through a few suppliers. This is whole grain barley with all of its bran and germ intact and should have the most nutrients of any form of this grain available. I have not yet been able to discover yet how suitable it is for long term storage.

BUCKWHEAT: Buckwheat is another of those seeds commonly considered to be a grain, but which is not a true cereal. It is, in fact, a close relative to the docks and sorrels. The "grain" itself is a dark, three cornered seed resembling a tiny beechnut. It has a hard, fibrous hull requiring a special buckwheat huller to remove it. Here in the U.S., it is most often used in pancakes, biscuits and muffins. In Eastern Europe and Russia it is known in its toasted form as kasha. In the Far East, it's often made into soba or noodles. It's also a good bee plant, producing a dark, strongly flavored honey. The flour is light or dark depending on how much of the hull has been removed before grinding. Dark flour is much more strongly flavored than lighter flour, but because of the high fiber and tannin content of its hull it is not necessarily more nutritious. Buckwheat is one of those foods with no middle ground in peoples opinions

-- they either love it or they hate it. Like amaranth, it's high in lysine, an amino acid commonly lacking in the true cereal grains.

CORN (maize): Corn is the most common grain crop in the U.S., but it is mostly consumed indirectly as animal feed or even industrial feedstock rather than directly as food. As one of the Three Sisters (corn, squash and beans) it was the staple grain of nearly all of the indigenous peoples of the American continents before the advent of European colonization. It comes in an amazing variety of forms with some being better suited for a particular purpose than others. The varieties intended to be eaten as sweet corn (fresh green corn) are very high in sugar content and do not dry or store well. The other varieties are the flint, dent, flour, and popcorns. All of them keep well when they have been properly dried. To a certain extent, they're all interchangeable for purposes of grinding into meal (sometimes known as polenta meal) or flour (very finely ground corn, not cornstarch), but some make better meal than flour and vice versa.

As a general rule of thumb, the flint varieties make better meal as they have a grittier texture than the other corns. If meal, hominy and hominy grits (commonly called just "grits") are what you are most interested in, use the flint type. If you intend to make corn masa for tortillas and tamales, then the flour type is what you want, but it is seldom found on the commercial market so the dent type is next best. Popcorn is what you need if you want to pop it for snacks and it can also be ground into meal or flour. It seems to me it makes a very good meal, but it's a bit gritty for flour. It's also difficult to hull popcorn with alkali treatment though your mileage may vary. Yellow dent corn seems to be the most commonly available variety among storage food dealers and will work fine for almost any purpose but popping.

Popcorn is one form of a whole grain available to nearly everyone in the U.S. if they know where to look. It is so popular as a snack food, particularly in movie theaters and events like fairs and ball games, that even the smallest of towns will generally have at least one business selling it in twenty-five or fifty pound bags. Since it's meant to be eaten it's safe for food. To be at its most "poppable", this corn needs to have a moisture content between 13.5%-15.5% which makes it just a little too moist for ideal storage. A small amount of drying will need to be done before it's packed away. If wanted for popping later, it can always be re-hydrated by sprinkling a tablespoon of water per quart of kernels, shaking vigorously and allowing it to be absorbed for a day or two. If you still get too many "old maids" or unpopped kernels then repeat the process once more. Popcorn is harder than the other varieties of corn so if your mill is not of the heavy duty sort you may want to consider cracking the popcorn into coarse pieces first then grinding into finer textured meal. The Family Grain Mill states that it should not be used to mill popcorn and the Back To Basics mill should not be used to mill any great quantity.

Once you've decided between flint, dent or popcorn, (the flour types are

difficult to find commercially) you now have to decide upon it's color: There are yellow, white, blue, & red dried varieties. The yellow and white types are the most common by far with the blues and reds mostly being relegated to curiosities, though blue corn has been gaining in popularity these last few years. It should be kept in mind that white corn does not have the carotene (converts into vitamin A) content of yellow corn. Since vitamin A is one of the major limiting vitamins in long term food storage, any possible source of it should be utilized. For this reason I suggest storing yellow rather than white corn.

Additionally, much of the niacin content of corn is chemically bound up in a form not available for human nutrition unless it has been treated with an alkali. This is really of importance only if 85% or more of your daily calorie intake will come from corn, but grits, hominy or corn masa (for tortillas and tamales) are traditional uses for this grain and can go a long way toward increasing the number of recipes you can make with it. Give them a try, they're really quite good.

MILLET: Millet is an important staple grain in North China and India, but is little known in the U.S, where we mostly use it as bird feed. The grain kernels are very small, round, and usually ivory colored or yellow, though some varieties are darker. A lack of gluten and a rather bland flavor may account for the anonymity of this cereal. Millet has a more alkaline pH (and a higher iron content) than other grains which makes it very easy to digest. A major advantage of millet is that it swells a great deal when cooked and supplies more servings per pound than any other grain. When cooked like rice millet makes an excellent breakfast cereal. It has little gluten of its own, but mixes well with other flours.

OATS: Though the Scots and the Irish have made an entire cuisine from oats, it is still mostly thought of in the U.S. as a bland breakfast food. Seldom found as a whole grain, it's usually sold processed in one form or another. Much like barley, the oat is a difficult grain to separate from its hull. Besides its longtime role as a breakfast food, oats make an excellent thickener of soups and stews and a filler in meat loafs and casseroles. Probably the second most common use for oats in America is in cookies and granolas. A little creative thought can really increase their culinary range.

Listed below in order of desirability for storage are the forms of oats found in this country. Rolled and cut oats retain both their bran and their germ.

Oat groats: These are whole oats with the hulls removed. They are not often found in this form, but can sometimes be had from natural food stores and some storage food dealers. Oats are not the easiest thing to get a consistent grind from so producing your own oat flour takes a bit of experience. If you have a roller mill or attachment you can produce your own oatmeal using whole oat groats.

Steel cut oats: Also known as Irish, pinhead or porridge (but so are

rolled) oats. These are oat groats which have been cut into chunks with steel blades. They're not rolled and look like coarse bits of grain. This form can be found in both natural food stores (sometimes much cheaper) and many supermarkets.

Rolled oats: These are also commonly called old fashioned, thick cut or porridge oats. To produce them, oat groats are steamed and then rolled to flatten. They can generally be found wherever oats are sold. They take slightly longer to cook than do the quick cooking oats, but they retain more flavor, texture and nutrition. This is what most people will call to mind when they think of oatmeal.

Quick cooking rolled oats: These are just steamed oat groats rolled thinner than the old fashioned kind above so that they will cook faster. They can usually be found right next to the thicker rolled oats.

Instant rolled oats: These are the "just add hot water" or microwave type of oat cereals and are not particularly suited for a storage program. They do, however, have uses in "bug out" and 72 hour food kits for short term crises.

Whole oats: This is with the hulls still on. They are sold in feed & seed stores and sometimes straight from the farmer who grew them. Unless you have some means of getting the hulls off, I don't recommend buying oats in this form. If you do buy from a seed supplier, make certain that they have not been treated with any chemicals that are toxic to humans.

QUINOA: Quinoa is yet another of the grains that is not a true cereal. It's botanical name is *Chenopodium quinoa* (pronounced "keen-wah"), and is a relative of the common weed Lambsquarter. The individual kernels are about 1.5-2 mm in size and are shaped rather like small flattened spheres. When quinoa is cooked, the germ of the grain coils into a small "tail" that lends a pleasant crunch. This exotic grain should be thoroughly washed before cooking in order to prevent it from tasting bitter and most retail offerings already have been. There are several varieties of quinoa that have color ranging from near white to a dark brown. The larger white varieties are considered superior and are the most common.

RICE: Rice is the most commonly consumed food grain in the world. The U.S. is the leading exporter of it, though we actually only produce about 1% of the global supply. The majority of the world's rice is eaten within five miles of where it was grown.

Much like wheat and corn, rice comes in a number of varieties, each with different characteristics. They are typically divided into classes by the length of their kernel grains; short, medium and long.

Short grain rice: The short grain variety is a little softer and bit moister when it cooks and tends to stick together more than the longer rices. It has a sweeter, somewhat stronger flavor than long grain rice.

Medium grain rice: The medium grain variety is not very common in the States. It has flavor like the short variety, but with a texture more like long.

Long grain rice: The long grain variety cooks up into a drier, flakier dish than the shorter types and the flavor tends to be blander. It is the most commonly found size of rice on American grocery shelves.

Each of the above may be processed into brown, white, parboiled or converted and instant rice. Below is a short discussion of the differences between the various types.

Brown rice: This is whole grain rice with only the hull removed. It retains all of the nutrition and has a pleasant nutty flavor. From a nutritional standpoint it is by far the best, but it has one flaw: The essential oil in the germ is very susceptible to oxidation and soon goes rancid. As a result, brown rice has a shelf life of only about six months unless given special packaging or storage. Freezing or refrigeration will greatly extend this. It's possible to purchase brown rice from long term food suppliers already specially packaged in air tight containers with an inert nitrogen atmosphere or you can do it yourself. In this kind of packaging, (if properly done), the storage life can be extended for several years.

Converted rice: Converted rice starts as whole rice still in the hull which undergoes a process of soaking and steaming until it is partially cooked. It is then dried, hulled and polished to remove the bran and germ. The steaming process drives some of the vitamins and minerals from the outer layers into the white inner layers. This makes it more nutritious than polished white rice, but also makes it more expensive. Its storage life is the same as regular white rice.

White rice: This is raw rice that has had its outer layers milled off, taking with it about 10% of its protein, 85% of its fat and 70% of its mineral content. Because so much of the nutrition is lost, white rice sold in the U.S. has to be "enriched" with vitamins to partially replace what was removed.

Instant rice: The type of rice is fully cooked and then dehydrated needing nothing more than the addition of water to reconstitute it. In a pinch, it's not even necessary to use hot water. It's not particularly suitable for inclusion in storage programs, but it does have a place in "seventy-two hour" and other short-term emergency kits. The white variety is by far the most common, but in the last few years instant brown rice has made an appearance on the market.

RYE: Rye is well known as a bread grain in the U.S. It has dark brown kernels longer and thinner than wheat, but less gluten. Bread made from this grain tends to be somewhat dense unless gluten is added (often in the form of a lot of wheat flour) with color that ranges from pale to

dark brown. German pumpernickel, made with unrefined rye flour and molasses, is the darkest, densest form.

SORGHUM: Sorghum is probably more widely known here in the States for the syrup made from one of its varieties. Also known as milo, it is one of the principle cereal grains grown of Africa. Its seeds are somewhat round, a little smaller than peppercorns, of an overall brown color with a bit of red and yellow mixed in. The varieties called yellow endosperm sorghum are considered to have a better taste. It is a major feed grain in the Southwestern U.S. and is where the vast majority of the national production goes. Like most of the other grains, sorghum is low in gluten, but the seeds can be milled into flour and mixed with higher gluten flours or made into flat breads, pancakes or cookies. In the Far East, it is cooked and eaten like rice, while in Africa it is ground into meal for porridge. It's also fermented for alcoholic beverages.

TEFF: Easily the smallest of the grains, teff kernels are only about 1/32nd inch in diameter. The name itself means "lost" because if dropped on the ground, it's too small to recover. It's been very little known until recently, but has been a staple grain in Ethiopia for nearly five millennia. Small amounts are now being grown in South Africa and the United States. This grain ranges in color from reddish brown to near white. It has a protein content in the 10-12% range, good calcium and a useful source of iron. It is traditionally used in making the Ethiopian flat bread "injera", but has no gluten content of its own. It'll combine well with wheat flour though and has something of a sweet taste.

TRITICALE: Triticale is not a creation sprung from the smooth brows of Star Trek script writers. It is, in fact, a cross or hybrid between wheat and rye. This youngest of grains combines the productivity of wheat with the ruggedness of rye and has a high nutrition value. The kernels are gray-brown, oval shaped larger-than-wheat and plumper than rye. It can be used in much the same way as either of its two parents. It will make a raised bread like wheat does, but the gluten is a bit weak so wheat flour is frequently added to strengthen it. Because of the delicate nature of its gluten, excessive kneading must be avoided. Although it is the youngest of the grains, it's been around for decades, but has curiously never achieved much popularity.

WHEAT: Wheat comes in a number of different varieties. Each variety is more suitable for some purposes based on its characteristics. The most common classifications for its varieties are spring or winter, hard or soft, red or white.

The hard wheats have kernels that tend to be small, very hard and with high gluten contents. Low gluten wheat does not produce as fine a loaf as high gluten wheat, though it can still be used for yeast breads if necessary. As a general rule, hard varieties have more protein than soft varieties.

The soft wheats have kernels tending to be larger, plumper and softer in

texture than hard wheats. Their gluten content is less and are used in biscuits, pastries, quick breads, pastas, and breakfast cereals where a higher gluten content would contribute an undesirable tougher texture.

Winter wheats are planted in the fall, over winter in the field and are harvested the next summer. Spring wheats are planted in the early spring and are harvested in the fall. Red wheats comprise most of the hard varieties while white wheats comprise most of the soft. Recently, hard white wheats have been developed that are very suitable for raised bread making. Some feel the hard white varieties make a better tasting whole wheat bread than the hard red.

The hard red varieties, either spring or winter, are the most commonly stored because of their high protein and should have no less than 12%. The hard white spring wheats are still relatively new and are not yet as widespread. They have the same excellent storage characteristics as the hard red wheats.

HOME

Uses for Vinegar

by Rae Osenbaugh

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I found this list of uses for vinegar on one of the discussion lists I participate in....you may recognize some of them, and others may be new to you (there were a few new ones for me!). So, break out those gallons of vinegar! (thanks for the ideas to Sarah in KY!)

- 1 Kill grass on walks and driveways.
- 2 Kill weeds. Spray full strength on growth until plants have starved.
- 3 Increase soil acidity. In hard water: one gallon of tap water for watering rhododendrums, gardenias, or azaleas.
- 4 Deter ants. Spray vinegar around doors, appliances, and along other areas where ants are known.
- 5 Polish car chrome. Apply full strength.
- 6 Remove skunk odor from a dog. Rub fur with full strength vinegar; rinse.
- 7 Keep cats away. Sprinkle vinegar on areas you don't want the cat walking, sleeping, or scratching on.
- 8 Keep dogs from scratching his ears. Use a clean, soft cloth dipped in diluted vinegar.

- 9 Keep chickens from pecking each other. Put a little in their drinking water.
- 10 Tenderize meat. Soak in vinegar over night.
- 11 Freshen vegetables. Soak wilted vegetables in 2 cups of water and a tablespoon of vinegar.
- 12 Boil better eggs. Add 2 tablespoons water before boiling eggs. Keeps them from cracking.
- 13 Soothe a bee or jellyfish sting. Dot the irritation with vinegar and relieve itching.
- 14 Relieve sunburn. Lightly rub white vinegar; you may have to reapply.
- 15 Condition hair. Add a tablespoon of vinegar to dissolve sticky residue left by shampoo.
- 16 Relieve dry and itchy skin. Add 2 tablespoons to bath water.
- 17 Fight dandruff. After shampooing, rinse with vinegar and 2 cups of warm water.
- 18 Soothe a sore throat. Put a teaspoon of vinegar in a glass of water. Gargle, then swallow.
- 19 Treat sinus infections and chest colds. Add 1/4 cup or more vinegar to the vaporizer.
- 20 Feel good. A teaspoon of apple cider vinegar in a glass of water, with a bit of honey added for flavor, will take the edge off your appetite and give you an overall healthy feeling.
- 21 Deodorize the kitchen drain. Pour a cup down the drain once a week. Let stand 30 minutes and then flush with cold water.
- 22 Eliminate onion odor. Rub on your fingers before and after slicing.
- 23 Clean and disinfect wood cutting boards. Wipe with full strength vinegar.
- 24 Remove fruit stains from hands. Rub with vinegar.
- 25 Cut grease and odor on dishes. Add a tablespoon of vinegar to hot soapy water.
- 26 Clean a teapot. Boil a mixture of water and vinegar in the teapot. Wipe away the grime.
- 27 Freshen a lunchbox. Soak a piece of bread in vinegar and let it sit in

the lunchbox over night.

28 Clean the refrigerator. Wash with a solution of equal parts water and vinegar.

29 Unclog a drain. Pour a handful of baking soda down the drain and add 1/2 cup of vinegar. Rinse with hot water.

30 Clean and deodorize the garbage disposal. Make vinegar ice cubes and feed them down the disposal. After grinding, run cold water through

31 Clean and deodorize jars. Rinse mayonnaise, peanut butter, and mustard jars with vinegar when empty.

32 Clean the dishwasher. Run a cup of vinegar through the whole cycle once a month to reduce soap build up on the inner mechanisms and on glassware.

33 Clean stainless steel. Wipe with a vinegar dampened cloth.

34 Clean china and fine glassware. Add a cup of vinegar to a sink of warm water. Gently dip the glass or china in the solution and let dry.

35 Get stains out of pots. Fill pot with a solution of 3 tablespoons of vinegar to a pint of water. Boil until stain loosens and can be washed away.

36 Clean the microwave. Boil a solution of 1/4 cup of vinegar and 1 cup of water in the microwave. Will loosen splattered on food and deodorize.

37 Dissolve rust from bolts and other metals. Soak in full strength vinegar.

38 Get rid of cooking smells. Let simmer a small pot of vinegar and water solution.

39 Unclog steam iron. Pour equal amounts of vinegar and water into the iron's water chamber. Turn to steam and leave the iron on for 5 minutes in an upright position. Then unplug and allow to cool. Any loose particles should come out when you empty the water.

40 Clean a scorched iron plate. Heat equal parts vinegar and salt in a small pan. Rub solution on the cooled iron surface to remove dark or burned stains.

41 Get rid of lint in clothes. Add 1/2 cup of vinegar to the rinse cycle.

42 Keep colors from running. Immerse clothes in full strength vinegar before washing.

43 Freshen up the washing machine. Periodically, pour a cup of vinegar in

the machine and let it run through a regular cycle (no clothes added).
Will dissolve soap residue.

44 Brighten fabric colors. Add a 1/2 cup vinegar to the rinse cycle.

45 Take grease off suede. Dip a toothbrush in vinegar and gently brush over grease spot.

46 Remove tough stains. Gently rub on fruit, jam, mustard, coffee, tea. Then wash as usual.

47 Get smoke smell out of clothes. Add a cup of vinegar to a bath tub of hot water. Hang clothes above the steam.

48 Remove decals. Brush with a couple coats of vinegar. Allow to soak in. Wash off.

49 Clean eyeglasses. Wipe each lens with a drop of vinegar.

50 Freshen cut flowers. Add 2 tablespoons vinegar and 1 teaspoon sugar for each quart of water.

HOME

Hydrogen Peroxide -- What's it all about?

Hydrogen peroxide is water (H₂O) with an extra oxygen molecule. The combination is H₂O₂, an unstable powerful oxidant. It is a natural substance which can be found in trace amounts in rain and snow. Rain combines with ozone in the upper atmosphere. When the two mix, the ozone (O₂) loses one oxygen molecule to the water and hydrogen peroxide is formed. Hydrogen peroxide is very unstable and breaks down readily into water and a single oxygen molecule. Oxygen is stable only when the molecules are pairs (O₂). A single oxygen molecule is a strong oxidizing and disinfecting agent. Hydrogen peroxide is a simple yet effective substance. Our own immune system produces and uses hydrogen peroxide to control bacteria and viruses.

Merck's index indicates that hydrogen peroxide can be used as a water disinfectant. In the medical world it is used as a topical disinfectant. The FDA in the US has approved hydrogen peroxide to be used for "Aseptic" packaging in the food industry, as well it can be used in the processing of cheese and related cheese products. It can also be used in mouth rinse products for cleaning and healing mouth injuries.

Hydrogen peroxide is a healthy, environmentally friendly alternative to chlorine in your hot tub. Switch to hydrogen peroxide and you will be bathing in clean, oxygen enriched, odor free water. Always check with the manufacturer of your pool or tub as to the compatibility of hydrogen peroxide with your system.

35% Food Grade Hydrogen Peroxide and Tubbing

Hydrogen peroxide comes mixed with water in several strengths and types. Drug store variety is 3% strength. For hot tubbing we recommend 35% food grade (approved for food production) hydrogen peroxide. Some dissolved substances, particularly iron and organics will use up the hydrogen peroxide rapidly. The installation of an ozonator (H₂O₂ works well any ozonator or UV sterilizer) will usually solve this problem. If you are unsure of the mineral content of your water, try the hydrogen peroxide and test the level frequently.

Peroxide Test Strips

Peroxide test strips are a plastic strip with a reactive pad on one end. They are used to test the concentration of hydrogen peroxide in a solution. Dip the pad into the solution for 1 second. After 5 seconds compare the color of the pad to the color scale on the bottle. Test strips measure from 0 to 100 parts per million. Hot tubs are kept between 30 to 100 ppm hydrogen peroxide.

