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Contents

The Guide To Green: How To Build Your Own Vermiponics System And Greenhouse — And Other Stuff 1

Vermiponics 1

Worms 1

European Nightcrawlers 2

Fish 3

Veggies 3

Nutrients Matter 3

Nitrogen System 4

Where To Place The System 4

Pests 4

Lighting Indoor Vermiponics 4

Materials 5

Water Pump 5

Plumbing 6

Media 6

Compost 6

Tools 6

On To the Building 7

Step 2 — Pump 7

Step 3 — Media Layers 8

Step 4 — Worms 8

Step 5 — Irrigation System 9

Step 6 — Let it Cycle For Six (6) Weeks 9

Step 7 — Do A Dance 9

Maintenance Tips 9

Greenhouse 11

Tips 12

Where to Store Certain Foods 12

Construction 15

The Ultimate Guide To Canning and Preserving 17
The Ultimate Guide to Beekeeping 35
When to Examine The Colony 35
Most Important Tool 36
Clothing/Equipment 36
Equipment 36
How To Get Bees 37
How to Manage Your Queen 37
Substitutes for Nectar 38
Pollen Substitute 38
If You Live in the Suburbs… 38
Bacterial Diseases 39
Pests 39
How To Deal With Bee Stings 40
Processing Honey 40
How To Cut Comb Honey 41

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The Guide To Green: How To Build Your Own Vermiponics System And Greenhouse — And Other Stuff

Contestants ate worms on Fear Factor.

That was a total waste. They should have kept them for their self-sustaining vermiponics system.

Or for their own greenhouse.

Maybe they could have canned them and preserved them for a different time…

Or fed the worms to the bees.

Wait… bees don't eat worms.

Sorry. I was trying to connect the four major parts of this article together. Because in this nifty packet you're going to learn how to…

- Build your own vermiponics system.
- Build your own greenhouse.
- Can and preserve your own food.
- Become a beekeeper.

Let's start with the crawling things…

Vermiponics

Use worms and their waste to grow crops — instead of dirt.

Worms

Red wigglers are best for vermiponics systems. That's because they:

- Reproduce more easily than earthworms.
- Enrich the soil with more nutrients.
- Endure all temperatures and conditions.

- Enjoy enclosed spaces and indoors.

European Nightcrawlers

Look for ones that:

- Decompose well.
- Reproduce easily and quickly.
- Are easy to find.
- Are cheap to buy.

Tips

- Keep the bedding moist.
- Keep out of direct sunlight.
- Add waste a few times each week.
- Be sure worms have consumed all food before adding more.

Feeding Worms

Mix scraps that contain carbs and nitrogen — if it's void of protein, lower the nitrogen levels.

Stay away from animal matter.

Instead, use…

- Paper filters
- Shredded paper
- Vegetable peels
- Fruit peels (no citrus)
- Tea bags
- Coffee grounds

Keep a fresh layer of bedding over the food scraps, or else flies will get everywhere.

Overfeeding produces a nasty smell, so feed in moderation. Only about once or twice a week is enough. And don't feed them until the food is completely gone.

Fish

Tilapia, trout or carp work.

Just make sure you know how to take care of your specific fish.

Be mindful of the following:

- Water quality
- Temperature
- Transportation

Veggies

Understand the plants you grow. Because one false move, and disease and pests can destroy them.

But overall, plants are wonderful.

Nutrients Matter

Primary Plant Nutrients:

- Nitrogen (N)
- Phosphorus (P)
- Potassium (K)

Secondary Plant Nutrients:

- Calcium (Ca)
- Magnesium (Mg)
- Sulfur (S)

For your plants, have some agricultural lime. Add seaweed extract a couple times a year.

Nitrogen System

When the pH levels are around 4, add bacteria to the system. A healthy tank should have a pH level of around 7 - 7.4.

To start the system, put in dead fish or shrimp. Do this when it's hot out, so that the cold doesn't keep the bacteria dormant (which makes the process go on longer). Test it out.

Where To Place The System

The following are tips on where to keep your system:

- On level ground.
- In a covered area.
- Away from bedroom windows and noisy neighbors.
- Where it can get 6 hours of sunlight — near a south-facing wall or in a greenhouse.
- Needs about 200 sq ft for a typical vermiponic system.
- Needs a dark area for fish, and a light area for worms and plants.

Pests

For most flying insects, get sticky traps or chili and garlic sprays.

If there's mold or fungus on the plants, spray some potassium bicarbonate on them

For slugs? Fill a saucer with beer near the system. They'll get in and drown their sorrows away.

Lighting Indoor Vermiponics

The Sun is the best light source for growing plants.

However, there are thousands of other options for lighting.

Usually, plants need T5 lighting. The bigger the T, the larger the bulb. You don't absolutely need a T1000, unless the Terminator is coming through your door. For plants, T5 is good enough.