Shocking your tub to get started

To start your hot tub on hydrogen peroxide it is necessary to shock the water with a high dosage. For every 1000 liters of water in your tub, add 250 ml of hydrogen peroxide (250 ml to every 250 gallons of water). Let the tub stand for one day with the circulation pump running intermittently. Clean the filters before you start and check them frequently after shocking. The peroxide will oxidize any material in the water and the filters can quickly plug causing damage to the pump. Hydrogen peroxide may not work if the water has a high dissolved mineral or organic content.

Maintaining the hydrogen peroxide levels

The amount of hydrogen peroxide used depends on the quality of the water, the number of people using the tub, the frequency of use, and the amount of sunlight the tub gets. Check the level of hydrogen peroxide frequently with the test strips until you are familiar with how much hydrogen peroxide to add and when to add it. Then check at least once per week. The level should jump up to 100 ppm. Maintain the level between 30 and 100 ppm. Check and clean filters frequently.

Danger:

35% hydrogen peroxide is a strong oxidant and extremely corrosive. Handle with care. Keep out of reach of children. Store in a cool, dark place. There is first aid information in the next section of this brochure. Never dispense hydrogen peroxide into an unlabeled container. Toxic or fatal if swallowed at full strength.
Hydrogen Peroxide

Merck's Index indicates that hydrogen peroxide can be used as a water disinfectant.

Always use 35% food grade hydrogen peroxide in a dilute solution. Never use it as a concentrate without diluting it first. To make a 3% solution, mix 1 ounce 35% food grade hydrogen peroxide with 11 ounces of water. Distilled water is best when feasible, especially if the solution can be stored for any length of time.

The following information is for educational purposes and is not meant to treat or prescribe. We are sharing what others have told us has worked for them as they seek to have healthier animals and plants. Man, too, will benefit further down the food chain.

It was in 1985 that the first dairy farmer began injecting hydrogen peroxide in the water system of his entire farm. The water on his farm was polluted and mastitis was a problem with his herd. After continual use since that time, this same farmer has noticed with satisfaction the healthy state of his cows. In April 1988, the butterfat content of his Holstein cows was up to 5.3%. Another farmer who weighs the milk from every cow at every milking, reported that his milk production increased from 6 to 8 pounds per cow per milking. Others have reported their bacteria count has gone down to less than 2,000 per cubic centimeter. Many other farmers are continuing this experimental process.

Drinking Water of Farm Animals:

Use 8 ounces of 35% food grade hydrogen peroxide per 1000 gallons of water of 30 ppm. If you do not have an injector, start out by using 1 teaspoon of 35% hydrogen peroxide in the drinking cups at the stanchion. This same ratio is used for all farm animals: cows, pigs, poultry, sheep, goats, rabbits and birds, increasing the oxygen level to the blood and cells. When hydrogen peroxide has been used for cattle, an increase in milk production and an increase in butterfat content have been reported. Farmers have also reported less mastitis in their herds. Hog farmers have reported less mastitis in their herds. Hog farmers have reported their hogs using less feed in a shorter growing time (as much as 30 days less). Turkey and chicken growers reported increased weight per bird using less feed. A man in Wisconsin has told us that he has had the best reproduction rate of his buffalo by using hydrogen peroxide in their drinking water.

Peroxide application into the well water, or city water can best be accomplished by a metering device, which keeps the application more constant and thorough although manual application can be a second best. The rule of thumb is 8 to 10 oz. of 35% hydrogen peroxide to 1000 gallons water.

The Many Uses of Food Grade Hydrogen Peroxide

Hot Tubs:

Check with the hot tub manufacturer to determine the compatibility of your system with H₂O₂. The average size hot tub could be started up with one of two liters or more of 35% H₂O₂ until it tests 40 parts per million (ppm). Turn the circulation pump on to distribute it evenly during the next 24 hours. Add enough hydrogen peroxide from time to time to maintain it approximately 40 ppm, 3 to 6 ounces daily.

Additional Uses for Food Grade Hydrogen Peroxide

Vegetable Soak:

Add 1 cup H₂O₂ to a full sink of cold water. Soak light skinned (light lettuce) 20 minutes, thicker skinned (like cucumbers) 30 minutes. Drain, dry and refrigerate. Prolongs freshness.

If time is problem, spray vegetable (and fruits) with a solution of 3%. Let stand for a few minutes, rinse and dry.

Leftover Tossed Salad:

Spray with solution of 1 cup water and 1 tablespoon of 3%. Drain, cover and refrigerate.

To Freshen Kitchen:

Keep a spray bottle of 3% in the kitchen. Use it to wipe off counter tops and appliances. It will disinfect and give the kitchen a fresh smell.

Works great to clean refrigerator and kids' school lunch boxes.

Marinade:

Place meat, fish or poultry in a casserole (avoid using aluminum pans). Cover with a dilute solution of equal parts of water and H₂O₂. Place loosely covered in refrigerator for 1 hour. Rinse and cook.

In the Dishwasher:

Add 2 ounces of 3% H₂O₂ to your regular washing formula.

Sprouting Seeds:

Add 1 ounce of 3% H₂O₂ to 1 pint of water and soak the seeds overnight. Add the same amount of H₂O₂ each time you rinse the seeds.

House and Garden Plants:

Put 1 ounce of 3% H₂O₂ in 1 quart water. Water or mist plants with this solution.

Humidifiers and Steamers:

Mix 1 pint of 3% H₂O₂ to 1 gallon of water.

Insecticide Spray:

Mix 8 ounces black strap molasses or white sugar and 8 ounces of 3% H₂O₂ to 1 gallon water.

Laundry:

Add 8 ounces of 3% to your wash in place of bleaches.

Shower:

Keep a spray bottle of 3% H₂O₂ in the shower. Spray body after washing to replace the acid mantle on your skin that soap removes.

Facial:

Use 3% on cotton ball as a facial freshner after washing.

Rejuvenating Detoxifying Bath:

Add 6 ounces of 35% H₂O₂ to tub of water. May increase H₂O₂ up to 2 cups per bath. Soak at least at hour.

Alternate Bath:

Add cup of 35% H₂O₂, cup sea salt, cup baking soda or Epsom salts to bath water and soak.

Foot Soak:

Add 1 ounces of 35% H₂O₂, to 1 gallon water and soak.

Athlete's Foot:

Soak feet nightly in 3% H₂O₂ until condition is improved.

Mouthwash:

Use 3% H₂O₂. Add a dash of liquid chlorophyll for flavoring if desired.

Toothpaste:

Add baking soda and add enough 3% H₂O₂ to make a paste. Or just dip your brush in 3% H₂O₂ and brush.

Douche:

Add 6 tablespoons of 3% H₂O₂ to a quart of warm water. This is the minimum amount to use.

Colonic or Enema:

For a colonic, add 1 cup (8 ounces) 3% H₂O₂ to 5 gallons warm water. (Do not exceed this amount). For an enema, add 1 tablespoon of 3% H₂O₂ to a quart of warm water.

Hydroponics:

For every 30 gallons of nutrient solution, pre-dilute three to six tablespoons of 35% H₂O₂ to a gallon of distilled water. Then slowly add to the nutrient solution, stirring gently. If you are mixing up a fresh batch of nutrient solution, pour in half of the water first (preferably with a high purity of essence) and add the H₂O₂. Add the nutrients to the other half, then gently combine the two halves.

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SIXTY (Plus) USES OF SALT

Although you may not realize it, simple table salt has a great number of uses other than simply seasoning your food. The following list will give

you sixty uses of salt, many of which you probably didn't realize:
If you drop a whole egg on the floor, pour salt all over the egg, let it sit for awhile, then use dustpan, the egg will come right up, without all that mess. Contributed by Ms. Jerry McGinnis,
CRAFTYLADY1@worldnet.att.net

Soak stained hankies in salt water before washing.

Sprinkle salt on your shelves to keep ants away.

Soak fish in salt water before descaling; the scales will come off easier.

Put a few grains of rice in your salt shaker for easier pouring.

Add salt to green salads to prevent wilting.

Test the freshness of eggs in a cup of salt water; fresh eggs sink; bad ones float.

Add a little salt to your boiling water when cooking eggs; a cracked egg will stay in its shell this way.

A tiny pinch of salt with egg whites makes them beat up fluffier.

Soak wrinkled apples in a mildly salted water solution to perk them up.

Rub salt on your pancake griddle and your flapjacks won't stick.

Soak toothbrushes in salt water before you first use them; they will last longer.

Use salt to clean your discolored coffee pot.

Mix salt with turpentine to whiten you bathtub and toilet bowl.

Soak your nuts in salt brine overnight and they will crack out of their shells whole. Just tap the end of the shell with a hammer to break it open easily.

Boil clothespins in salt water before using them and they will last longer.

Clean brass, copper and pewter with paste made of salt and vinegar, thickened with flour

Add a little salt to the water your cut flowers will stand in for a longer life.

Pour a mound of salt on an ink spot on your carpet; let the salt soak up the stain.

Clean your iron by rubbing some salt on the damp cloth on the ironing surface.

Adding a little salt to the water when cooking foods in a double boiler will make the food cook faster.

Use a mixture of salt and lemon juice to clean piano keys.

To fill plaster holes in your walls, use equal parts of salt and starch, with just enough water to make a stiff putty.

Rinse a sore eye with a little salt water.

Mildly salted water makes an effective mouthwash. Use it hot for a sore throat gargle.

Dry salt sprinkled on your toothbrush makes a good tooth polisher.

Use salt for killing weeds in your lawn.

Eliminate excess suds with a sprinkle of salt.

A dash of salt in warm milk makes a more relaxing beverage.

Before using new glasses, soak them in warm salty water for awhile.

A dash of salt enhances the taste of tea.

Salt improves the taste of cooking apples.

Soak your clothes line in salt water to prevent your clothes from freezing to the line; likewise, use salt in your final rinse to prevent the clothes from freezing.

Rub any wicker furniture you may have with salt water to prevent yellowing.

Freshen sponges by soaking them in salt water.

Add raw potatoes to stews and soups that are too salty.

Soak enamel pans in salt water overnight and boil salt water in them next day to remove burned-on stains.

Clean your greens in salt water for easier removal of dirt.

Gelatin sets more quickly when a dash of salt is added.

Fruits put in mildly salted water after peeling will not discolor.

Fabric colors hold fast in salty water wash.

Milk stays fresh longer when a little salt is added.

Use equal parts of salt and soda for brushing your teeth.

Sprinkle salt in your oven before scrubbing clean.

Soaked discolored glass in a salt and vinegar solution to remove stains.

Clean greasy pans with a paper towel and salt.

Salty water boils faster when cooking eggs.

Add a pinch of salt to whipping cream to make it whip more quickly.

Sprinkle salt in milk-scorched pans to remove odour.

A dash of salt improves the taste of coffee.

Boil mismatched hose in salty water and they will come out matched.

Salt and soda will sweeten the odor of your refrigerator.

Cover wine-stained fabric with salt; rinse in cool water later.

Remove offensive odors from stove with salt and cinnamon.

A pinch of salt improves the flavor of cocoa.

To remove grease stains in clothing, mix one part salt to four parts alcohol.

Salt and lemon juice removes mildew.

Sprinkle salt between sidewalk bricks where you don't want grass growing.

Polish your old kerosene lamp with salt for a brighter look.

Remove odors from sink drainpipes with a strong, hot solution of salt water.

If a pie bubbles over in your oven, put a handful of salt on top of the spilled juice. The mess won't smell and will bake into a dry, light crust which will wipe off easily when the oven has cooled.

HOME

SIXTY USES OF BAKING SODA

Bicarbonate of soda or baking soda has many different uses in the

household.

Although much more expensive products have been developed over the years to do the same jobs, baking soda can work for you just as well, if not better. Use it in the following ways:

To make your own baking powder, stir and sift together 2 parts of Cream of Tartar to 1 part baking soda and 1 part cornstarch.

Be sure to keep an extra box of baking soda by your stove in case of grease or electrical fire. Scatter the powder by the handful to safely put it out.

Keep a container of baking soda in your garage as well as in your car to put out a fire. It won't damage anything it touches.

Baking soda will also put out fires in clothing, fuel, wood, upholstery and rugs.

Clean vegetables and fruit with baking soda. Sprinkle in water, soak and rise the produce.

Wash garbage cans with baking soda.

Soak and wash diapers with baking soda.

Oil and grease - stained clothing washes out better with soda added to the washing water.

Clean your fridge and freezer with dry soda sprinkled on a damp cloth. rinse with clear water.

Deodorize your fridge and freezer by putting in an open container of baking soda to absorb odors. Stir and turn over the soda from time to time. Replace every 2 months.

Soda absorbs kitty litter odors. Cover the bottom of the kitty box with 1 part soda; then add a layer of 3 parts kitty litter on top.

Always add 1/2 cup soda to your washing machine load.

Clean combs and brushes in a soda solution.

Wash food and drink containers with soda and water.

Wash marble-topped furniture with a solution of 3 tablespoons of soda in 1 quart of warm water. Let stand awhile, then rinse.

Clean formica counter tops with baking soda on a damp sponge.

Wash out thermos bottles and cooling containers with soda and water to get rid of stale smells.

To remove stubborn stains from marble, formica or plastic surfaces, scour with a paste of soda and water.

Wash glass or stainless steel coffee pots (but not aluminum) in a soda solution (3 tbsp. soda to 1 quart water).

Run you coffee maker through its cycle with a soda solution. Rinse.

Give baby bottles a good cleaning with soda and hot water.

Sprinkle soda on barbecue grills, let soak, then rinse off.

Sprinkle soda on greasy garage floor. Let stand, scrub and rinse.

Polish silverware with dry soda on a damp cloth. Rub, rinse and dry.

For silver pieces without raised patterns or cemented-on handles: place the silver on aluminum foil in an enamel pot. Add boiling water and 4 tbsp. baking soda. Let stand, rinse and dry.

Reduce odor build-up in your dishwasher by sprinkling some soda on the bottom.

Run your dishwasher through its cycle with soda in it instead of soap to give it a good cleaning.

To remove burned-on food from a pan: let the pan soak in soda and water for 10 minutes before washing. Or scrub the pot with dry soda and a moist scouring pad.

For a badly-burned pan with a thick layer of burned-on food: pour a thick layer of soda directly onto the bottom of the pan, then sprinkle on just enough water so as to moisten the soda. Leave the pot overnight, then scrub it clean next day.

Rub stainless steel and chrome with a moist cloth and dry baking soda to shine it up. Rinse and dry. On stainless steel, scrub in the direction of the grain.

Clean plastic, porcelain and glass with dry soda on a damp cloth. Rinse and dry.

Remove that bad smell from ashtrays with soda and water.

Sprinkle a bit of dry soda in your ashtrays to prevent smoldering and reduce odor.

Clean your bathroom with dry soda on a moist sponge - sink, tub, tiles, shower stall, etc.

Untitled Document

Keep your drains clean and free-flowing by putting 4 tablespoons of soda in them each week. Flush the soda down with hot water.

Soak your shower curtains in water and soda to clean them.

To remove strong odors from your hands, wet your hands and rub them hard with soda, then rinse.

Sprinkle baking soda on your wet toothbrush and brush your teeth and dentures with it.

Sprinkle soda in tennis shoes, socks, boots and slippers to eliminate odor.

Add 1/2 cups or more of baking soda to your bath water to soften your skin.

Putting 2 tbsp. of baking soda in your baby's bath water will help relieve diaper rash irritations.

Apply soda directly to insect bites, rashes and poison ivy to relieve discomfort. Make a paste with water.

Take a soda bath to relieve general skin irritations such as measles and chicken pox.

Take 1/2 teaspoon of baking soda in 1/2 glass of water to relieve acid indigestion or heartburn.

Gargle with 1/2 tsp. baking soda in 1/2 glass of water. Freshens and cleans your mouth.

Used as a mouthwash, baking soda will also relieve canker sore pain.

To relieve sunburn: use a paste of baking soda and water.

Bug bites: use a poultice of baking soda and vinegar.

Bee sting: use a poultice of baking soda and water.

Windburns: moisten some baking soda and apply directly.

Making Play Clay with baking soda: combine 1 1/4 cups water, 2 cups soda, 1 cup cornstarch.

Use soda as an underarm deodorant.

If your baby spits up on his shirt after feeding, moisten a cloth, dip it in baking soda and dab at the dribbled shirt. The odor will go away.

When scalding a chicken, add 1 tsp. of soda to the boiling water. The

feathers will come off easier and flesh will be clean and white.

Repel rain from windshield. Put gobs of baking soda on a dampened cloth and wipe windows inside and out.

Add to water to soak dried beans to make them more digestible.

Add to water to remove the "gamey" taste from wild game.

Use to sweeten sour dishcloths.

Use dry with a small brush to rub canvas handbags clean.

Use to remove melted plastic bread wrapper from toaster. Dampen cloth and make a mild abrasive with baking soda.

HOME

STORING HERBS AND SPICES.

It is difficult to give exact instructions on how best to store culinary herbs and spices because there are dozens of different seeds, leaves, roots, barks, etc., we call an herb or a spice. There are, however, some general rules that may be followed to best preserve their flavors. All spices, particularly dried, are especially sensitive to heat, air and light. Room temperature is satisfactory for keeping them and refrigeration or freezing is even better, but they should be kept away from heat sources. It is common for the household spice cabinet or shelf to be located over the stove, but this is really a very poor place. Dark opaque glass is best for storage, but failing that, keeping a tightly sealed glass container in a dark place is next best. The cellophane packets some products come in just won't do. Tightly sealed metal containers will work as well. Even dense plastic will do, but glass is best.

Where possible, buy spices whole. Whole nutmegs will keep their flavor far longer than ground nutmeg, the same for other seeds and roots. You'll have to use a grater, grinder or whatever, but the difference in flavor will be worth it.

If you buy spices in bulk containers (which is certainly cheaper) consider transferring some into smaller containers and keeping the larger one tightly sealed in a cool, dark place. This will prevent unwanted light and air from continually getting in and playing havoc.

Included in the suppliers addresses are listings for several spice and herb companies. The one I have personally dealt with so far is Penzey's (contact info in the Resources section) and their products have been consistently excellent with good prices. It's worth investigating some of these companies as they can really take the sting out of purchasing large quantities.

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GENERAL SUPPLIES

Updated September 25, 2001

CAMPING GEAR

36 each Candles
200 each Fire Starters (jelly, ribbon, tablets, impregnated peat bricks, wax-coated pine cones, magnesium block, flint)
1 each First Aid Kit (see list)
each Fuel Refills (for each type, propane, sterno, diesel, gas)
2 each Fishing Kit
4 each Foam Mattress Pads (for under sleeping bags, swags, etc.)
4 cans Insect Repellent
1 each Kettle, huge, with lid (at least lobster pot size) for boiling water
18 each Light sticks (12 hour)
4 each Lighter (butane)
4 bottles Liquid Detergent for clothes and dish washing
1 each Mosquito Netting
4 each Plastic Sheeting or Tarps (waterproofing between sleeping bag and ground)
2 each Propane Lanterns and Extension Poles
2 each Propane Tank (20 lb or 9 Kg.)
4 each Propane Wicks or Socks
1 each Portable Clothes Line and Pegs or Clothes Pins
2 each Prescriptions for current medications
4 each Sleeping Bag, Bedroll, Swag or Wool Blankets
1 each Snake Bite Kit
4 each Space Blankets (reflects up to 90% of your body heat and only weighs 20 oz)
2 each Tents (2 person)
5 each Trash Bags*
1 each Wash Board
1 each Wash Tub for laundry
10 boxes Waterproof Matches

* Purchase the heaviest, largest trash bags available for countless uses like an extra tent, emergency wind/rain protection or keeping pack and contents dry)

CARRYING ITEMS

4 each Backpack for supplies
4 each Fanny pack for short excursions
1 each Five Gallon Pail with Lid
4 each Water Canteen

CLOTHING

24 each Bandanas (inexpensive shield face, head cover, wash cloth,

bandage, sanitary pad)
12 each Complete Change of Clothing* (3 for each person)
2 each Current Prescription Glasses
12 each Dust Masks
12 each Extra 3 sets of underwear (3 for each person)

1 each Gas Mask if you are living in one of the top 120 major cities

8 pair Heavy Socks for boots
4 each Rain Poncho OR Rubberized Parka and Rain Pants (oversized to layer clothing underneath - these items are preferable over the Rain Poncho-offers more protection)
4 each Sturdy Boots
4 each Sunglasses
4 pair Tennis Shoes
4 pair Work Gloves, heavy duty
*Most people will need to consider seasonal changes. Every season, update your stored change of clothes for appropriate weather conditions. In winter, include coats, hats, gloves, thermal underwear, snow boots and clothes for layering.

COMMUNICATION ITEMS

1 set \$1000. in cash and change (during times of disaster charge cards and checks will not be honored*)
2 each Compass of good quality
6 each Notepad
2 each Map of your local area
4 each Pen
4 each Pencil
1 set Phone numbers and addresses of friends/family
1 set Pre-addressed, stamped postcards of friends and family out of state (if a disaster is widespread, you'll want to contact someone out of the area)
1 each Radio (solar, hand cranked or battery powered)
8 each Road Flares (these are not legal in Australia)
1 each Short-wave Radio (plus extra batteries)
12 each Signal Flares (these are not legal in Australia)
4 each Signal Mirror
4 each Signal Whistle
*Money is always hard to tuck away and pretend it isn't there, but in this instance, it is a necessity. One can't depend on merchants accepting credit cards during a crisis. Think about it. Whenever you make a purchase, it is always verified by a telephoned authorization number. If phone lines are down and these numbers are not obtainable, chances are your proposed purchase won't be allowed.

COOKING ITEMS

2 rolls Aluminum Foil, heavy weight
2 each Boning Knife
2 each Bread Loaf Pan
1 each Butcher Knife

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- 1 each Camp Stove
- 1 each Can Opener, manual, heavy duty
- 1 each Corkscrew
- 6 each Dish Cloths
- 1 each Dutch Oven, large with lid, stainless steel or cast iron best*
- Food/Water Supplies (see Long-Term Storage suggestions)
- Fuel for Camp Stove (see Propane Tank listed in Camping Gear)
- 1 each Grater
- 1 each Grain Grinder, manual
- 1 each Hot Pad
- 6 each Melamine Plates and Cups (aluminum gets too hot)
- 1 each Metal Coffee Maker or Billy Can
- 1 each Mixing Bowl, Large
- 1 each Mixing Bowl, Small
- 2 each Pancake Turners, metal not plastic
- 1 each Paring Knife
- 1 roll Plastic Wrap
- 2 each Quart Containers with Lids (for purifying water, you need 2 so water can be poured back and forth to re-oxygenate)
- 1 each Sauce Pan, large with lid, stainless steel or cast iron best*
- 1 each Sauce Pan, small with lid, stainless steel or cast iron best*
- 1 each Spoons, Metal
- 2 each Spoons, Wooden
- 1 each Skillet, large with lid, stainless steel or cast iron best*
- 5 pkgs Water Purifying Tablets (50 count)
- 2 each Water Purification System (see article water purifiers)
- 2 boxes Ziploc Freezer Bags, gallon
- 2 boxes Ziploc Freezer Bags, quart

*If you elect to cook outside, cover food to guard against insects. In Australia there are nasty blowflies (blowies in OZ speak) which do rather rude things (lay maggot eggs) in any meat, given the chance. Using lids will also expedite cooking and water boiling times which reduces fuel consumption.

INFANT SUPPLIES

- 3 sets Baby Clothes
- 2 bottles Baby Powder
- 2 bottles Baby Wash
- 2 each Blankets
- 3 each Bottles
- 26 boxes Diapers, disposable (24 count)
- 1 bottle Diaper Rash Ointment
- ? cans Formula
- 2 bottles Lotion
- 1 each Teething Ring
- 2 boxes Towelettes, Premoistened

Toys

LATRINE AND GENERAL HYGIENE

- 12 pair Surgical Gloves (these are inexpensive and can be obtained in discount stores)

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Untitled Document

- 1 each Camping Potty
- 2 bottle s Disinfectant
- 3 gallons Liquid Bleach and Eye Dropper
- 4 bottles Liquid Detergent for clothes and dish washing
- 4 each Sponges
- 2 boxes Steel Wool Pads like Brillo
- 40 rolls Toilet Paper, rolls flattened
- 2 boxes Towelettes, Premoistened (in addition to ones for infants)
- 120 each Trash Bags, large (for human waste and misc. rubbish)
- 4 bottles Vinegar

MISCELLANEOUS

- 1 each Bible
- 1 each Board Games: Scrabble, Monopoly, Chess, Backgammon, Checkers,
- 8 each Books for pleasure
- 1 set Certified Copies of:
 - wills
 - birth, death, marriage certificates and divorce decrees
 - house and life insurance policies
 - inventory of valuable household items
 - deeds and contracts
 - stocks and bonds
 - charge card account numbers and their "lost or stolen" notification numbers
 - bank account numbers
 - medical records including immunizations
 - social security numbers
 - passports, where pertinent for each family member

*Keep these items in waterproof containers. Many survival and camping stores sell flat, water tight pouches. If you have a food vacuum sealer, this is another great use for it!

Ammunition, appropriate to and if firearm is selected

- 1 each Clock, wind-up manually like Big Ben and Baby Ben
- 2 each Firearm, (pistol and rifle recommended, personal choice item, see Firearms Page if you don't know where to start))
- 1 each Hunting Knife
- 2 decks Playing Cards
- 1 each Magnifying Glass
- 1 box Paper Clips, assorted sizes
- 1 box Rubber Bands, assorted sizes
- 1 box Safety Pins, assorted sizes
- 1 each Survival Manual

PERSONAL HYGIENE

- 1 bottle After Shave
- 2 months Birth Control
- 2 bottles Body/Hand Lotion
- 4 each Comb and Brush
- 1 set Cosmetics

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- 2 each Dental Floss
- 4 each Deodorant
- 3 bottles Liquid Soap for personal washing
- 1 box Panty Liners
- 1 bottle Perfume
- 3 pkgs Razor Blades (10 count)
- 3 bottles Shampoo
- 1 box Tampons/Sanitary napkins
- 4 each Toothbrush
- 3 tubes Toothpaste
- 1 each Tweezers, pointed
- 8 each Wash Cloths & Towels

PET CARE

- 18 each Chew Bones
- 10 bags Dog Food, dry (4 Kg or 10 Lb each)
- 2 each Food Bowl
- 2 each Leash and Collar
- 2 each Muzzles
- 5 bags Litter
- 1 each Litter Box
- 1 pkg Litter Box Liners
- 2 each Toys
- 1 each Water Bowl
- ? gallons Water*, one gallon per dog per day. For a cat, it is about 1 pint.

*(Even if it is a small animal, plan on the unexpected. SOMEBODY will undoubtedly spill their day's ration and the pet's water can be used in emergency.)

SENIOR CARE

- 2 each Batteries for Wheelchairs and Hearing Aids
- 1 each Crutches or Walkers, Tips and Pads
- 2 boxes Denture Care Items
- 1 spare Eye Glasses
- 2 months Heart or Blood Pressure Medications
- 2 months Prescriptions
- Special Dietary Items
- 3 sets Warmer Clothing (generally the elderly have trouble with poor blood circulation and get cold easier)

TOOLS & HANDYMAN ITEMS

- 2 each ABC Fire Extinguisher (check for expiration date)
- 1 each Axe
- 6 each Bungee Straps (variety of lengths)
- 1 each Bush or Tree Saw
- 1 set Buttons, assorted sizes
- 1 each Crowbar
- 1 each Drill, Hand-operated
- 3 rolls Duct Tape
- 4 each Flashlight (extra batteries, spare bulbs)

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1 each Generator, diesel preferably 5 KW
1 each Hammer
1 each Hatchet
1 roll Masking Tape (for labeling, etc)
1 box Nails, assorted sizes
1 pkg Needles and Thread, assorted "eye" sizes
1 box Pins
1 each Pliers, needle nose
1 each Pliers, regular
1 each Post Hole Digger, auger type
100' (30 meters) Rope, Nylon
1 each Scissors
1 each Screwdriver, Phillips
1 each Screwdriver, Flat Head
1 each Shovel, Rounded V-shaped for digging
1 each Sledgehammer
1 each Staple Gun and Staples
1 each Swiss Army Knife
100' (30 meters) Twine or Heavy String
1 each Vice Grips
1 each Wire Cutters
1 each Wench and Cable, manual
1 each Wrench

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'Signs of spoilage and what to do

Before a container is opened, you can see signs of spoilage that indicate the food is unfit or actually dangerous to eat:

- Seeping seams, bulging ends on cans.
- Seepage around the seal, even though it seems firmly seated.
- Mold around the seal or visible in the contents.
- Gassiness (small bubbles) in the contents.
- Cloudy or yeasty liquid.
- Shriveled or spongy-looking food.
- Food an unnatural color (often very dark)

When the container is opened, these are additional signs of spoilage:

- Spurting liquid, pressure from inside as the container is opened.
- Fermentation (gassiness).
- Food slimy, or with too soft a texture.
- Musty or disagreeable or downright nasty odor.
- Mold, even a fleck, on the underside of the lid or in the contents.

If any such signs are evident in unopened or opened containers
DESTROY THE CONTENTS SO THEY CANNOT BE EATEN BY PEOPLE OR ANIMALS.

Burn the food if you can. Otherwise put food and containers and closures in a large enameled kettle, pour in water to cover by several inches, and add 1/4 cup of strong detergent and an effective household disinfectant according to directions on the label for sterilizing (do not use bleach here, because of its vapor when hot). Bring the kettle to boiling, and boil hard for 20 minutes. Fish out the containers and closures, flush everything else down the toilet. Discard the sterilized metal cans and closures, and all sealers. Sterilized jars and glass lids may be used again if they are perfect and undamaged. In a solution made in the proportion of 1 part household chlorine bleach to each 4 parts water, wash all utensils, cloths and surfaces that might have come in contact with the spoiled food.

A further precaution deals with canned food that has no obvious signs of spoilage either before or after it is opened, and this is: NEVER taste canned food without boiling it first for 15-20 minutes for greens, corn, meats, poultry and seafood. If it has a bad smell or foams unduly during boiling, destroy it so it cannot be eaten by people or animals, and treat the containers as described above.'

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An Emergency /Survival Food Primer

by Byron Kirkwood

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Are you confused about emergency and survival food? Do you know the difference between an MRE and an Emergency Food Ration (life-raft cookie bar)? And how are the long-shelf life foods different from normal grocery store canned goods?

You know you need to have some food on-hand for emergencies, right? -- but where do you start? What goes into an emergency kit and what do you obtain for long-term emergencies or serious food shortages?

This primer may help you better understand what is available, and which

type of food best fits the different situations.

First, let me start with a few definitions. For this discussion I consider an "emergency" situation one that may last anywhere from a few hours (including the magical "72-hours") up to about two weeks. For periods longer than two weeks, I consider this a "survival" situation. Experts feel that for most emergencies the situation will normalize itself in less than 72 hours. By this time the proper agencies will be in place to assist with shelter, water, food, clothing, etc.

Another consideration in planning for emergencies is, will you be in your home during the emergency, or will you be away from your home and on the move? Some emergencies happen while you are at home, such as a winter freeze, power outages, etc. Others require you to flee your home, such as an incoming hurricane or having your home damaged by a tornado or earthquake. And sometimes emergencies happen when you are away from home, as when you are traveling in your automobile.

When an emergency happens, your first line of defense (food-wise) is the food in your refrigerator and pantry (assuming you are at home). Even if you have to flee, you will likely want to raid the pantry on the way out. The disadvantages to this as the only supply of emergency food, is that this type of food typically has a relatively short shelf life, and most contain their own liquid (water), and are therefore heavy to transport. With all this in mind, let me discuss the different types of foods that are available.

FOOD BARS - these are specially formulated "cookie" bars that are non-thirst provoking and high in protein to help in a high stress situation. Each bar exceeds the normal daily requirements for vitamins and minerals. They typically have a five-year storage life and can withstand extreme temperature ranges (-40 degrees to 300 degrees F). A typical 3-day package contains 9 bars of 400 kcal each (3,600 kcal per package). They are normally Coast Guard approved for lifesaving craft (life rafts). Because of their wide storage temperature range and relative small size and weight, they are ideally suited for emergency kits -- especially for an emergency kit you leave in the trunk of your car, where the temperature may range from below zero in winter, to over 100 degrees in summer. A 3-day (9 bars) package cost under \$10. The taste is acceptable (I think they are tasty), but you may tire of them after a few meals. But then -- they are for survival!

MREs (Meals-Ready-to-Eat) are the military's latest type of rations (see note 1). The big difference between these and previous types of military rations (K and C) is that these taste good. The MREs are packaged in a specially designed triple-layer foil/plastic "retort" pouches that are sealed, cooked and not exposed to air until opened. MREs typically have a five to seven year shelf life if stored in a cool environment. But the nutritional value and taste deteriorate with an increase in ambient storage temperature (see the MRE Storage Life Chart in the B&A catalog). MREs are available in full meals; that contain a meat, vegetable or

fruit, peanut butter, high protein crackers, freeze dried fruit bar, beverage base, accessory packet and a spoon. Or individual entrees and other pieces can be purchased separately. They can be eaten warm (warmed in a number of different ways) or eaten cool. Typical MRE entrees include: chicken a la king, barbecue pork with rice, spaghetti with meat and sauce, and omelette with ham.

A supply of MREs makes an excellent food supply for emergencies. They are light enough they can be taken with you in the automobile or include a few in your emergency kit. Just don't leave them in a potentially warm environment for very long (like the trunk of your car). I suggest you store them inside your house in a "sports" type bag or box, and grab them if you have to flee. One advantage to MREs over other types of emergency food, is that it doesn't require that water be added (except to the drink base). They don't need any cooking or preparation, making them an excellent choice of food while you're on-the-move. A typical MRE full meal cost less than \$7, and occasionally bargains can be found on MREs. If you are interested in MREs, I suggest you try one of the "12 Pouch Sample Order" or the "72-Hour Emergency Food Supply" kits available through B&A or at your local Army & Navy store.

CAMPING POUCH PRODUCTS are available from a number of suppliers. The brand that B&A carries is AlpineAire and is considered one of the best (see note 1). These products are packaged in an aluminized foil pouch and typically have a shelf life of about 2 years (if stored at room temperature). The foods are either dehydrated or freeze dried, and each package is nitrogen flushed to ensure freshness and extended storage life. Many are "no-cook" varieties that don't require any cooking. To prepare you simply add hot (or cool) water. There is a wide variety of entrees (both meat and meatless), side dishes, soups, breakfasts, fruits and desserts (see B&A catalog for list). AlpineAire has a Sampler (#1204) that will feed two people for 3-days for \$46 (plus S&H). That means the average cost per meal, per person can be as low as \$2.50. One advantage of having a supply of these items is that they can double as normal trail and camping food, while serving as emergency food if you need it. By being dehydrate or freeze dried, they are very light and easy to transport. And the taste of the camping meals is usually excellent.

LONG SHELF LIFE FOOD SUPPLY. Typically this is food that is dehydrated or freeze dried (similar to the pouch products), packaged in double-enamelled #10 or #2-1/2 cans, nitrogen flushed, and has an expected shelf life of 10 to 15 years (or more). B&A carries two lines of this type of food; Ready Reserve Foods and the AlpineAire's line of Gourmet Reserves. This is the type of food you will want to obtain and store, to prepare for a long term survival situation. Both Ready Reserves and AlpineAire have food kits that provide enough food for a few days up to a year (or more). A kit (#U-12) for 4 people for 3 days sells for as little as \$91 (plus S&H). And a family kit for 4 people for a year sells for about \$2800 (plus shipping). The family kit would average less than \$1 per meal, per person -- not bad!

Something that often happens when people start planning their long term food needs is -- they look at what they need (1 or 2 year supply) and are overwhelmed by the cost, and then do nothing. Don't try to take on the whole task at one time. You can break up your purchases and buy a little at a time. Storage space can also be a problem. But you might be surprised to find that you have many places to store items that you might not have otherwise considered, as an example in the space under your bed.

Remember that dehydrated and freeze dried food will require clean water to be able to reconstitute. Also, when you obtain your supply of storage food, use it on a rotational basis. This will get your family accustomed to the taste and keep fresh product in the storage supply, as you replace that which is eaten.

This has been an overview to familiarize you with the different types of "emergency" foods that are available, their respective costs, and to help you decide which is best suited for your situation. I hope it helps. (I recognize that this article doesn't address the natural emergency food that can be found in nature, if you know what can and can't be eaten.)

A couple of final points: it is better to be two years too early in your emergency planning, than one minute too late. And consider that purchasing your emergency food supply is analogous to buying "food insurance."

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CONSUMER STORED PRODUCT PESTS

I. INSECTS:

The insect pests of our stored food products consist of many different species, but are primarily either of the order Coleoptera (beetles and weevils) and Lepidoptera (moths). In this section we will review some of the more common species of both orders.

The different species are divided into three groups according to their feeding habits. There are internal feeders, external feeders, and scavengers.

I.A. INTERNAL FEEDERS

The internal feeders are so called because the female deposits a single egg inside a whole kernel of grain. The egg hatching, the larvae feeding, and the pupation all occur within that grain kernel. These insects are primarily a problem in fields or in grain storage and processing facilities.

I.A.1. RICE WEEVIL & GRANARY WEEVIL

1. Adult is reddish-brown in color; about 1/8" long.
2. Rice weevil has four light colored spots on the wing covers and the wing cover is dotted with small round punctures.

3. The rice weevil is one of the most destructive insect pests of stored grain in the United States.
4. Weevils can be identified by the presence of the characteristic "snout" that is used for boring into the grain kernels.
5. Granary weevil back covers have elongated oval punctures and no colorations; it has no wings.
6. Granary weevil cannot fly so infestation is restricted to stored whole grains; rice weevil is a good flier so also infests fields.
7. Under ideal conditions, development from egg to adult takes as little as four weeks.
8. The adult female lives four to eight months during which time it lays up to 400 eggs.
9. Both can survive the winter by hibernating.
10. The adults are sometimes found in flour or macaroni, but their eggs cannot hatch in these materials.

I.A.2. BEAN WEEVIL

1. This insect, actually a beetle, is called a weevil because its feeding and egg laying habits are like the weevil
2. The adults and larvae feed on beans

I.A.3. ANGOUMOIS GRAIN MOTH

1. This pest is frequently encountered in homes, as well as warehouses and stores; it often is found in seed art or decorative dried "Indian corn".
2. The adult is very small like a clothes moth, yellowish white in color with pale colored wings.
3. The hind wing has a finger-like projection on the leading edge.

I.A.4. LESSER GRAIN BORER

The LESSER GRAIN BORER is an internal feeder of the bostrichid family. This family is more well known for its wood-boring members. The lesser grain borer also bores into wood and books as well as whole grains.

I.B. EXTERNAL FEEDERS

The external feeders are so called because the egg is laid outside the whole grain, and the larvae bores its way in and feeds and develops then inside the grain or product. These insects are often found in homes.

I.B.1. DRUGSTORE BEETLE

1. This beetle feeds on almost every dried plant product there is; it is often found in dried dog food, and spices such as red pepper.
2. The adult is light brown in color, about 1/10" long.
3. It can be distinguished from the cigarette beetle that it resembles by the longitudinal lines on the wing covers (elytron).
4. There will be one to four generations per year depending on temperatures; under ideal conditions development takes about 40 days.

I.B.2. CIGARETTE BEETLE

1. Most common pest of stored tobacco; also infest most other dried plant products.

2. Similar in appearance to the drugstore beetle except body is smooth.
3. More prolific breeder than the drugstore beetle, and is a good flier.

I.B.3. CADELLE

1. The largest of the food pests; is also known as the bread beetle or bolting cloth beetle.
2. The adult is shiny black in color, about 1/3" long, and the pronotum is strongly separated from the wing attachments giving a "tractor and trailer" appearance.

I.B.4. TROGODERMA

1. T. Granarium, the Khapra beetle, is the most destructive of the food infesting insects; many efforts are made to prevent this insect from again becoming established in this country.
2. Some other trogoderma are quite well established already; the Cabinet beetle (T. ornatum), the larger Cabinet beetle (T. Inclusum), and the Warehouse beetle (T. Variable).

The warehouse beetle adult is brown to black and about .12 inch in length.

The Larvae is about 0.25 inches and has sharp pointed hairs which can cause severe gastric disturbances when ingested in food.

3. If Khapra beetle is suspected, obtain verified identification immediately and notify agricultural authorities

I.B.5 INDIAN MEAL MOTH

1. Most common pest of dried fruit.
2. Adult is distinctive in appearance and behavior, about a 3/4" wingspread, outer half of forewings are reddish- brown in color, flies at night in an irregular zigzag pattern.
3. The larvae is about 1/2" long, dirty white color with a pinkish or greenish tint; the mature larvae is often found searching for a suitable place to pupate, they are often mistaken for clothes moths.

I.C. SCAVENGERS

The scavengers are so called because they are unable to penetrate or feed on undamaged grain kernels. They lay their eggs and the larvae feed on dust and particles of food products, or on the kernels damaged by the internal or external feeders.

I.C.1 RED FLOUR BEETLE & CONFUSED FLOUR BEETLE

1. Very similar in habits and appearance.
2. Red flour beetle is a strong flier, the last three antenna segments form a distinct club.
3. Confused flour beetle, often called the BRAN BUG does not fly, the antenna segments gradually enlarge to a slender club end.
4. Both are reddish-brown in color, about 1/8" long.
5. Female lays up to 400 eggs in her lifetime of up to three years.

I.C.2 SAW-TOOTH GRAIN BEETLE

1. The smallest of the stored food pests, it is able to easily penetrate

almost any package or jar after the original seal has been broken.

2. Adult is about 1/10" long, flattened body; brownish color.
3. Gets its name from the six saw-tooth projections on each side of the thorax; merchant grain beetle very similar in habits and appearance.
4. Are found in almost any stored dry food material, large population develops rapidly in normal household conditions.
5. Female lays about 300 eggs in her life of up to three years.

I.C.3 MEDITERRANEAN FLOUR MOTH

1. Common in household products such as nuts and chocolate as well as spices, dried fruits, and flour.
2. Adult has about 1" wingspan, wings are pale gray with black wavy bars running across them.
3. When at rest, has a characteristic pose with the head elevated and the tip of the abdomen protruding between the wings.
4. Silken threads or mats in infested material indicate this moth.

I.D. CONTROL/PREVENTION RECOMMENDATIONS

I.D.1. PREVENTION:

Purchase your grains and storage foods from a reputable dealer. Even so you will sometimes run into these stored insect pests. Nitrogen packed grains in sealed buckets should be safe from infestation. If you purchase bulk grains or dried fruits in other type packaging, it is sometimes advisable to take steps to kill any stored product insects that may be in the packaging. The first method of making sure you have not brought any stored grain pest into your home is by freezing the grain. Freezing the grain at 0 degrees Fahrenheit for 4-7 days will kill most stored insect pests. Another alternative is to fumigate the food stuffs with carbon dioxide. Sustained exposure to levels of CO₂ as low as 3% can kill insects in active growth and feeding stages. The other alternative is to heat the grains. Spread the grains out on a tray and heat in the oven for 20 minutes at 150 degrees F (66 degrees C), or for two to three hours at 120 - 130 degrees F (49-54 degrees C). By heating the grains you also dry them out, which is important if there is any question about your grain being too damp. Your grains should be placed into sealable containers as soon as possible after purchase regardless as to whether you take these other preventative steps or not.

Diatomaceous earth (DE) will kill larvae and adults, but not eggs or pupae. Both DE and inert gas, if properly used, will prevent outbreaks. Some suppliers sell pheromone traps, for monitoring many of the moth species that infest stored grain.

I.E. SIGNS OF INFESTATION

THE INFESTED PRODUCTS MUST BE REMOVED AND DESTROYED
when inspecting for infestation look for:

- (a) live or dead insects
- (b) webbing or silk threads
- (c) insect droppings in the bottom of a container
- (d) small holes in boxes or bags, sealed or not

(e) flying moths

(f) emergence holes in whole grains, or quantities of grain dust

If you have found insect infestations, the following steps should be taken:

- 1). After removal of the infested materials, all food particles and residues must be thoroughly cleaned.
- 2). If you so chose, a registered pesticide for this use, and apply to cracks and crevices, and under shelving and behind paneling. (Often these are the areas where the larvae will go to hide to pupate.)
- 3). It is normally advised not to eat food that has been contaminated with food storage insects. Insects and other pests can introduce microbes into the food, and there may be an association between pest insects and the development of fungal toxins known as mycotoxins. This having been said, I have often eaten foods that have had relatively minor infestations of sawtooth grain beetles. The infested grain products were used in cooking, and no one was the wiser. However if the grain has been infested by any of the beetles in the Trogoderma family, you definitely should NOT eat the grain; have the grain destroyed. The larvae of all of the Trogoderma beetles and especially the Warehouse beetle have sharp pointed hairs, which can cause severe gastric disturbances when ingested in food. Grains which have any mold, or rodent urine or feces need to also be definitely destroyed and not eaten.
- 4). For large quantities of infested food material such as railroad cars, ships, grain silos, pallets of bagged products, you may want to investigate the hiring of a professional to fumigate the infested product with methyl bromide or aluminum phosphide. (Neither of these products are available to the consumer and should only be handled by the appropriately trained and licensed individuals.)

II. RODENTS:

II.A. Comensal Rodents

Comensal (Lives with man) Rodents are those rodents that have become dependent on man for survival, as different from wild or feral rodents. Over the centuries, these rats and mice have adapted to living in or near our dwellings and farms, and eating our stored food and garbage. They have caused more deaths and misery and economic damage than any other group of vertebrates.

The three common species of commensal rodents were first introduced into this country from Europe; during the Gold Rush period they were brought into California in large numbers and have thrived in this climate. Our cities, our suburban areas, and our farms have become heavily populated. Their lives are designed around survival. They breed year round. Their sight is poor, but their highly developed sense of hearing, touch, smell, and taste more than compensate. They are very athletic and acrobatic with excellent balance, swimming, climbing, and burrowing abilities. They are very secretive, usually only seen at night unless a heavy population is competing for limited food or nesting space. Rats will range one hundred feet or more from the nest for food and water. Mice control only a small

territory, and are often introduced in crates and boxes. A large population may exist for some time before anyone is aware of their presence.

An infestation is usually detected by noticing one or more signs; gnawed door corners or holes in walls, rub marks or swing marks from their greasy bodies rubbing along a surface, spilled food, or their fecal droppings. Sometimes their constant gnawing, necessary to keep their teeth ground down, causes structural fires.

In addition to the physical damage caused by their eating and gnawing, and the contamination from their feces and urine, the plague they have sometimes carried is probably the best known and most feared, but salmonellosis (food poisoning), murine typhus, and Weil's disease are also a hazard. While there have been reports of rats biting people at night, they will usually only attack when surprised or cornered, then they will bite and scratch fiercely. An infestation of commensal rodents should never be ignored or taken lightly.

II.A.1. PHYSICAL CHARACTERISTICS

II.A.1.a. NORWAY RAT

1. Largest of the commensal rodents.
2. Head and body 7 1/2" to 10" long, tail is shorter than head and body.
3. Weighs from 12 to 20 ounces.
4. The coarse fur is grayish brown on the back and grayish white on the belly; also called Brown rat, or sewer rat depending on the region.
5. Prefers to burrow so is built for digging; stocky body, small close-set ears and eyes, and blunted muzzle.
6. Fecal droppings are 1/2" long, smooth with blunted ends.
7. Live about 12 months.
8. Female has two to four litters of eight or nine per litter.
9. Prefers meats, fish, and grains for food, about one ounce per day.
10. Needs more water than the roof rat, or about one ounce daily.
11. Burrows often found along side of streams and ditches in coastal and valley areas.

II.A.1.b. ROOF RAT

1. Smaller and lighter than Norway rat.
2. Head and body 6" to 8 1/2" long, tail is longer than head and body.
3. Weighs from 8 to 10 ounces.
4. The color varies with the subspecies; the black rat is sooty black on the back and gray below; the Alexandrine is gray-brown on the back and yellow-white underneath.
5. Usually nests in the open or in trees and hedges so is adapted for open living; large wide-spaced ears and eyes, the long tail for balance, and a sharply pointed muzzle.
6. Fecal droppings are 1/4" long, smooth with pointed ends.
7. Live about 12 months.
8. Female has two to four litters of five to seven per litter.
9. Prefers fruits and vegetables as well as grains, about one ounce of

food and about one-half ounce of water.

10. Likes to live high up in places; attics, etc., but will live wherever they have to; found in the foothills up to 3,500'.

II.A.1.c. HOUSE MOUSE

1. Resembles a miniature roof rat.
2. Head and body about 2 1/2" to 3 1/2" long, tail is 3" to 4" long.
3. Weighs less than one ounce.
4. Dusky brownish gray color, slightly lighter underneath.
5. Nests anywhere; may spend complete life in a box or a closet as long as food and water is available; male is very territorial in habits.
6. Fecal droppings are 1/8" long; smooth with pointed ends.
7. Live about 6-9 months.
8. Female has six litters of five or six per litter.
9. Prefers to feed on seeds and grains, needs little water; will nibble when feeding and may feed 15 to 20 times per day.
10. May live outside in summer and move inside for winter.

II.A.2. CONTROL OF COMMENSAL RODENTS

One can consider rodent control from the standpoint of prevention through environmental management and population suppression. Prevention is best, and environmental management is required as part of a suppression operation.

There are biological factors, behavioral factors, and environmental factors to be considered in designing a rodent control program. They must be all weighed and allowed for or the control program will not be successful.

II.A.2.a. BIOLOGICAL FACTORS

1. Rodents begin reproducing at a very young age, have large litters, and breed year around. A 90% population reduction may be replaced in as little as 9 months
2. The territorial movement of rats and mice tend to be quite limited and their movement is usually only at night.
 - (a) If live rodents are seen during the daytime it indicates that a heavy population is present
 - (b) Rats normally range no more than 150 feet from the nest; a male mouse will control an area of 10-20 feet from the nest
 - (c) Rats will migrate on their own; mice are often carried in boxes or crates into new locations
3. Rats rarely live more than one year; mice average 6- 9 months.

II.A.2.b. BEHAVIORAL FACTORS

1. Rats and mice have poor sight, but their other survival senses are extremely well developed
 - (a) TASTE sensitive to fresh food; they remember foods that made them sick in the past
 - (b) SMELL sensitive to certain poisons and freshness, smell of man does not frighten them
 - (c) HEARING very keen, can identify strange sounds and locate them and

they will adapt to any constant noise (including ultrasonics)

(d) TOUCH centered in the whiskers and guard hairs causes them to tend to follow vertical surfaces when they travel

(e) PHYSICAL abilities of climbing, burrowing, and swimming enable them to enter and survive most environments

2. New object avoidance is a term that describes the tendency of rats to be very cautious and wary of new objects introduced into their surroundings (such as bait boxes or traps) and or changes in the surroundings.

(a) Major sanitation programs should be done after the initial suppression is performed.

3. Mice are very curious and will immediately investigate new objects.

(a) Rearranging furniture or storage will encourage the mouse to go out to inspect and remap the new arrangements.

(b) They are often caught in newly set traps.

II.A.2.c. ENVIRONMENTAL FACTORS

1. Poor sanitation usually means abundant food, water, and harborage is available so a population may become easily established; good sanitation involves;

(a) Garbage and waste in closed containers with no spillage.

(b) Stored foods in rodent proof containers.

(c) Storage 6" off the floor and 18" clear of all walls.

(d) No structural defects or closed areas such as double floors, dead spaces under cabinets, blocked corners, abandoned rooms or buildings.

(e) No outdoor harborage such as rubbish or debris piles, tall or thick weeds, stacks of lumber, pallets, or boxes

(f) No free water such as leaky faucets, standing water as in puddles, toilet bowls or sinks

2. Excluding the rodents from the structure is the most effective and provides the longest term control; rodent- proof the building by correcting:

(a) Openings under or around doors that are more than 1/2" for rats and 1/4" for mice.

(b) Unshielded wooden doors or door frames (use metal kick plates and in some cases metal door frames to keep rats from gnawing through.)

(c) Unscreened sewer drains.

(d) Vines, shrubs, or trees touching or overhanging the structure.

(e) Dirt floors or openings through floor to subarea.

(f) Holes in walls or gaps around pipes or utility entrances.

(g) Practices that permit rodents to be carried in with merchandise or materials.

II.A.3. POPULATION SUPPRESSION THROUGH CHEMICAL POISONING AND TRAPPING

Suppressive measures are considered as supplementary to and not a substitute for basic environmental sanitation.

II.A.3.a. TRAPPING is the preferred method of control when:

(a) The use of chemical rodenticides is to be completely avoided.

(b) The animals may die in an inaccessible area and cause an odor problem; anti-coagulant rodenticides do not cause the animal to go

outdoors to die.

(c) The last few survivors of a population refuse to take baits.

The classic snap trap or glue boards are effective for rats; mice can also be caught by snap traps and glue boards, as well as the Ketch-All repeating trap or the Tin Cat device

Mice are easily caught in traps; rats are more wary of new objects so the technique of baiting an unset trap for several feedings is effective in maximizing results.

(a) The best bait is that food that the rodents are eating now, providing it can be affixed to the trap and can be kept fresh.

(b) Baits for rats and mice include rolled oats, peanut butter, gum drops, raisin bread, and bacon.

(c) Cheese is not effective bait material.

(d) If food is not being taken, cotton balls or other nesting materials, or shiny beads may be attractive, especially to mice.

Set the trap against a wall or other vertical surface where the rodents are traveling; use non-toxic tracking powder (talc or flour) to determine the traffic patterns. Like baiting with food, place the trap with the trigger side against the wall and leave for several days before setting the trap.

II.A.3.b. CHEMICAL POISONING

This is the most common method of suppression and for obvious reasons, I recommend using baits ONLY as a last resort. (There are many situations where baits can be safely used, but due to the complexity and potential hazard of baits, I do not recommend lay people use them, but will cover the subject for academic reference.)

(a) Poison baits are hazardous to humans and non-target animals.

(b) Only place poisons in areas or containers that are not accessible to children and non-target animals.

(c) Bait containers must be properly and visibly marked - this is a required safety step.

Many of the same considerations as in trapping apply.

(a) Best bait is familiar food, or other solids or liquids

i. Cereal grains, fish, meat, fruits or vegetables

ii. If water is limited, use water as the bait with a little sugar added for acceptance

Pre-baiting with the unpoisoned bait material will help overcome shyness.

Toxic tracking powder can also be used if food baits are not well taken.

(a) Toxic tracking powders are as hazardous as food poisons so must be handled and applied with the same considerations for safety.

II.A.4. DEALING WITH INFESTED FOOD & CONTAMINATED AREAS:

All foodstuffs, which have show evidence that rodents have either eaten or defecated or urinated upon, should be destroyed.

The U.S. Center for Disease Control (CDC) recommends that to protect yourself from communicable diseases spread by rodents and their urine & feces you should do as follows:

Wear protective clothing, including coveralls, gloves, goggles and a respirator. (Only a hepa filter respirator will filter out viruses) Wear protective clothing when collecting dead rodents. Rodents collected

(either already dead, or trapped) should be sprayed with disinfectant (see below for recommendations), it's carcass placed inside two plastic trash bags and disposed of in the garbage. Snap traps should be liberally sprayed with disinfectant if they are to be reused.

It is recommended that you use Lysol, or other disinfectants containing diphenols as your disinfectant. Hospital disinfectants are effective if they contain benzalkonium chloride. Follow the label for the dilution rates of the disinfectant you chose to use. You may also use a mixture of one half cups chlorine bleach with one gallon of water.

Do not sweep up or vacuum areas containing rodent feces or urine. Clean up rodent waste using the disinfectants described above. Mop or sponge the suspected area with the solution. Place your waste inside two plastic garbage bags and throw away in an exterior garbage can.

Attics and subareas should be left alone using the method described above . Take extreme care not to contaminate the living areas of a home or structure with rodent feces and waste that may be found in and attic or sub area.

II.B. Other Rodents

II.B.1 Deer Mice

Deer Mice are of some importance due to the Hantavirus. A full FAQ on Hantavirus can be found in the yet to be released Health Pests FAQ. Deer Mice (*Peromyscus* spp) are found throughout the nation.. Deer mice are active all year, and are usually found in fields, shrubbery, and wooded areas. Though not normally found in structures they sometimes nest in empty structures, and have been known to get into stored foods. The first outbreak of Hantavirus in the US came about because of pine nuts, which were contaminated with Deer Mice urine. Deer mice are about the same size as house mice but are easily distinguished. Deer mice have a bi-colored tail and body. The upper portion of the tail and body is dark colored usually brown or in the case of juveniles, gray, and the underside of the body and tail is white. The deer mice in California have also been known to have fleas carrying the bubonic plague. Though Deer mice appear to be the primary vector for the Hantavirus , the virus has been identified in the pinon mouse and chipmunks.

Follow all the safety precautions described above in this FAQ for cleaning up and disposing of feces of rodents.

III. FUNGI & MITES

Both fungi and mites are pests, which appear only in moist grain. Usually proper storage of grains will prevent these problems. With any of the fungi or mites, you should never try to eat the food, and it should be disposed of. Fungi cause mycotoxins in many stored foods. Rather than to list these out, it is better said that any foods (with the exception of cheese) should be thrown out if you suspect fungi infestation. Mite infestations are sign enough that you have a serious moisture problem and most likely have fungi. (There are one or two mites used in grain mills to attack other stored product pests, but these mites should not be present in any of your food storage.)

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DISCLAIMER: Safe and effective pest prevention and elimination, food storage and food preservation requires attention to detail and proper equipment and ingredients. Use all chemical products according to the manufacturer's directions. The label IS the law. The author makes no warranties and assumes no responsibility for errors or omissions in the text, or damages resulting from the use or misuse of information contained herein. This FAQ is does not include all pests, nor is it intended to be an end resource for the identification and control of such pests.

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HOME

Food

Have an adequate supply of food

Most people don't realize it, but at any given time, there is only about 40-50 days worth of food on-hand in America. If the distribution system collapses as a result of a disaster (e.g., impassable roads, prolonged power outage), your grocery store could run out of food. Because of this, you need to take responsibility for your family's food supply. You cannot assume the government is going to take care of you.

It is prudent for you to have extra food in a pantry to deal with emergencies.

How much food you decide to stash away for a crisis depends on: 1) how much money you have and are willing to spend on buying supplies; 2) how much storage space you have available to you; and 3) your level of anxiety about future disasters. For some, an adequate food supply can be as little as three-days of food; for others, a year's worth.

So the first thing you need to figure out is exactly how much food you will stockpile. Recognize that the food you store is not intended to nourish you forever; it is, after all, impossible to stockpile 30-years worth of food. Rather, the purpose behind your food reserve is to act as

a short-term backup until one of two things happens: 1) the crisis abates, or 2) you are able to reliably supply food for yourself through gardening, hunting and bartering.

Consider establishing a 30-day reserve of non-perishable food - at the very minimum. If you have the means to do so, create a six month supply. Why? It is good insurance just in case you ever lose your job. It can take several months to go through the job search and interview process before you finally get hired. And, even then, you often have to wait two-to four-weeks before receiving your first paycheck.

By having six months of food on-hand, you won't have to immediately worry about how you are going to put food on the table.

Create A Pantry Plan

Before you rush out to the nearest grocery store, sit down and create a logical food-storage plan. This way, you will ensure that you and your family will have your basic nutritional requirements met.

Strive to provide each person in your family with 1,800-2,000 calories of food per day (more for active teenagers) - realizing, of course, that those calories cannot all be from potato chips and cookies! Create simple daily menus that take into account the following food items and servings:

FOOD ITEM SERVINGS (per person per day)

Bread, Cereal, Rice & Pasta (6-11)

Vegetables (3-5)

Fruit (2-4)

Milk (2-3 cups)

Meat, Poultry, Fish, Dry Beans Eggs, and Nuts (2-3)

Fats, Oils and Sweets (according to family practice)

Since figuring out exactly what you need to buy can be an overwhelming task, use the following method. It is the simplest way to define your emergency food stores. Make a list of 10 different breakfast's, 10 lunches and 10 dinners. Make sure the recipes are simple and easy-to-fix, and strive for variety in food items. (Go ahead, blow off the dust and thumb through your cookbooks!)

When you're done, you'll have an on-going 10-day menu you can repeat three times over a month, nine times over three months, or for as long as you like.

All you have to do now, is figure out exactly what foodstuffs, spices, etc. you need to buy - and in what quantity - to prepare each meal for

your family. Before buying these items, make certain that each day's menu is nutritionally sound, calorie wise and vitamin wise. (In other words, 100% of the recommended daily allowance of vitamins and nutrients, plus 1,800-2,000 calories.) You can determine this by looking at the nutrition label printed on the cans and packaging. A glance through your pantry and refrigerator, or a quick trip to the store will help you collect all the information you need.

This logical approach to food buying ensures a proper diet that provides you with a variety of foods. Variety is important, since people get tired of eating the same food in a short period of time. (Who wants to eat chili five days in a row?) And when they do - especially children - they either start skipping meals or don't eat as much food as they normally would. This can lead to malnutrition and, subsequently, a host of medical ailments. By following the 10-day food rotation, no one will get tired of eating a particular food. (They will be eating turkey only three times a month, for example.)

Food Selection

When buying food, select items that require no refrigeration, preparation or cooking, and little or no water. Ready-to-eat canned products (e.g., ham, fruit, tuna fish, turkey) meet these requirements. Also, try to select foods that are compact and lightweight, such as powdered milk, freeze dried spices, and dehydrated fruits.

Additionally, be sure to add a few "food treats" to your stockpile. These are foods that psychologically make you feel good when depressed or ill, such as candy, cookies or nuts. (Scientific research has shown that the act of eating causes your brain to release dopamine, a powerful chemical that makes you feel good.) So have each member of your family list three of their favorite foods and then store away a small amount. When a difficult time strikes, pull them out. It will cheer everyone up.

Regardless of what you end up buying for your emergency food reserve, the most important rule is: **BUY AND STORE WHAT YOU EAT!** In other words, don't stockpile anchovies if you can't stand anchovies. If you do, you'll have 20 cans in the basement for years to come. Always buy foods that you will enjoy eating. It will make your survival lifestyle much less stressful.

HOME

Harvesting and Storing Potatoes

Curtis E. Swift, PhD, Area Extension Agent (Horticulture)

Colorado State University Cooperative Extension

Tri River Area Mesa, Delta, Montrose and Ouray Counties

The keeping quality of white ("Irish") potatoes (*Solanum tuberosum* L.) increases greatly if tubers are harvested after vines are killed by the first fall frost. Potatoes intended for long-term storage should not be harvested until the vines have been dead for at least ten to fourteen days. This permits the proper thickening of potato skins, which increases

the length of time potatoes can be stored. Potatoes harvested too early easily 'skin' during the harvesting and handling period and do not store well.

Potatoes are best dug when the soil temperature is above 45 degrees Fahrenheit and the soil is not wet. Digging when the soil is cold and wet often results in splits and cracks. Potatoes harvested from cold wet soils are also more susceptible to bruising, more difficult to cure and more prone to breakdown during storage.

Potatoes should never be allowed to freeze in the ground, but since many of the soils in the Tri River Area do not freeze until mid-December, gardeners in this area have sufficient time between the first frost and the ground freezing to allow for the harvest of these tubers. If the soil is frosty or the air temperature is near or below freezing, it would be best to begin harvesting later in the morning or afternoon when temperatures have risen. Soil temperatures would be warmer from 11 a.m. to 11 p.m. Commercial growers often harvest into the evening hours to take advantage of this warmer soil temperature.

Bruising can occur when the tubers are being dug or during any of the operations involving moving the tubers. Internal black spots often develop within six to eight hours after bruising or may not appear until a day later. Consequently, care should be taken to avoid dropping the tubers during any of the steps from harvest through storage.

Despite precautions taken to prevent injury to the skin of a potato, some damage is likely and a curing process is necessary for any wounds to heal. This process is facilitated by a curing process.

The Healing Process

A cut in a potato tuber undergoes two steps when it heals. Suberization is the first of these steps and involves the development of a waxy, fatty compound called suberin which is produced by cells just below the cut surface. This seals the wound preventing water loss and invasion by pathogens. This process occurs one to three days after wounding and is typically complete within four to seven days.

The formation of a specialized tissue called wound periderm is the second step in this healing process and results in the development of a permanent, protective layer of cells that replaces the 'skin' that was destroyed by the wound. This corky layer is a final protective coating which prevents infection and water loss. The development of this wound periderm begins shortly after suberization and is complete within one to two weeks. Ideally, potatoes should be cured for this entire period, but many home gardeners will move their tubers into permanent storage after the four to seven day suberization period.

When potatoes are first dug they should be placed in piles and allowed to go through a sweating (curing) period. During this period a temperature of 70 degrees Fahrenheit hastens the healing of bruises and cuts helping

to prevent rot. If the crop is relatively free of wounds, a curing temperature of 57 to 60 degrees Fahrenheit can be safely maintained. Potatoes can be left in the field during this curing process and covered with burlap or some other material to prevent sun scald. Potatoes can also be cured in a warm room. Tubers to be stored should be clean, firm and free from disease. Rains during the curing process will inhibit this healing process and piles left outside should be protected from fall rains by piling the tubers under a makeshift shed roof. The piles should not be covered with a tarp, however, as air movement through the pile is necessary to promote healing and a tarp will cut off this necessary air supply.

Storage

Potato tubers should be stored in sacks, bins or crates or in piles in areas that are free of disease organisms. Washing storage containers and areas down with a disinfectant several weeks prior to storage will help reduce storage rot problems.

Immediately following the sweating period, tubers should be stored in a humid area (90 to 95 % relative humidity) at a temperature near 40 degrees Fahrenheit if the tubers are for eating or to be used for seed potatoes. Processing tubers used for french fries are typically stored at 45 degrees Fahrenheit; tubers for potato chips are stored at temperatures of 50 to 55 degrees Fahrenheit. If stored at temperatures below 36 degrees Fahrenheit, potatoes may become sweet. If potatoes become sweet, exposing them to ordinary room temperature for a few days tends to restore natural flavor.

Potatoes held in storage for too long or at the improper temperature or humidity may break dormancy. The tubers will start to shrivel and sprout. Tubers in this condition should be used as quickly as possible to prevent breakdown and decay.

to the Vegetable Home Page

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HOME

How to Purify Drinking Water

Boiling Method:

Boiling is the preferred way to purify water. Bring water to a rolling boil for 3-5 minutes, keeping in mind that some water will evaporate. Let the water cool before drinking.

Boiled water will taste better if you put oxygen back into it by pouring the water back and forth between two clean containers. This will also improve the taste of stored water.

Bleach Method:

When boiling water is not possible, filter water, letting particles settle out. Pour off clear water. Add regular household liquid bleach (5.25% sodium hypochlorite, such as Clorox bleach -- not scented or colorsafe), as follows:

4 drops regular liquid bleach per quart of water

16 drops regular liquid bleach per gallon of water

1 teaspoon regular liquid bleach per 5 gallons of water

Mix well; wait 30 minutes. Water should have a slight bleach odor. If not, repeat and wait 15 more minutes.

Ultra CLOROX liquid bleach.

In case of an emergency, we recommend boiling water for 1 minute. When boiling is not possible, we recommend filtering water to let suspended particles settle out. Pour off the clear water and add Ultra CLOROX liquid bleach as follows:

1 teaspoon Ultra CLOROX bleach per 5 gallons water

16 drops Ultra CLOROX bleach per 1 gallon water

4 drops Ultra CLOROX bleach per 1 quart water

Wait 30 minutes. The water should have a slight chlorine odor. If not, repeat dose and wait 15 minutes, then sniff again. Use only Ultra CLOROX bleach, not a scented bleach.

HOME

Sprout Seeds

40 pounds per person of seeds to be used in salads or as salad greens (sunflower, pumpkin, pea, alfalfa, barley, clover, buckwheat, lentil, radish, adzuki, garbanzo, quinoa, wheat, oat, and mung bean)

40 lbs. per person of seeds to sprout and use in cooking (mung, lentil, garbanzo, pinto, pink, black, kidney, small white, navy, lima, soy, etc.)

In addition to bottled and dehydrated fruits and vegetables, store the following quantities of seeds for sprouts to be eaten raw:

sprouting barley - 25 lbs.
rye - 15 lbs.
mung beans - 30 lbs.
quinoa - 20 lbs.
whole oats - 10 lbs.
alfalfa - 15 lbs.
peas - 10 lbs.
lentils - 30 lbs.
clover - 20 lbs.
sunflower - 60 lbs.
whole buckwheat - 35 lbs.

For sprouts to be cooked, I store:

Lentils - 30 lbs.
Garbanzo Beans - 50 lbs.
Pinto Beans - 50 lbs.
Navy or Small White Beans - 50 lbs.
Soy Beans - 25 lbs.
Mung Beans - 40 lbs.
Kidney Beans - 20 lbs.

HOME

Prepare to eat well in an emergency

SOUTH FLORIDA SUN-SENTINEL

It's time to stock up before trouble strikes. The classic trouble for Floridians is, of course, the hurricane. But it pays to be prepared even if you expect nothing more trying than an unannounced guest.

With that in mind, this is a foodie's guide to stocking an emergency pantry. Sure, putting together such a stockpile means you'll purchase and store the usual canned and packaged goods your family likes. And we aren't going to try to change that list.

But we want to introduce some new ideas. Products that take up less space and taste better than some of the items you may have used in the past. Some that are easier to prepare than before.

We offer food preparation tips to keep you sated and safe in the event of several days without power or running water. And we remind you to stock those treats that make it more enjoyable surviving the heat and humidity without air conditioning. Just don't forget the water (1 gallon per person per day; stock a supply that lasts two weeks).

New and improved products for the pantry

Albacore tuna packaged in shelf-stable pouches is excellent, and you don't need a can opener to get to it (StarKist, Bumble Bee and Chicken of the Sea are all good brands).

Premium white chicken in shelf-stable pouches (Valley Fresh brand).

Premium chunk ham with natural juices in shelf-stable pouches (Sweet Sue brand).

Fully cooked bacon that comes in a box and stores at room temperature. You can eat it as is in a pinch or cook it on a griddle or the grill in 20 seconds per side.

Real bacon bits packed in shelf-stable resealable bags (Oscar Mayer brand comes in 3-ounce bags). Although these must be refrigerated after opening, the bags are small enough that you can use them up in one meal. Try making sandwiches with them, sprinkling into bean salads or adding to eggs.

Try all those antipasti products now available in special displays in supermarkets (the Flora brand is readily available).

You'll find jars of marinated artichoke hearts, "bruschetta" or chopped vegetables, marinated mushrooms, high-quality tuna in heavy olive oil, roasted peppers and more. They are perfect for mixing with beans and other vegetables to make salads; the liquid from these can be used as marinades or dressings.

Canned beans no longer mean just kidney beans. With so much ethnic diversity in Florida, there are many varieties readily available including pigeon peas, red, great northern, small white, pink, pinto, black and piquitos. Stock up and use them in soups and salads. They are a great source of protein and fiber.

Soups no longer have to be the condensed type to which you add precious water. Now they are ready to open and eat. Progresso and Campbell's Chunky brands are our favorites. You can turn just about any good soup into a stew by adding canned vegetables and beans. Thicken it a bit with cornstarch dissolved in water. Serve over rice.

Now you can get high-quality canned potatoes. Fresh-Cut Diced New Potatoes (Del Monte) are firm and fresh tasting. You can use them to make a potato salad or add them to Campbell's Kitchen Classics Cream of Potato Soup to make it even heartier. Sprinkle dried parsley flakes for a garnish.

Canned tomatoes used to come whole, crushed, pureed or stewed. Now you can get them petite cut or diced, with or without flavors such as roasted garlic, Italian herbs, green peppers, sweet onions and celery; garlic and olive oil, zesty jalapeno, or mushroom and garlic (Hunt's, Contadina and

Del Monte brands).

Del Monte introduces a new line of canned Savory Sides in pop-top cans. Our favorite is the Green Bean Casserole. Stock it with a can of French's Fried Onions and you can have a skillet version of Mom's holiday casserole on the table in mere minutes. It's great comfort food in times like these. Avoid the Honey Glazed Carrots, though. They are soggy and gloppy.

Uncle Ben's Ready Rice (simmer the boil-in-bag 4 minutes; no pan washing) is better than instant rice. And the different flavors - Spanish Style, Roasted Chicken and more - add variety to meals. Let the rice cool and use it to make savory salads.

Zatarain's offers shelf-stable envelopes of New Orleans-style rice that include Jambalaya, Red Beans & Rice and Yellow Rice. While they are made to be popped into the microwave for 60 seconds, the rice can also be cooked for 2 minutes in a skillet when the electricity is out and you have only a gas burner or grill top. We also found they can be boiled in the bag.

Couscous is readily available and now it comes in flavors and colors: red tomato basil, green spinach and festive tricolor. It requires no cooking. Just add boiling water and let sit 5 minutes. Use it for salads or as a bed for grilled meats or vegetables. Heat a can of soup and use that as the liquid for preparing the couscous. You'll have a one-dish meal.

Chili seasoning envelopes let you make chili on the grill. Just combine canned beans and/or meat and canned tomatoes with the seasoning packet in a heavy saucepan and simmer 10 minutes.

Paul Newman Lighten Up Light Balsamic Vinaigrette makes a great dressing for canned vegetables, beans, cold or hot pastas or use it as a marinade. And best of all, it doesn't require refrigeration, even after opening. Other Newman brand dressings that don't require refrigeration include Light Red Wine Vinegar and Olive Oil, Light Italian and Balsamic Vinegar. Read the label on the cap carefully as some varieties do require cold storage.

They are not new and they aren't particularly gourmet, but in a crisis, they sure taste good: Velveeta and Swiss Knight processed cheeses. The advantage is that neither require refrigeration before opening. The 8-ounce box of Velveeta can be used in one meal; Swiss Knight comes in single-serving wedges to enjoy on crackers with wine.

Red wines come in single-serving, screw-top bottles. There's no need for a corkscrew. And red wine is better than white served at room temperature.

Water bottled with lemon or lime flavor. You don't want these for

washing or as part of your gallon-a-day-per-person requirement, but they are nice for a refreshing change.

Look for condiments - mustard, ketchup, mayo - in single-serving packets so that once open they won't spoil if there's no refrigeration. If you don't have prepared mustard on hand, make it yourself by mixing mustard powder, vinegar and water. Keep Asian mustard powder or wasabi on hand for a real kick.

Buy cookies, chips, pretzels, crackers with processed cheese in single-serving snack packs so that they don't succumb to humidity and get soggy once opened. For a sweet treat, stock mini candy bars.

To go with those chips, purchase pop-top cans of dip. They come in a variety of flavors including onion, bean, mild cheddar and jalapeno cheddar (Wise and Fritos). Sitting with the family enjoying these as you heat the grill for dinner is a good way to help everyone relax at a trying time.

Single-serving, shelf-stable boxes of Parmalat make it easier to keep milk from spoiling.

Fruits come packaged in shelf-stable plastic cups. Del Monte brand can be eaten right out of the cup without dirtying another bowl; no need for a can opener.

Pudding in plastic cups means no dishes to wash and they don't require refrigeration.

Tips on preparing food safely in a trying time

Be creative: Don't even think about recipes. Use common sense and what you have on hand to prepare filling and nutritious meals.

Good juice: When you use canned or preserved fruits, pour off their canning juice or liquid before eating the fruit. Use that liquid in dressings for salads.

On the grill: For cooking on the grill, try Reynolds Hot Bags, foil bags to cook just about anything. Also, Reynolds Wrap Release Non-Stick Aluminum Foil makes cooking sticky things over coals easier. No problem with cleanup.

Save cooking water: When you have a pot of water to heat boil-in-bags, you don't have to discard it. Save it to heat boil-in-bags at another meal. Just bring to a boil again, let boil a few moments, then add more bags. Don't use for another purpose, however. If you've stocked a lot of boil-in-bags, be sure to have tongs on hand to get them out of the pot easily. Scissors also help to cut them open for serving.

Bread ideas: If bread becomes a bit stale, don't throw it out. When you

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make soup, break up the bread and put a few of these croutons in the bottom of the bowl before you ladle the soup into it. The bread will soak up the soup and make a more hearty potage. Or break the bread into smaller cubes and add to a marinated vegetable or bean salad. The vinaigrette dressing will soak into the bread for a version of panzanella. You also might try toasting the bread on the grill to use for bruschetta. Of course, if the bread is moldy you must discard it.

Pasta perfect: If you plan to stock pasta, purchase a thinner variety such as angel hair that cooks in less time so it uses less fuel. And there's no need to heat the sauce separately. Just toss the room temperature jarred sauce with the hot pasta. If you don't have Parmesan cheese, you can grate stale bread or use dried bread crumbs as a stand in.

Spice it up: A variety of dried spices and spice mixes makes it easier than ever to add flavor to such simple things as rice, couscous, instant mashed potatoes, pasta tossed with olive oil and other simple but filling starches.

Cold soup: Make gazpacho by adding tomato juice and water to thin salsa from a jar.

Off easy: Soups and many canned vegetables now come in pop-top cans so you don't need a can opener.

Rinse once: When using a variety of canned beans for one meal, place them all in a colander and rinse them all at one time instead of one kind at a time. This saves water.

Sweet defrost: If you have treats in the freezer - brownies, cookies, pound cake - and the power goes out, be sure to enjoy them as they defrost.

Food safety: Food kept under minimal refrigeration (in an ice chest) is prone to food-safety issues, so be very careful how you handle it. During an emergency, food-safety rules are very important. Use disposable food-cutting sheets for preparing meats and vegetables. And wear disposable gloves.

Cleanup: Use disposable plastic gloves to mix things by hand so you don't dirty utensils unnecessarily. This saves water used for cleanup. And use self-seal plastic bags instead of mixing bowls to mix salads. Just put the ingredients into one, seal and toss to mix. No need to wash a container. And if you store food in plastic bags in an ice chest, they take up less space than plastic containers.

Avoid them: Scallions have been the culprits in a number of food-illness outbreaks; avoid them when you're cooking under duress.

Leftovers

HOME

When hurricane season ends and the all-clear whistle sounds on Nov. 30, let's hope you have lots of supplies lingering in the pantry. Here are some ideas of what to do with them:

Let's party: Get a few jugs of wine and cases of beer. Buy a few loaves of good French bread and crackers and tell all your neighbors to bring their hurricane supplies, too. Put out antipasto and snack goodies for a "celebrate the end of the hurricane season" party.

Soup's on: Invite friends for a simple supper. Combine similar soups in one big pot and serve them with a selection of crackers. By combining flavors you come up with new varieties. Add some of the canned vegetables and beans for added heartiness and flavor.

Dinner is served: Make a large pot of rice and beans. Use a variety of beans and rices you have on hand. Freeze for future meals.

<http://www.tallahassee.com/mld/talla...od/8930075.htm>

HOME

WHO SHOULD HAVE A FOOD STORAGE PROGRAM?

We never know what emergency may befall us during which we may not be able to obtain food or drink. The emergency may be loss of job or inability to work due to accident or illness. This may result in a situation where financial resources to purchase food would not be available or may be decreased appreciably. Natural catastrophe such as flood, earthquake or storms may result in temporary inability to distribute food to supermarkets. Under these conditions even having money to purchase food does not mean it can be obtained. Even in the United States each of the above conditions occurs occasionally. Because of the possibility of such emergencies the Civil Defense recommends storing food and drink adequate for your family's needs for a two-week period. Certain church organizations have recommended their members have on hand a year's supply of food, fuel, clothing and where possible money.

WHY HAVE A FOOD STORAGE PROGRAM?

A food storage program is essential to provide for ourselves and our family members in an emergency. The biggest motivator most adults have is to avoid hearing a hungry child cry. Even the most macho man is distraught if he cannot provide food or beverage to prevent a child from suffering.

WHAT TO STORE

Water

Since the human body is about 65 percent water we must consider it as an important nutrient. Rubner, a German physiologist, found that during starvation an animal can live if it loses nearly all the glycogen and fat, as well as half the body protein, but a loss of 20 percent of the

water in the body results in death. One can live without food for over a month, but without water only a few days. Sources of water for our bodies come from 1) fluid foods in the diet, 2) solid foods in the diet, and 3) water produced in the body resulting from metabolism of energy nutrients. Water is lost from the body by way of the kidneys (urine), skin (perspiration), lungs (expired air), intestinal tract (feces), and eyes (tears).

A reasonable recommendation for water consumption per day would be a tablespoon for each 15 calories of food. A 2,200 calorie diet would require about 10 cups or 2 quarts per day/person. Water may be stored effectively by one of two methods: 1) individual containers of 1 - 2 gallon size; or 2) large immovable reservoirs of 50-100 gallon size. The advantage of small individual containers is the ease with which they can be transported. Large reservoirs, although immovable, may be connected to a potable water system so that circulation of fresh water is continuous.

TABLE 2. U.S. RDA's

Vitamin A	5,000 IU
Vitamin D	400 IU
Vitamin E	10 IU
Vitamin C	60 mg
Folic Acid	0.4 mg
Thiamin	1.5 mg
Riboflavin	1.7 mg
Niacin	20 mg
Vitamin B6	2.0 mg
Vitamin B12	6.0 mcg
Biotin	0.3 mg
Pantothenic Acid	10 mg
Calcium	1.0 g
Phosphorus	1.0 g
Iodine	150 mcg
Iron	18 mg
Magnesium	400 mg
Copper	2.5 mg
Zinc	15 mg
Protein	45 g

WATER BALANCE (Average Individual)

Water Intake

Liquid Food 4.7 cups

Solid Food 2.1 - 3.8 cups

Water produced in body 1.7 cups

TOTAL 8.5 - 10.2 cups

Water Output

Vaporization (lungs & skin) 3.9 4.2 cups
Feces 0.3 0.4 cups
Urine 4.2 5.5 cups
TOTAL 8.4 10.1 cups

Water may be stored for long periods of time (5 years or more) if it does not react with the container or its components. Glass, polyethylene, polyester, or metallized polyester containers all work well. Insure that lids do not contain paper components. Adding an insert or barrier of any of the above plastics will work well. Water stored for long periods in proper containers may taste flat, but can be improved by shaking, causing some air to be incorporated with it.

Food Items

Enough people have eaten for a long enough period of time that some conclusions on What to Eat? can be drawn from experience. Some average amounts of the nutrients required for growth, maintenance and reproduction of the human system have been published. These nutrients are distributed among the food groups: 1) milk/cheese, 2) meat/poultry/fish, 3) vegetables 4) fruit, 5) bread/cereal, and 6) fat/alcohol/sweets/other. Appropriate servings from each food group combined into a daily intake will provide an adequate nutrient supply. There are three key principles to consider (i.e., variety, balance, and moderation) for diet selection.

Enough data has been generated by our tax dollars so that any person can quickly determine a nutritionally sound diet to support and maintain good health. Such information is found in the Food Guide Pyramid.³ Every individual does not like the same foods. Each family member should have some input into planning what foods to store. A simple, sensible rule is to store the foods that you normally eat, if they provide an adequate diet. This rule will insure that, 1) family members will eat the food that is stored, and 2) stored food will be consumed within the shelf-life period. If the family prefers corn flakes, milk, sugar, juice and bread for breakfast, then these are the items to store. It is difficult to imagine much enthusiasm at the breakfast table if this family were to sit down to whole wheat, powered milk, honey, and a vitamin pill. A diet of these foods would become monotonous in a few days. Additionally, a marked alternation in diet could cause some temporary digestive problems.

HOW TO USE THE DAILY FOOD GUIDE

What counts as one serving?

Breads, Cereals, Rice, and Pasta

1 slice of bread
cup of cooked rice or pasta
cup of cooked cereal
1 ounce of ready-to-eat cereal

Vegetables

cup of chopped raw or cooked vegetables

1 cup of leafy raw vegetables

Fruits

1 piece of fruit or melon wedge

cup of juice

cup of canned fruit

cup dried fruit

Milk, Yogurt, and Cheese

1 cup of milk or yogurt

1 to 2 ounces of cheese

Meat, Poultry, Fish, Dry Beans, Eggs, and Nuts

2 to 3 ounces of cooked lean meat, poultry, or fish

Count cup of cooked beans, or 1 egg, or 2 tablespoons of peanut butter

as 1 ounce of lean meat (about serving)

Fats, Oils, and Sweets

LIMIT CALORIES FROM THESE especially if you need to lose weight. The amount you eat may be more than one serving. For example, a dinner portion of spaghetti would count as two or three servings of pasta.

A Closer Look at Fat and Added Sugars

The small tip of the Pyramid shows fats, oils, and sweets. These are foods such as salad dressings, cream, butter, margarine, sugars, soft drinks, candies, and sweet desserts. Alcoholic beverages are also part of this group. These foods provide calories but few vitamins and minerals. Most people should go easy on foods from this group. Some fat or sugar symbols are shown in the other food groups. That is to remind you that some foods in these groups can also be high in fat and added sugars, such as cheese or ice cream from the milk group, or french fries from the vegetable group. When choosing foods for a healthy diet, consider the fat and added sugars in your choice from all the food groups, not just fats, oil, and sweets from the Pyramid tip.

How many servings do you need each day?

Women & some older Children, teen girls, active Teen boys & active men
adults women, most men

Calorie level* about 1,600 about 2,200 about 2,800

Bread group 6, 9, 11

Vegetable group 3, 4, 5

Fruit group 2, 3, 4

Milk group **2 3 **2 3 **2 3

Meat group 2, for a total of 5 ounces 2, for a total of 6 ounces 3, for a total of 7 ounces

*These are the calorie levels if you choose lowfat, lean foods from the five major food groups and use foods from the fats, oils, and sweets group sparingly. **Women who are pregnant or breastfeeding, teenagers, and young adults to age 24 need three servings.

Only store foods that your family will eat.
Your food storage is only as good - and as nutritious - as the original quality.

Food comes in many forms. Fresh, frozen, dehydrated, canned, salted/cured, pickled, smoked, and pasteurized food can all play a role in a good storage system. All of these foods require some energy for their production, harvesting, preservation, storage, and preparation (cooking). In the absence of traditional energy sources some food forms may not be available or may not store for the normal shelf-life period. It is possible to convert some forms of food with short shelf-life into other forms with longer shelf-life. Fresh apples which spoil in 3-4 weeks at ambient temperatures (70 F) may be held 4-5 months at refrigerated temperatures (32 F). Frozen meat may be thawed, salted to a level of 12 percent salt, and then held at 60 F for several weeks. Before the meat is consumed salt must be leached from the tissues using fresh water so the resulting cooked product will be palatable. Frozen meat may be thawed and then canned without loss of quality. Vegetables and fruits which have been frozen are not acceptable when thawed and canned, but some kinds may be readily dehydrated after being frozen for short periods.

STARTING YOUR FOOD STORAGE

Food storage is viewed as a part of emergency preparedness. It is also a part of the program of a gardener to preserve and store away some of the fruits of his or her labor. Whatever the reason a person has for storing food beyond immediate needs, planning must be done to avoid waste.

There are a number of approaches to building a food storage program. Only two will be outlined, which can be adapted to fit individual needs. A major reason for not having food storage is the expense. A simple way to avoid a large cash outlay is to merely purchase double the items on the grocery list with each shopping excursion. The extra items are then marked with the purchase date and put into storage to be rotated out and replaced on the next shopping trip.

Perishable items such as fluid milk or eggs are difficult to work into this system. Therefore substitutes such as nonfat dried milk may be purchased for storage. Keep in mind, however, that there is a limit to the length of time that even these semi-perishable or dehydrated items can be stored.

A disadvantage of the double purchase system is that it is not as easy to benefit from sales prices. One advantage is that items are only purchased that are routinely used in menu planning, thereby reducing waste and improving rotation.

Another approach to beginning a food storage program is to use a lump sum of money such as a tax refund or a bonus check to purchase a large amount of basics for your family. The pamphlet *Essentials of Food Storage* has suggested that basics should include wheat, sugar or honey, salt and

nonfat dried milk. While it is true that these items do store well, it is important that the family will use what they store. This list could be modified to include grain products such as wheat and white flour, pasta products, rolled oats, rice, dried beans, split peas, lentils and other dehydrated fruits and vegetables. Cracked or whole wheat products do not store well because the membranes are broken that keep the oil in the wheat germ away from the iron and other minerals in the endosperm and the bran layer. Rancidity occurs at a rapid rate. Rolled oats are heat treated which destroys the lipase enzyme and therefore will store quite well.

When establishing a food storage program do not forget:

1. Store only those items you will use. If you do not currently include a food in your diet it is not likely that you will use it.
 2. Do not purchase more than you will rotate and use within a 2 to 3 year period of time to reduce waste.
 3. Insure that the quality of the item you purchase is acceptable.
- Quality does not improve upon storage for most foods. Planning before you begin a food storage program will help to avoid pitfalls.

HOW MUCH TO STORE

Many families or individuals desire to maintain a 12 month supply of food. Most food storage systems involve growing and preserving food at home from gardens and orchards. Generally, these sources provide a major portion of foods to the storage systems between June and October. Home meat supplies are most commonly obtained in the fall of the year when wild game seasons occur, and following pioneer traditions of slaughtering domestic animals during the cooler months to take advantage of natural refrigeration.

If you were to sample most families food storage programs in November, about 45 percent would have adequate stores of food for one year. If the same families were resample in May only 20 percent would still have a years supply on hand. Families which did not have a years supply in May had used food from storage and had no garden or orchard to replenish the supply during the winter months. For this reason, it is suggested that an 18 month supply be stored in order to maintain a 1 year supply of food. The extra 6 months supply of food would be available between December and June when most systems are at their lowest level.

Families that were resample and still had a years supply in May did so because they never used food from their storage system. We have analyzed over 10,000 food storage systems in and found that many people are under the illusion that food lasts forever. Their food storage systems are designed so that a years supply is purchased and stored until needed. Consequently they have some stored food that is 10, 20, and 25 years old. In view of what is known about shelf-life, these systems are quite wasteful and inefficient.

14 gallons of water per person (2 week supply)
1 pound of dry matter per person per day of dried foods

One pound of dry matter provides about 1600 calories of energy. Because energy is the most critical item in a food storage program (it will prevent the baby from being hungry) it should be considered first. Thus dried beans, flour, wheat, rice, sugar, dried fruits or vegetables, pastas or dried skim milk all provide about 1600 calories per pound. While 1600 calories will not adequately meet the energy needs of a hard-working large man it will quiet hunger pangs for individual members of a family. One pound of dry matter per person per day serves as a basis for a food storage program. Generally, with our home gardens a family will supplement the dried products with fresh fruits and vegetables in a storage pit or cellar as well as canned or frozen fruits and vegetables.

The cooler your storage, the longer the food will maintain quality. Properly processed canned, dried, and frozen (never thawed) foods do not become unsafe when stored longer than the recommended time, but palatability and nutrient quality are diminished.

THE STORAGE AREA

The storage area should be located where the average temperature can be kept above 32 F and below 70 F. Remember that the cooler the storage area the longer the retention of quality and nutrients. Freezing of some items, such as canned products, should be avoided since the expansion of the food during freezing may rupture (metal) or break (glass) the container, or break the seal on lids on glass bottles, and allow the food to be contaminated. This could pose a serious safety risk when the food thaws. The storage area should be dry (less than 15 percent humidity), and adequately ventilated to prevent condensation of moisture on packaging material. The area should be large enough so that shelves can accommodate all of the stored food and adequate space is available to keep the area clean and tidy. A 9 x 12 foot room with 10 foot ceilings will provide adequate space for a family of six to store an 18 month supply of food. Food should not be stored on the floor. It is a good idea to have the lowest shelf 2-3 feet off the floor in flood prone areas. Shelves should be designed so that a simple rotation system can effectively allow the oldest food to be used first and the newest food to be held within the shelf-life period.

When designing and building a food storage area, do it to minimize areas where insects and rodents can hide. As practical, seal all cracks and crevices. Eliminate any openings which insects or rodents may use to gain entrance to the storage area. Electrical equipment such as freezers, furnaces and hot water heaters should not be housed in the storage area. These appliances produce heat, unnecessarily increasing storage temperatures. Insulation of the storage area from other areas of the house will effectively reduce the average yearly temperature of the food.

STORAGE LIFE

Quality and nutritive value of food deteriorates during storage, therefore foods should not be held for long periods beyond their established shelf-life. When food is stored too long, there is the risk of two things happening: 1) color, flavor, aroma, texture or appearance

deteriorate to a level where people will not consume the food, and 2) nutrient deterioration may be severe enough to render the food an unreliable source of specific nutrients.

CAUSES OF DETERIORATION

Self Destruction

All living systems, whether plant or animal, were designed with a self-destruction mechanism. With death or harvest, this mechanism is activated. If allowed to proceed, naturally occurring enzymes in the food will cause discoloration, and undesirable flavor and textural changes such as when an apple rots. As animals and plants are slaughtered or harvested, they lose the protective devices provided by a living system. When wheat is ground, the kernel dies and becomes vulnerable to rancidity.

Microorganisms

Bacteria, yeasts and molds are the most common causes of spoilage of food and foodborne illness. Processing methods are designed to control microorganisms by either killing them (ex. canning) or preventing their growth (ex. drying or freezing). It is important to realize that a food which is safe due to inhibition of microorganisms loses that safety when conditions change. Dried beans that are cooked are no longer safe to store at room temperature. When meat is thawed, it still contains living organisms and therefore must be held under refrigeration and used within a fairly short time period.

Insects and Rodents

Rodents deposit waste products in stored grains. Insects grow in flour, hatching eggs, to produce larvae. Cleanliness and good packaging are important in the avoidance of both problems.

Contamination

Stored food can become unsafe to consume from contact with undesirable substances.

Be aware of what nonfood material is in close proximity to the stored food. This includes packaging in nonfood-approved substances such as storing wheat in plastic garbage bags.

Chemical Changes

Flavor and color changes can occur during storage; especially when stored in packages which do not exclude air and light. Baking powder can lose its sizzle and baked products won't rise.

WHAT AFFECTS STORAGE LIFE

Shelf-life is defined as the period of time between slaughter or harvest and consumption. Shelf-life may be relatively short (a few hours) or may

be extended for a number of months. Scientists determine the shelf-life of a food by storing it under carefully controlled conditions for a given period of time. During this storage period measurements are made to monitor changes in two important parameters: 1) the quality of the food (i.e., color, flavor, texture, odor), and 2) the nutrients it contains (i.e., vitamins, protein, fat, water, minerals, and carbohydrate).

There are several important factors which influence shelf-life and are important to consider in a food storage program. Temperature, humidity, packaging material, irradiation by sunlight, the protection from insects and rodents, and formation of natural toxicants are just a few of the parameters which must be considered in establishing shelf-life recommendations. Since storage temperature is one of the most important factors, perhaps a general rule might be appropriate. The lower the temperature the longer the shelf-life. Persons storing foods in a garage at an average temperature of 90 F should expect a shelf-life less than half of what could be obtained at room temperature (60-70 F) which in turn is less than half the storage life in cold storage (40 F). We have adjusted many of the recommendations to a 70 F environment (see Tables 3, 4, 5, 6). This is about the average basement storage temperature. Persons storing food at 90 F should reduce the recommendation by one-half in most cases. These recommendations were not made to establish how long food may be stored, but to provide data for a sensible rotation system. For instance, canned condensed milk may be stored safely for 5 years, but the quality and nutrient content will never be improved over what it was between 1-12 months. The quality may be so poor no one will consume it.

Irradiation by sunlight can also induce physical and chemical changes in food. Insects and animals can consume food and spread disease. High humidity increases perishability of many foods. Selective packaging material which can exclude light, air, and moisture enhances the length of shelf-life.

PACKAGING MATERIALS

While many families have gone to great lengths to insure an adequate store of food in their homes, not much thought has been given to packaging the food.

Food should only be stored in food-grade containers. A food-grade container is one that will not transfer non-food chemicals into the food and contains no chemicals which would be hazardous to human health. Some good examples of containers not approved for food use are trash or garbage bags, paint or solvent cans, industrial plastics and fiber barrels that have been used for non-food purposes. The safety of any packaging material can be determined by contacting the manufacturer and asking if a particular container is approved for food use. Many manufacturers are beginning to indicate on the container label if it is approved for food use.

Consumers who have stored food in containers other than those approved for food use should dispose of the food immediately. Bury the food deep

in the ground where animals do not have access to it. There is no stored food that is worth enough to risk chemical contamination by non-food chemicals and a potential hazard to human health.

Plastic films and containers of food-grade quality are made from polycarbonate, polyethylene and polyester. They differ in characteristics of density, strength and barrier properties. To increase moisture and oxygen barrier properties, films have been laminated. Laminated plastics may include a metallic layer which will greatly increase barrier properties. Military food packaged in metallized polyester, polyethylene wrap has a long shelf life (5+ years) if kept cool.

When safe packaging material has been identified, some suggestions as to size and durability are warranted. Containers for storage of dry foods such as wheat, beans, rice, oatmeal, and cornmeal should have a maximum of 20-30 pound capacity. These sizes may be moved easily by one adult person. More important is that these smaller amounts of food will be used up in a relatively short period of time, thus reducing the chance for contamination or infestation by insects. Smaller containers provide a way of using the food, but not exposing large quantities to the environment during use periods.

Metal cans used in the canning industry are only designed to last a few years. Losses of canned foods usually occur due to breakdown of the can rather than extensive deterioration of the food under normal storage conditions. Sealed number 10 cans are popular for dehydrated foods mainly due to size, convenience and minimal exposure of the foods to the environment.

Glass jars, which are popular among home canners, are quite inert compared to metal cans, but are less durable to shock. Fiber boxes, which were the original containers for glass jars, make excellent storage containers for jars of fruit since they exclude light and effectively separate individual jars to prevent breakage. Glass, metal and plastic containers, especially if they have tight-fitting lids and no open crevices or seams, are usually the containers of choice. If food items, such as grain or cereals, are insect-free when placed in these containers, they will most likely stay insect-free after a long period of storage. Glass jars have the advantage that you can see what's in them.

Flexible plastic containers last longer and are more durable if placed inside a rigid container. Information on the suitability of flexible plastic containers for protecting food from insect infestations is limited. If the food is insect-free to begin with, and if the packages are properly sealed, they should prove satisfactory.

Date and rotate food in your storage.

Chemicals

Non-food household chemicals should not be stored in the same area with

food. Volatile chemical compounds can be transferred to the food and affect the flavor and odor. These chemicals should be stored in a separate area where children do not have access to them. Many consumers have requested information concerning the chemical treatment of food prior to storage to extend the shelf-life and prevent insect infestation. Before using any chemical treatment, check to make sure it is safe to use and determine what levels of the chemical are safe and effective.

KEEPING BAD THINGS OUT OF THE FOOD SUPPLY

Clean, cool, dry storage areas are preferred. Avoid storing food in open containers on shelves. Keep food storage areas free from spilled food and food particles. Good housekeeping helps prevent insect infestations. To prevent or at least minimize insect infestations in stored food products it would be ideal to store them somewhere between 35 F and 45 F. Realistically, if they can be stored below 65 F it will be helpful.

Insects and Animals

In the best interests of the family budget, food conservation, clean food and health, stored food items should be protected from contamination and damage from insect pests. Small flour beetles, dermestids, weevils, larder beetles, several kinds of moths and other stored food pests readily infest, contaminate, destroy, and consume accessible food supplies. It is important to prevent or reduce these kinds of losses whenever possible.

Prevent Insect Infestations

To prevent insect infestations in bulk foods, keep all stored foods in tight, clean, metal, plastic, or glass insect-proof containers that have tight fitting lids and no open seams or crevices. Store food off the floor and away from damp areas.

Caution: Dry ice should always be handled with care. It should not be accessible to young children or to adults who are not aware of its vaporizing properties.

Fumigation with Dry Ice Prior to Storage

To fumigate home stored wheat or similar products, spread about 2 ounces of crushed dry ice on 3 or 4 inches of grain in the bottom of the container, then add the remaining grain to the can until it is at the desired depth. If fumigating large quantities use 14 ounces for 100 pounds of grain or 1 pound of dry ice for each 30 gallons of stored grain. At approximately 75 cents a pound for dry ice the cost of fumigating is reasonable.

Since the fumes from vaporizing dry ice are heavier than air, they should readily replace the existing air in the container. Allow sufficient time for the dry ice to evaporate (vaporize) before placing the lid on all the way (approximately 30 minutes). The lid should not be made tight until

the dry ice has pretty well vaporized and has replaced the regular air. Then it can be placed firmly on the container and sealed.

Should pressure cause bulging of the can after the lid has been put in place, remove the lid cautiously for a few minutes and then replace it. If using plastic bags in the can, don't seal the bags until the dry ice has vaporized. Carbon dioxide will stay in the container for some time, provided the container lid is tight. When practical, follow the above procedure in a dry atmosphere to reduce the condensation of moisture in the bottom of the can.

Dry ice tends to control most adult and larval insects present, but probably will not destroy all the eggs or pupae. If a tight fitting lid is placed firmly on the container after the dry ice has vaporized, it may keep enough carbon dioxide inside to destroy some of the eggs and pupae. After 2 to 3 weeks another fumigation with dry ice may be desirable to destroy adult insects which have matured from the surviving eggs and pupae.

If properly done, these two treatments should suffice. Yearly treatments are not indicated unless an infestation is recognized.

Chemical Control in Insect Infested Areas If the infestation is extensive, dispose of the contaminated food. If the infestation is light, you may be able to salvage the product, but in most cases it will be to your advantage to dispose of any insect infested food you have in storage, including spices.

Remove all food packages and containers from the infested area. Clean the shelves, and as appropriate, remove the lower kitchen drawers and clean the areas behind and underneath the drawers with an extension to the vacuum. Then spray the area with a household formulation of an approved insecticide such as pyrethrum or Malathion. If an aerosol formulation is used, the dosage should be no problem. If mixing a concentrated insecticide with water, follow label directions. Spray cracks and crevices under shelves and along mop boards. Do not spray the insecticide directly on food, food preparation surfaces, such as bread boards, or on any food equipment or utensils. If appropriate, once the spray dries, cover the shelves with clean shelf paper or foil before returning food packages to the shelves.

Kerosene-based sprays should not be used around flour since the flour may absorb the kerosene. If treating an area where flour is stored, remove the flour before treating and place it back on the shelves after the kerosene odor is gone. Do not spray oil-based insecticides on asphalt-tile floors.

Household formulations of Diazinon, Baygon (propoxur), Malathion, or Drione, may be used for crack and crevice treatment behind radiators, under sinks, and in ant runs to destroy ants, roaches, earwigs, silverfish and roaming flour-infesting insects. See label directions for

information on insects controlled by these chemicals and the appropriate uses.

NOTE: Most insecticides are poisonous to man and animals. Follow instructions on the label. Do not store pesticides near foods or medicines. Keep all pesticides out of the reach of children, pets, and livestock.

Physical Methods of Controlling Insects in Food

Clean, cool, dry storage areas are preferred. Avoid storing food in open containers on shelves. Keep food storage areas free of spilled food and food particles. Good housekeeping helps prevent insect infestations.

Deep Freeze Control for Grain

Small quantities of grain, 1 to 10 pounds, can be put in medium to heavy food grade plastic bags and placed in a deep freeze for 2 to 3 days. This will usually destroy all stages of any insect pests which are present.

As a check spread the deep freeze treated grain on a cookie tray at room temperature until thawed. If live insects are present they will probably be seen crawling about. If they are present, repeat the process. If not, remove any insect fragments, put the grain in an approved container and store it in a cool, dry place.

Heat Treatment Air

When packaged goods such as beans, cereals, whole grains, nut meats, and similar dried foods become infested they may be sterilized by heating in an open oven as follows. Spread a shallow layer of wheat in a cookie tray or large pan. Pre-heat the oven to about 140 to 150 F. Put the tray in the preheated oven and leave it there for 30 minutes or more. The oven door should be left slightly open to avoid overheating. This treatment should destroy all stages of the insect if the layer of grain on the tray is not too thick (1/2 inch). Next, remove the tray and cool the wheat thoroughly before returning it to a clean, dry storage container. As necessary, use a fan to blow off any existing insect fragments. Where large quantities of dry food are to be treated, this method is not practical. Heat is detrimental to the proteins in wheat and may reduce the ability of the bread to rise properly. Some reduced loaf volume and heavier texture may be apparent when using heat treated grains.

Dry Ice

Food may be fumigated with dry ice as previously described.

Bay Leaves, Chewing Gum, Chanting Words and Phrases

We receive numerous inquiries asking about exotic treatments to prevent insect infestations in stored grain. In unofficial experiments we have conducted, it was noted that some insects will continue to feed when enclosed in containers with tight fitting lids, even in the presence of these exotic suggestions. We have also concluded that chanting words and phrases fall upon deaf ears. Some consumers have reported on the effectiveness of many exotic treatments. Our investigations have shown

these instances to only be effective when no insects were initially present in the food.

HOME

Building Your Storm Pantry
J. Scott Wilson , Food Editor

UPDATED: 9:04 AM EDT September 10, 2004

When's the last time your electricity went out? How long did it stay out? Have you ever been told your water wasn't safe to drink or cook with?

If you've been through a major hurricane, or a large blizzard for our northern friends, you have likely experienced conditions much like these. The "fun" atmosphere that comes on when the lights go out quickly fades as you listen to your freezer defrost and realize that your can opener's electric and the only non-raw food you've got in the house is a couple of ancient cans of beanie-weenies in the back of the pantry.

Let's go over a few of the basics of food survival during and after the storm.

Ideally, you'll lay in a two-week supply of your necessities, a week at minimum. Most of these items have very long shelf life, and they're things you'll consume in "normal" life after the storm.

What To Have

Water: Barebones basic requirements for an adult human is 64 ounces, the eight 8-ounce glasses we're all supposed to consume every day. That's your "drinking" supply. Beyond that, you'll want some for cooking if the power or gas comes back on and your tap supply still isn't safe, some more for basic sanitation, and then that all-important "cushion" amount.

Don't forget ice! If you have time before the storm, freeze a few gallons of your drinking water and use it to keep coolers cold. Ice can be a commodity as valuable as charcoal when the power's out and food is spoiling.

Your drinking supply, of course, ideally should be clean water in sealed jugs. However, before the storm hits, fill every pitcher, teapot, drink cooler or other coverable container with water. It's better to have too much than too little. Make that your motto and you'll rarely go wrong.

Now, a lot of hurricane and storm survival guides will advise filling your bathtub with water. I'm against this for one simple reason: unless you've got a storm cellar, the bathtub is one of the safest places to hide if a tornado is headed your way. And tornadoes go with hurricanes like gravy with chicken-fried steak. You don't want to have to ask the

tornado to wait while you drain the tub so you can jump in and cover up for a few minutes.

Cooking supplies: I know you've seen me say here that self-lighting charcoal, with its lighter fluid-impregnated briquets, is a tool of the devil, and something no self-respecting grill cook would touch. However, in this case, that bag of Match Light can be a lifesaver. My ideal post-storm cooking setup would be an APS grill from CampChef and 50 pounds of self-lighting charcoal. However, if you don't have one, you can use your own patio grill. Just make sure you don't LEAVE it on the patio when the storm comes or someone several miles away may end up making use of it.

At the lowest end of the emergency-cooking spectrum are the grill and charcoal combinations, which usually consist of an aluminum pan with wobbly wire legs with a small bag of self-lighting charcoal and a metal grill. You're not going to do any high-performance cooking on these, but for grilling up that last pound of hamburger before it turns green, they'll do just fine.

I would hope this is the sort of thing that goes without saying, but so often those end up being the very things you wish you'd said: NEVER, EVER cook indoors with charcoal. Burning charcoal produces a host of poisonous gases that will kill you. Better to let an entire freezer full of prime grass-fed steaks go to rot than fire up a grill indoors.

If you have any sort of a propane setup, of course, you're out ahead of the curve ... but only if you've made sure your tanks are full. I still advise having a charcoal backup, just in case a fitting gets damaged or your grill/stove is rendered unsafe to use in some way. Murphy's Law just LOVES people who don't have backup plans, especially in storms.

Oh, and for those of you with fireplaces, please do NOT count on using them immediately following the storm. If they've been exposed to high winds, you need to have the flue and topper checked for defects, crimping or blockage that could fill your house with deadly fumes and completely ruin your eating experience.

As far as pots, pans and utensils go, if you're going to be slapping these over a bed of hot coals or even a propane flame, cast iron is your best choice. It's indestructible, easy to clean, and once you get it hot you can do a lot of cooking. For utensils, I'd recommend hitting the dollar store and purchasing three or four basic sets of cooking tools and putting them in different spots. Remember Murphy!

Speaking of Murphy, make sure each set of cooking utensils includes a hand-crank can opener. Not only will you be glad you have spares, you can use them for valuable barter items should society take the storm as a cue and just decide to collapse altogether.

For eating surfaces and utensils, go with sturdy paper plates and

plasticware. The plates have the added bonus of being flammable should you need to start some non-self-lighting charcoal.

Food

Packaged meals: Items like meals ready to eat MREs and just-add-water camping meal packs always get a lot of play in prestorm news stories, and if you've got the money they are a good choice. However, in my experience, the prices of these items seem to magically spiral upward with the approach of a storm, and they can become extremely hard to find. Time spent searching for them could better be spent at the grocery store, getting items that are actually in stock.

Protein: No matter how well-prepared you are, it's inevitable that you're going to get caught with a few steaks, a pound of hamburger or a chicken that has to head grillward lest it become a bacterial playground. If you're really fortunate, you'll have some even less-prepared neighbors who have copious amounts of grillables to donate to your impromptu post-storm meat-a-thon. It's the neighborly thing to offer to use your charcoal to cook up their meat, and just as neighborly for them to offer you some of the finished product. Then you can all collapse into a meat-induced neighborly nap.

OK, that's gotten you through the first day or maybe even two after the storm, but what after that? Lay in a variety of sources: jerky, canned meats, protein bars, soy products, peanut butter and even nutrient "shake" products if you choose.

Vegetables: You're probably not going to have a whole lot of time to worry about your five-a-day while you're nailing plastic over the holes in your roof, but that's no reason to abandon any pretense of a healthful diet. Fruit and vegetable juices have the double benefit of providing vitamins and supplementing your water supply. There are also more varieties of canned vegetables and fruit than you can shake a stick at.

Fresh fruits, especially tough-skinned ones like oranges, are a good idea if you have time to lay them in.

Snacks: Let's face it, there are going to be stretches of time, especially during the storm, when you're too busy trying to keep body and soul together to worry about cooking a meal. You'll want ready-to-eat foods in abundance, and it's been proven that enjoyable edibles reduce stress, so indulge a little! Lay in a supply of your favorite tummy-filler and worry about the Weight Watchers guidelines later. If you're faced with having to crawl up on the roof midstorm and try to nail down flapping shingles, you'll be more motivated to save a house that contains a healthy supply of Twinkies than one devoid of cream filling and tasty sponge cake.

Organization

During the storm, even if it's midday, you are liable to have long periods where the only illumination is whatever battery-powered lights

you've got. This is not the time to have to hunt through dark pantries and cupboards to find what you need. I recommend buying a supply of sandwich- or quart-sized plastic bags and making food packs, along the lines of a school lunch with a juice box or can and a couple of edible items, and putting them in easily accessible spots. Again, remember that preparedness is your best friend: have a few meal packs in every room of the house. You never know where you may end up.

And, hey, if the storm veers away or you have some packs left over, just toss in a sandwich and Junior's got his school lunch for the day.

Above all, keep your wits about you. If you have kids, they are going to be looking to you as a basis for their own reactions, fears and attitudes. If you stay level-headed and treat every situation as a problem to be solved, not an overwhelming crisis, the children will pick up on your behavior.

One final word: don't forget your pets! Fido and Ginger are going to be just as frazzled as you are, and they're going to need fresh food and water just like you. Take care of your little furry friends.

Got a comment? Question? Recipe to share? Drop me a line anytime!

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HOME

Growing and Using Sprouts

Sprouts are great to eat for everyday living and especially so in an emergency situation. Typical foods set aside for storage are traditionally low or nonexistent in vitamin C and many of the B vitamins. Yet it is exciting to know the seeds from those same storage foods can be sprouted to give a rich source of these important nutrients. Sprouts are an excellent source of vitamin C and also contain many good B vitamins. And you probably won't find a less expensive way to get these vitamins than from low calorie sprouts. Green leafy sprouts are also a good source of vitamin A. Sprouts are a good source of fiber, protein, and contain enzymes that aid digestion. In addition, sprouting destroys the seed's natural preservative enzymes that inhibit digestion.

Different kinds of seeds you can sprout: (This list gives the popularly sprouted seeds and is not all inclusive as you can sprout any kind of seed.)

Generally eaten raw:

Alfalfa, radish, mung bean, sunflower, clover, cabbage.

Generally cooked: Kidney, Pinto and other miscellaneous beans.

Eaten raw or cooked: Lentils, Soy beans, green peas and wheat. (In addition, all the sprouts that are generally eaten raw can be easily

cooked.)

Alfalfa: Alfalfa, one of the most popular sprouts, is a good source of vitamins A, B, C, D, E, F, and K and is rich in many minerals, as well as many enzymes needed for digestion.

Radish sprouts are high in vitamin C and potassium and have a rich flavor.

Wheat is high in Vitamins B, C, and E and has three times the vitamin E of dry wheat. Wheat also has many minerals.

Mung Beans: These sprouts should be sprouted under pressure to produce long and juicy sprouts. Mung bean sprouts are an excellent source of protein, vitamin C, A and E, along with many minerals.

Green Pea sprouts are rich in many of the B vitamins and vitamin C. Green pea sprouts make a rich addition to any green salad.

Soybeans: An extremely rich source of protein and vitamins A, B, C and E. Soybeans are rich in minerals and lecithin. They can be sprouted under pressure like mung beans.

Kidney beans, pinto beans and miscellaneous beans: They are a good source of vitamin C, many of the B vitamins and many minerals. Sprouting these beans also changes their indigestible carbohydrates to digestible carbohydrates thereby greatly reducing the intestinal gas they otherwise cause.

Lentils: Rich in protein, vitamin C and the B vitamins. They have a mild ground pepper flavor.

Buckwheat: Makes a great salad green. High in vitamins A, B, C and D.

Sunflower: Rich in vitamins B, D, and E, many minerals, and Linoleic Acid, the W6 EFA.

Do Not eat tomato or potato sprouts as they are poisonous.

Growing Sprouts:

Sprouts are easy to produce and require no special equipment or knowledge. All that is required to produce sprouts is seeds, moisture, warmth, darkness and maybe 10 minutes of your time every day. Methods vary from high tech production to something as simple as quart jar or a cloth covered pan. Perhaps the simplest method is to take your seeds, place them in a quart jar, and cover them with water to start the process.

Seed amounts to use per quart jar:

1/2 Cup Seeds: Wheat, All Beans, Rye, Oats, Rice, Sunflower, Lentil, Hulled Buckwheat, and Garbanzo Beans.

2 Tablespoons: Alfalfa, radish, clover, cabbage.

Be aware that seeds soak up 2 or 3 times their dry volume in water. After they have absorbed all the water they are going to absorb (2-12 hours depending on the size of the seed), drain the water off, rinse them, and put them in a dark, warm place, with the bottle upside down and tipped up against a corner so water can drip out. Of course you need to put something under the bottle to catch the dripping water. Use a lid that permits air to move in and out of the jar. You can use a thin cloth, a nylon stocking, or anything you have that's handy. Fasten it down around

the opening of the jar using an elastic or bottle ring. After the seeds have stopped draining, if you are sprouting very small seeds like alfalfa, cabbage or radish seeds, roll the bottle, coating the outer wall of the bottle with seeds. Leave the bottle on it's side in the dark. Room temperature is best for growing sprouts, around 70 degrees F. Rinse the seeds twice a day, being sure to drain them well. (Do not neglect to rinse them. They will sour and be useless.) Within two days your seeds should begin sprouting.

For sprouts you are going to cook, let the sprout grow only as long as the seed. For sprouts you will eat raw (except wheat) let them grow up to 2-3 inches. Expose mature alfalfa, wheatgrass, buckwheat or sunflower sprouts to indirect sunlight for 4-5 hours. As they turn dark green their vitamin A content dramatically increases. (This is an important step, for if you don't, your sprouts will have only about 1 percent of this vitamin's RDA. Don't expose bean sprouts to sunlight as this will give them an unpleasant bitter taste.) When your sprouts have grown to the desired length, rinse them again, then put them in a sealed container with something to absorb the water on the bottom and store them in the refrigerator.

Sprouting mung beans under pressure

Place soaked beans in a small colander inside another container. Place several layers of burlap over the top of the seeds, then place a 3-5 pound bag of marbles or small stones on top of this. Water every two or three hours to ensure adequate moisture (this prevents the root systems from over developing in their search for water). Keep them in the dark at all times or they will turn bitter as they begin to green. When they are 2 to 3 inches long, remove them from the colander and refrigerate.

Using your sprouts

After sprouts reach their peak, they immediately begin to lose their vitamin C. Because of this, don't attempt to store sprouts longer than a week. Only grow small quantities of sprouts that can be used in a short period of time. If you plan on getting many of your vitamins from sprouts, it would be a good idea to have one or two small batches of sprouts growing all the time.

Cook sprouted beans using the same recipes you normally use. Sprouted beans cook in 2/3rds the time of unsprouted beans. Heat kills a percentage of the vitamins and enzymes gained by sprouting, so simmer or steam slowly depending on your recipe, and don't cook longer than necessary.

You can sprout a mixture of seeds to make great green salads all by themselves. You can also use raw sprouts in just about anything:

Blended in drinks.

Added to bean or lettuce salads.
Mixed with already cooked breakfast cereals.
Wrapped in tortilla or taco shells and smothered in your favorite sauce.
Added to soups and stews just before eating.
Sprout filled Won Tons.
Put into sandwiches.
Raw sprouts are so versatile that they can also be thrown into just about anything then cooked, such as:
Breads and biscuits.
Soups.
Pancakes.
Eggs and omelets.
Oatmeal or cracked wheat.
Sauces.
Mexican or Chinese foods.
Potato Patties.
Casseroles.
Dips.
Meatloaf.
Any vegetable.
Stir fried all by themselves.
Even desserts. Really, the sky's the limit.
When cooking sprouts, it is better to steam or stir fry them than to boil them and discard the water. You only lose 20-30 percent of the vitamin C compared to 60 percent.

How much sprouting seed you should store and tips on purchasing.

It is suggested that if you plan to get all your vitamins from sprouts alone, that you store up to 125 lbs of a variety of seeds per year per person. If you have other sources for your vitamins, it is suggested you have 30 lbs of seeds set aside for sprouts to be eaten raw, and 30 lbs of sprouts intended to be cooked per year per person.

Many specialty companies exist that deal exclusively in sprout seed. Usually these seeds cost several times more than other seeds of the same type. One study shows that mung beans sold exclusively for sprouting cost 4.5 times more than regular mung beans. Yet 99 percent of the time the cheaper seed will sprout and grow as quickly as the more expensive seed. It is the web page author's opinion that it is a waste of money to buy 'sprouting seed' over regular seed. Before purchasing a large amount of storage seed intended for sprouting, purchase a small amount and test it to see if it sprouts well.

Do not attempt to store your sprouting seed for more than 5 years unless it is stored in a cool (at least 60-65 degrees F) dry place. If you are storing large seed, it may be packed in the absence of oxygen. Seed may last up to 15 years stored in this way. As your seeds get old they will take longer to sprout, and you will progressively get more seeds that won't sprout. The key again is rotate, rotate, rotate.

Use several different kinds of sprouts to find what you like before purchasing a large quantity of seed. Do not purchase seeds intended for anything except human consumption. Many seeds processed by farmers and gardeners for planting have been treated with fungicide and or insecticide agents and are very poisonous. These seeds are usually, but not always dyed red. If in doubt, ask.

|| Walton Home Page || Whole Grains Home ||

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Revised: 25 Nov 1996

HOME

MRE Fast Facts

The Meal, Ready-to-Eat (MRE) was first served to soldiers in 1980. The MRE replaced the Meal, Individual (better known as C-Rations) which had been used since the Vietnam War.

MREs have approximately 1300 calories (5439 kJ) per meal with 55% of the energy from carbohydrates, 35% from fat and 15% from protein.

MREs are shelf stable for a minimum of 3 years at 80oF (26oC) and a minimum of 6 months at 100oF (38oC)

MREs are designed to withstand harsh military transportation requirements, including airdrop with and without parachutes and storage at -60oF (-51oC) up to 120oF (49oC). Chemicals and preservatives are not used to extend the shelf life of the MRE

Protecting the meals from oxygen and moisture, the tri-laminate foil packaging is the secret to the MRE's shelf-life. Oxygen and moisture are two primary factors in food spoilage.

Oxygen scavengers absorb excess oxygen to preserve freshness

Vacuum seals keep out moisture and oxygen

Thermal process, canning in a pouch, protects entrees and fruits. Exposing the cooked meal to high heat and pressure kills any microorganisms that cause mold and spoiling.

MRE menus are designed using feedback from soldiers in field. Surveys are conducted several times each year.

As a result of customer feedback, over 50 new items have been included and approximately 12 items have been discontinued since 1993. By 1998, there will be 24 menus available doubling the current variety.

Offering soldiers a taste of home, commercial items such as M&Ms and granola bars have been incorporated into the MRE. Ethnic foods and vegetarian meals have also become more popular.

MREs meet the military recommended daily allowance (RDA) guidelines established by the surgeon general. Developed for a healthy and extremely active population, the military RDA is higher in calories and protein requirements.

The flameless ration heater lets soldiers heat their meals in the field. When soldiers add one ounce of water there is a reaction with the magnesium iron compound causing the water to boil. By placing the entree pouch into the boiling water, a hot meal will be ready in 10 minutes. The heating process produces no chemical byproducts.

Since 1993, a flameless ration heater and an individual jar of Tabasco sauce have been included in each MRE.

Source: U.S. Army Soldier Systems Command
Public Affairs Office
Kansas Street
Natick, MA 01760-5012
(508) 233-4300
amsscpa@natick-emh2.army.mil

http://www.millennium-ark.net/News_Files/Hollys.html

HOME

1 month Shopping List for 1 person

Buy food from each category

Category.....Quantity

Protein

Canned: tuna, fish, meat, chicken, ham, etc. 14 cans

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Meals

Canned: Stew, ravioli, chunky soup, chow mien, chili, hash, etc. 14 cans

Vegetables (low sodium, where available)

Canned: mixed vegetables, corn, carrots, peas, green beans, beets, spinach, hominy, tomatoes, etc. 28 cans

Fruit

Canned or dry: peaches, apricots, pears, apples, prunes, raisins, oranges, pineapple, juices, etc. 28 cans or packages

Starches

Ramen noodles, egg noodles, instant rice, angel hair pasta, crackers, instant mashed potatoes, canned potatoes, yams, stuffing mix, (buy quick cooking style) Several boxes or cans

Beans

Canned: baked beans, pork and beans, kidney beans, garbanzos, pinto beans, etc. 7-14 cans

Dairy

Evaporated milk, dry milk, Parmalat, non-refrigerated cheeses, etc. As many servings as you like

Breakfast

Cereal, granola bars, instant oatmeal, Ensure, etc. Enough for 28 breakfasts

Comfort food/drink

Coffee, tea, cocoa mix, cookies, no bake pie crust and filling, etc.

Miscellaneous

Vitamins, bouillon, salad dressing, vinegar, oil, condiments, sugar, creamer, ketchup, spices, peanut butter, packets of mayonnaise and pickle relish

HOME

How do I incorporate basic life sustaining storage items into our diet/menu?

We eat the same main dishes about 80% of the time because of taste, habit, awareness, familiarity, etc.

Using your food storage can be as simple as creating a list of dishes eaten and liked by your family.

The created list should be at least 10-20 dishes long.

Which of the dishes could include the addition of basic food storage items? Make small adjustments to recipes and increase changes as taste preference allows.

For Example:

Meat Loaf - Add rice and/or wheat berries and/or dry beans.

Chili - Add wheat and/or rice.

Tuna Noodle Casserole - Add wheat.

Stroganoff Serve over rice. - Add wheat berries to sauce.

Hamburger Macaroni - Add dry beans.

Stuffed Green Peppers - Add rice and/or wheat.

Chicken Tonight - Add cooked dry beans.

Chicken Enchiladas - Use dry milk base.

Shepherd s Pie - Add cooked dry beans.

Chicken Noodle Soup - Add rice and wheat.

Chicken Divan - Add wheat. Serve over rice.

Ham Fried Rice - Add wheat.

Choc. Chip Cookies - Add oatmeal and wheat flour.

Pancakes Make mix using dry milk, wheat flour, and oatmeal.

Cream Soup Use dry soup mix.

Vegetable Soup - Add rice and wheat berries

For best results:

Choose familiar recipes your family likes.

Avoid creating abnormal dishes. The further from a normal dish the recipe becomes the greater the chance the dish will be rejected and considered undesirable.

Add new dishes and recipes to the master menu which use basic storage.

Make a conscious effort to use the master menu and basic storage items.

Start out slowly to avoid gastrointestinal problems

Taken from: Food Storage Cooking School- Low and Hendricks, USU Extension, Salt Lake County, 1/99. Copies may be made for individual and non-profit use.

HOME

Top Ten Reasons To Secure Food NOW!!!

1. **INSURANCE:** We insure the things that have value to us, and we wouldn't want to do without! How important is food? Try going without it for just a few days and see if it has as much value to you as your home, car, etc. Maybe you'll find it has even more value?
2. **WEATHER & EARTH CHANGES:** Have you noticed any changes in the weather? Good, I'm glad I'm not the only one. Earthquakes, Floods, Tornados, Hurricanes, all kinds of disasters in ever increasing magnitude. If this isn't a sign of the times, I don't know what is!
3. **ECONOMIC PROBLEMS:** We live in a time where a great majority live beyond their means. It's not surprising since our own government has set such a poor example! I don't know why our country is not bankrupt, do you? We are now over \$5.5 trillion dollars in dept and we do not earn near what we need to repay our debts. Now I don't know about your household, but if my household were being run like the government, we would have been out on the street long ago. How long can this continue?
4. **STORE BOUGHT FOOD:** How much food do you think your local grocer has on hand in the event of an emergency? Do you think it would last a day, two, maybe three? That's about it.
5. **TAINTED FOOD SUPPLY:** Remember the "NAFTA" agreement? Now food can be grown in other countries where they use pesticides and other chemicals which have been outlawed in our country. Problem is; because of the NAFTA agreement we can't know where these foods in our stores come from, and whether or not they contain contaminants we don't want to be using. This could become a much more serious problem soon because of the weather problems we've been having in our own country.
6. **WARS & RUMORS OF WARS:** I don't think I need to elaborate.
7. **JOB SECURITY:** Seems as though job loss in this country is running rampant. Every day more and more companies are letting people go without warning. Happend to a friend of mine just the other day. Remember when Corel was still in Utah? No more! Is your job as secure as you think?
8. **PROPHESY:** We have been warned and forwarned since ancient times. When will we listen?
9. **WISDOM:** A wise man once said "It is better to be ten years too early then one day too late". Will we be ready when the time comes? It will come!
10. **BECAUSE YOU LOVE YOUR FAMILY:** It's up to you to be prepared! Don't let your little ones down. They are dependant on your decision to prepare. If you don't they will suffer too. I don't know if I could live

with myself if my family went hungry because I failed to listen, or needed that car, boat, etc. more than Food Storage. Could you?

<http://www.thefoodguys.com/topten.htm>

HOME

I have update for the UV section.

Maybe your info is based on old studies: you don't need to kill Crypto, it's enough if it is not able to reproduce.

I included here part of the public domain document.

Ultraviolet Light Disinfection in the Use of Individual Water Purification Devices

Bacteria, Virus, and Protozoa Inactivation Capability

Microorganism Inactivation Capability

The effectiveness of UV light on microorganism inactivation varies with different types of microorganisms. Generally, UV light is most effective at inactivating Cryptosporidium and Giardia, followed by bacteria and then viruses: Cryptosporidium and Giardia > Bacteria > Viruses. Interestingly, UV resistance appears to follow microorganism size, with the smallest microorganisms being most resistant. The reason for this may be due to the amount of UV light absorption per cell. With microorganisms larger than 1 micron, the absorption of UV light by the cell can be significant, effectively reducing resistance to UV disinfection. Table 2 is a summary of numerous UV disinfection studies and shows UV doses and corresponding log inactivation for various microorganisms. The most UV resistant viruses of concern in drinking water are adenovirus Type 40 and 41. Because viruses are the most resistant to UV disinfection, dosing is controlled by log inactivation requirements for viruses, not protozoan cysts. As Table 2 shows, Cryptosporidium and Giardia are very sensitive to inactivation by low doses of UV light.

Table 2. UV Dose and Corresponding Log Inactivation by Microorganism.

Micro-organism Type	Micro-organism	UV Dose for 3-log inactivation	UV dose for 4-log inactivation
---------------------	----------------	--------------------------------	--------------------------------

Virus	Adenovirus Type 40	90	120
Virus	MS2	52	71
Virus	Poliovirus Type 1	23	30
Virus	Hepatitis A	15	21
Spore	Bacillus subtilis	61	78
Bacteria	Salmonella enteriditis	9	10
Bacteria	Salmonella typhi	5	9
Protozoa	Cryptosporidium parvum	<6	-
Protozoa	Giardia lamblia	<6	-

HOME

21 Uses for Vodka

1. To remove a bandage painlessly, saturate the bandage with vodka. The solvent dissolves the adhesive.
2. To clean the caulking around bathtubs and showers, fill a trigger-spray bottle with vodka, spray the caulking, let set five minutes and wash clean.
The alcohol in the vodka kills mold and mildew.
3. To clean your eyeglasses, simply wipe the lenses with a soft, clean cloth dampened with vodka. The alcohol in the vodka cleans the glass and kills germs.
4. Prolong the life of razors by filling a cup with vodka and letting your safety razor blade soak in the alcohol after shaving. The vodka disinfects the blade and prevents rusting.
5. Spray vodka on vomit stains, scrub with a brush, then blot dry.
6. Using a cotton ball, apply vodka to your face as an astringent to cleanse the skin and tighten pores.
7. Add a jigger of vodka to a 12-ounce bottle of shampoo. The alcohol cleanses the scalp, removes toxins from hair, and stimulates the growth of healthy hair.

8. Fill a sixteen-ounce trigger-spray bottle and spray bees or wasps to kill them.
9. Pour one-half cup vodka and one-half cup water in a Ziplock freezer bag, and freeze for a slushy, refreezable ice pack for aches, pain, or black eyes..
10. Fill a clean, used mayonnaise jar with freshly packed lavender flowers, fill the jar with vodka, seal the lid tightly and set in the sun for three days. Strain liquid through a coffee filter, then apply the tincture to aches and pains.
11. Make your own mouthwash by mixing nine tablespoons powered cinnamon with one cup vodka. Seal in an airtight container for two weeks. Strain through a coffee filter. Mix with warm water and rinse your mouth. Don't swallow.
12. Using a q-tip, apply vodka to a cold sore to help it dry out.
13. If a blister opens, pour vodka over the raw skin as a local anesthetic that also disinfects the exposed dermis.
14. To treat dandruff, mix one cup vodka with two teaspoons crushed rosemary, let sit for two days, strain through a coffee filter and massage into your scalp and let dry.
15. To treat an earache put a few drops of vodka in your ear. Let set for a few minutes. Then drain. The vodka will kill the bacteria that is causing pain in your ear.
16. To relieve a fever, use a washcloth to rub vodka on your chest and back as a liniment.
17. To cure foot odor, wash your feet with vodka.
18. Vodka will disinfect and alleviate a jellyfish sting.
19. To remove cigarette smoke in your home or office mix one part vodka and three parts water and spray the clothing, then launder and let dry.
20. Pour vodka over an area affected with poison ivy to remove the urushiol oil from your skin.
21. Swish a shot of vodka over an aching tooth. Allow your gums to absorb some of the alcohol to numb the pain.

<http://www.tummyfluff.co.uk/news/vodka.htm>

HOME

Boric Acid

If a product can kill a cockroach it is probably not good for humans either. Many pesticides are extremely harmful to the human nervous system, so safer, non-toxic remedies are a wise choice.

Boric Acid, a white powder, is mined from the Mojave Desert in California and is nature's proven long-term treatment in eliminating Cockroaches, Palmetto bugs, Waterbugs, Ants, Silverfish, Carpenter Ants, and Termites.

This chemical has many interesting and useful characteristics. A few are discussed here such as use as an insecticide, a preservative, and a fire retardant.

The first use of borates as an insecticide was in 1922 when P.F. Harris invented the Roach Tablet. It evolved into many products including today's Roach Motel.

By 1985 there were over 200 registered pesticides containing borates.

In 1955 framing lumber in New Foundland began being treated with borates to control an epidemic of termite destruction. Since then, none of the homes using borate treated wood has had any infestation of termites or wood decay.

In the 1970's Europe and the US began studying borates for wood preserving properties. There was a huge lawsuit involving an US lumber company that put tropical hardwoods in over 1000 homes. The hardwood had beetles in the wood. The homes were treated with borates and the hardwood mills in South America began pre-treating their wood with borates. Since then there have been NO problems with beetles.

This simple inexpensive, household chemical is deadly to all insects. It has been shown to attack their nervous systems, as well as being a drying agent to their bodies. In combination with certain chemical solvents (such as propylene glycol) it may migrate slightly into such objects as wood and concrete, following the solvent, and providing some degree of lasting protection. Commercial development of such products are Bora-Care, and Boric Acid type insecticides & products. (See Wood Rot) As a general household insecticide Boric Acid is safe enough to use around children, and has been used in ointments and salves for diaper rash on babies. It is also used, in a very dilute solution, as an eyewash. How Safe is it? (New Window opens)

Another well known and thoroughly proven use is in fire retardancy. It is the fire retardant used in all blown type cellulose insulation commonly used in homes.

Natures Insecticide:

Untitled Document

Boric Acid is the "secret ingredient" in so many commercial treatments for insect control. Boric acid (100%) powder is odorless and nonstaining. Kills roaches, termites, fireants, palmetto bugs, ticks, bedbugs, fleas, boxelder bugs, carpet beetles, centipedes, crickets, earwigs, grasshoppers, millipedes, scorpions, slugs water bugs, and many many more creepy crawly insects.

Ants : This past year have been on a rampage here in Fl, the insect capitol of the world. This homemade treatment has worked very well on both carpenter ants and pharaoh ants.

Ingredients:

1 Tablespoon of Boric Acid, 1 tsp of Sugar, 4 oz water, Cotton Balls.

Mix Boric Acid and Sugar in a bowl. This can be poured over a cotton wad in a small dish or bottle cap. Keep this from drying out for continued effectiveness. Place Cotton balls in path of Ants.

Roaches: Boric acid powder, is often called "roach powder". Here is a great remedy from Heloise "Boric Acid Roach Exterminating Formula"

Rid your home of silverfish, those hungry, nasty-looking insects that live under your sink, your drawers, or closets and feast on valuable clothing and important papers.

Termites:

Boric acid when mixed with propylene glycol (non-toxic version of anti-freeze) has proven to be very effective against many types of termites. The glycol helps the solution to penetrate into the wood and become a part of the wood fibre. This solution is a terrific treatment for dry rot in wood.

Kill Silverfish Quickly:

Mix a small amount of boric acid, 20% or so with an inert ingredient like "whiting" fold into small packets and place them in dresser drawers, under your sink, or closets to kill silverfish quickly with absolutely no mess.

A Safe Surface Insecticide may be formulated by dissolving Boric Acid in plain water to make a 5% to 10% solution of clear liquid. Heating the water first makes it easier to dissolve the white powder. This simple inexpensive, household chemical is deadly to all insects, is safe enough to use around children, and on interior surfaces (test first on a small hidden area to check for possible -- but rare -- discoloration of finishes). Don't expect instant results, give it some time, occasionally additional applications are needed. It lasts about a year, or until the surfaces are washed. Many modern applications of this ancient item are showing up in products, and commercial treatments.

To apply as a powder, you can use an old grated cheese shaker [make sure it has lots of holes] or an inexpensive mustard or condiment squeeze bottle.

Some important places to make sure you treat:
around all pipe and drain entrances in floors and walls
in and under all cabinets, especially corners and cracks
around all baseboards, in corners and on top of cabinets
behind and under range, dishwasher, and refrigerator

In new homes, during construction, the powder can be sprayed inside walls, soffits, and in the attic. Also, it is a good idea to apply the powder along the top of basement walls near the ribbon-plate [where floor joists rest on the concrete wall of the basement].

For carpenter ants drill holes in wood surrounding infestation, fill with boric acid

Fleas:

Simply sprinkle it on the carpet, (same mix as above for silverfish) brush it in so it settles down and in the fiber, let it sit for about a week then vacuum and fleas will be gone, eggs and all!

An EPA assessment of a boric acid pilot pest control program conducted at the U.S. Army s Aberdeen Proving Ground in Maryland found that boric acid was both more economical and more effective than a monthly spray treatment. Do to its unique mode of action, insects do not gain resistance to borates. It is water resistant, heat resistant and remains effective for long periods of time. Borates are the most effective treatment for many crawling insects including, cockroaches, silverfish, larder beetles, carpenter ants, and other wood borers, as well as wood decay organisms .

http://alsnetbiz.com/homeimprovement/boric_acid.html

HOME

Dry Pack Canning with Paint Cans BY No Prob Rob

Over the years I have tried everything out there. Recycled 5 gallon buckets, #10 cans, and Mylar bags. In my humble opinion paint cans, (new never been used) are the best option out there for several reasons.

1. Easier to handle than 5 gallon buckets. The older I get the more I appreciate not having to lug around buckets. Cans fit in a cabinet where a bucket usually gets stored on the floor taking up space and looking tacky.

2. 1 gallon gets used up sooner and minimizes spoilage. I have found that when I open a 5 gallon bucket it takes a good while to use up the contents. I have had bugs get into my flour because the bucket was open for so long. In addition the contents tend to degrade in quality over time when left open to the air.

3. Low Cost. The paint cans cost \$2.00 each but the price drops by each time it is reused. So over time they are economical. A dry pack canner costs over \$1000.00 for a hand crank model, plus the cost of the #10 cans and lids. You would need to fill a lot of #10 cans to make it economical.
4. The cans are simple to use. Unlike #10 cans that require a machine to seal the lids, a paint can only requires a rubber mallet to seal and a screwdriver or spoon to open. Ever pry off a 5 gallon plastic bucket lid by hand? I never break a sweat when opening 1 gallon paint cans.
5. The paint cans are stackable. Mylar bags are a pain. You need to build boxes or buy a container to hold the bags.
6. Paint cans are vermin proof. Mylar bags are not contrary to some who say they are.
7. 1 gallon paint cans hold more than a #10 can

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What is TVP?

TVP (Textured Vegetable Protein) is an excellent protein source that is easy to store and use. TVP is made from soy flour where the soy oil has been extracted. It is cooked under pressure and then extruded and dried. Not only is TVP high in protein, but its also high in fiber and low in fat. This makes TVP ideal for food storage and also for every day use. Because TVP is not made from meat, it does not have the contamination risk that many meats have with bacteria such as E. Coli and Salmonella. Because it is soy based, it is perfect for those on a vegetarian diet. It is also Kosher certified.

TVP is very shelf stable and can sit in a sealed container for at least a year. When sealed in an airtight container (where the oxygen has been removed) the shelf life is much longer. TVP is best stored in a cool, dry place.

To reconstitute TVP, pour cup boiling water over 1 cup TVP and let stand for 5-10 minutes. It can also be added dry to dishes with adequate liquid such as soups or spaghetti sauce. The texture of TVP can be adjusted by the amount of liquid added, so you can experiment to find out just how you like it. 1 oz of TVP is equivalent to approximately 3 oz of meat. After rehydration, TVP should be treated like meat and must be refrigerated and eaten within a few days.

TVP is also very convenient for camping as it weighs very little and can be quickly rehydrated or added to dishes. It also makes a great quick dinner as you can make sloppy joes or tacos in under 15 minutes for much less than the cost of ground beef and with more nutrition. TVP is a very

economical choice that provides the protein of meat without the fat or the mess that cooking and browning can create.

<http://www.shelfreliance.com/library/view/28>

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Types of Flour

Flour that is used in baking comes mainly from wheat, although it can be milled from corn, rice, nuts, legumes, and some fruits and vegetables. The type of flour of flour used is vital at getting the product right. Different types of flour are suited to different items and all flours are different you cannot switch from one type to another without consequences that could ruin the recipe. To achieve success in baking, it is important to know what the right flour is for the job!

All-purpose flour is a blend of hard and soft wheat; it may be bleached or unbleached. It is usually translated as "plain flour." All-purpose flour is one of the most commonly used and readily accessible flour in the United States. Flour that is bleached naturally as it ages is labeled "unbleached," while chemically treated flour is labeled "bleached." Bleached flour has less protein than unbleached. Bleached is best for pie crusts, cookies, quick breads, pancakes and waffles. Use unbleached flour for yeast breads, Danish pastry, puff pastry, strudel, Yorkshire pudding, clairs, cream puffs and popovers.

Shelf-Life: for cabinet storage, up to 8 months if properly stored in a sealed container or if tightly wrapped, and for refrigerator storage, up to one year.

Bread flour is white flour made from hard, high-protein wheat. It has more gluten strength and protein content than all-purpose flour. It is unbleached and sometimes conditioned with ascorbic acid, which increases volume and creates better texture. This is the best choice for yeast products.

Shelf Life: several months in a cool, dry cabinet when stored in a sealed container or if tightly wrapped, and up to one year in the freezer.

Whole-wheat flour is made from the whole kernel of wheat and is higher in dietary fiber and overall nutrient content than white flours. It does not have as high a gluten level, so often it's mixed with all-purpose or bread flour when making yeast breads. Whole wheat flour is equivalent to British whole meal flour.

Shelf Life: 6 months to one year in the freezer if stored in tightly sealed plastic containers or if tightly wrapped. It will keep for only a few months if stored in a cabinet. Due to the presence of the wheat germ, resulting in an unsaturated oil content that is higher than refined

flour. The potential for rancidity is greater if whole-wheat flour is kept for long periods and particularly if it is not stored under refrigerated conditions. It is best to store whole-wheat flour in a tightly sealed container in the refrigerator or freezer.

Instant flour (Wondra from Gold Medal) is granular and formulated to dissolve quickly in hot or cold liquids. It will not work as a substitute for all-purpose flour, although there are recipes on the container for popovers and other baked goods. It is used primarily in sauces and gravies.

Cake flour is a fine-textured, soft-wheat flour with a high starch content. It has the lowest protein content of any wheat flour. It is chlorinated (a bleaching process which leaves the flour slightly acidic, sets a cake faster and distributes fat more evenly through the batter to improve texture. When you're making baked goods with a high ratio of sugar to flour, this flour will be better able to hold its rise and will be less liable to collapse. This flour is excellent for baking fine-textured cakes with greater volume and is used in some quick breads, muffins and cookies. If you cannot find cake flour, substitute bleached all-purpose flour, but subtract 2 tablespoons of flour for each cup used in the recipe (if using volume measuring).

Pastry flour also is made with soft wheat and falls somewhere between all-purpose and cake flour in terms of protein content and baking properties. Use it for making biscuits, pie crusts, brownies, cookies and quick breads. Pastry flour makes a tender but crumbly pastry. Do not use it for yeast breads. Pastry flour (both whole-wheat and regular) is not readily available at supermarkets, but you can find it at specialty stores and online.

Self-rising flour, sometimes referred to as phosphated flour, is a low-protein flour with salt and leavening already added. It's most often recommended for biscuits and some quick breads, but never for yeast breads. Exact formulas, including the type of baking powder used, vary by manufacturer. Recipes that call for self-rising flour do not call for the addition of salt or leavening agents.

Make your own self-rising flour: Using a dry measure, measure the desired amount of all-purpose flour into a container. For each cup of all-purpose flour, add 1 1/2 teaspoons of baking powder and 1/2 teaspoon of salt. Mix to combine.

Semolina flour is used in making pasta and Italian puddings. It is made from durum wheat, the hardest type of wheat grown. The flour is highest in gluten.

Spelt flour is one of the most popular and widely available non-wheat flours. The full name of spelt is *Triticum aestivum* var. *spelta*. Spelt flour has a nutty and slightly sweet flavor similar to that of whole wheat flour. It does contain gluten and is a popular substitute for wheat

in baked goods. Check out the article on Spelt Flour - Add Spelt Flour to your Diet for Variety and Nutrition.

Durum flour is finely ground semolina and is grown almost exclusively in North Dakota.

Organic flour is used in the same way as regular flour. It must follow U.S. Department of Agriculture regulations to be labeled "organic." Using this flour is a matter of personal preference.

Gluten flour is usually milled from spring wheat and has a high protein. It is used primarily for diabetic breads, or mixed with other nonwheat or low-protein wheat flours to produce a stronger dough structure.

<http://whatscookingamerica.net/Bread/FlourTypes.htm>