You can also get:

- Photosynthetically active radiation (PAR)
- High Intensity discharge (HID)
- High pressure sodium (HPS)
- Metal halide (MH)
- Compact fluorescents (CFL)
- Light emitting diodes (LED)
- Induction lights

How much light do you need?

- 7x7 bed = 1,000 watts of HID
- 6x6 bed = 600 watts of HID
- 4x4 bed = 400 watts

Use whatever works best for you.

Materials

IBC containers are amazing.

Old Jacuzzis and bathtubs also work.

Or you can build your own with 2x4s, plywood and vinyl fiber.

Water Pump

You'll want a submersible pump that has a casing filled with coolant to keep it cool and lubricated. It's better than an in-line, since it needs to stay dry at all times.

The higher the head height, the less water it can bring up. But the lower the head height, the more volume it can carry.

Airlift pumps are also good, as they carry water inside bubbles that push to the top of the pipe. They're also energy efficient.

Plumbing

Anything for a plumbing job:

- Pipes
- Hoses
- Joints
- Valves
- Fittings
- Irrigation grommets
- Connectors and tubing

Media

You have a couple option:

- Hydroton
- Granite
- Gravel

Compost

There are 4 types of compost:

- **Yard waste** — clean up around your house.
- **Composted manure** — combine it with sawdust and yard waste.
- **Mushroom compost** — over time, the cow manure cools and produces mushrooms.
- **Worm castings** — waste from worms eating food, paper and yard waste.

Tools

- Drill
- Electric screwdriver
- Cordless or corded drill

- Angle grinder with cutting disk
- Hole saw
- Jigsaw
- Permanent marker
- Tape measure
- 1/2” drill bit
- Spade bit (easier with IBCs)
- Tech screws
- Safety goggles
- Gloves

On To the Building

Step 1 — Prepare The IBC Tank

Drain the tank, and wash it out thoroughly. You don’t know what was in there.

Separate the plastic container from the cage. Remove the top two bars, and use a regular screwdriver to unscrew the four screws holding the top two bars.

Drag the plastic container from the steel cage.

Cut out about 8” from the middle of the plastic container with a jigsaw. This should create two separate tanks.

Put the bottom half of the container back in the cage. Tighten them with tech screws.

Drill holes in the cage with a cordless (or normal) drill. Take two bars and place them in the holes halfway up the cage.

Slide the top half of the container on top of the bars, with the open side facing up. Screw them in place with tech screws, and you’re done.

Step 2 — Pump

Get a plastic hose and connect that to the outlet of the pump.

Place the pump at the bottom of the tank. Press it down hard to make it stay there.

Use plastic fasteners to fix the hose to the cage.

Trim off the excess part of the fasteners with pliers. You want it to look clean, right?

Trim off the excess hose with an industrial knife.

Get a gardening-type “quick” connector on the hose. And connect the irrigation adapter to the connector.

To keep it all in place, install more plastic fasteners.

Step 3 — Media Layers

The top half of the tank is the growing bed. So clean it out and drill drainage holes in the bottom of the tank.

The first media layer should be gravel or granite pebbles. Pour a nice layer of gravel for your filtration station, and make sure it covers the bottom of the growing bed.

On top of the gravel layer, put some mulching cloth or shade cloth to stop the soil from passing through and getting into the gravel. Put up duct tape to keep it in place.

For your compost, whether you have ready-made compost or DIY stuff (straw, soil, wood, ash, grass clippings, leaves, food scraps, horse manure, sawdust, paper, cardboard, etc.), just mix it hard and let Mother Nature do the work.

After a month or two, the worms are ready.

Step 4 — Worms

Add red wiggler worms. Top them off with expanded clay pebbles. Now the growing bed is ready.

Step 5 — Irrigation System

Buy either a commercial mini-irrigation system with all the parts, or make one out of PVC tubing. Plug in the pump and begin cycling. Also, look for leaks.

Step 6 — Let it Cycle For Six (6) Weeks

Patience is a virtue.

Step 7 — Do A Dance

Because you're done.

Maintenance Tips

Temperature

Find fish that are naturally in your area. You don't need the temperature of the water a certain way if the fish are close by.

When transporting, keep the water temperature the same. Put the fish inside a 5-gallon bucket or a large plastic bag inside the system water until the temperatures equalize.

Levels of pH

Test at least once a week - the pH level should be around 6.2 - 6.4. If it's too low, take out the strong plants with long roots. If it's too high, add more plants.

Oxygenation

If the air pump doesn't run, your fish will die if there's no aeration for 45 minutes. Make sure the air pump works.

Cycling

You can use any of the following:

- Peeing into the system — it's old school, but you can pee into the system a few times to start.
- Ammonia — use food-grade only, and test the water regularly.
- Dead fish — these have natural ammonia for the good bacteria.
- Cheap goldfish from WalMart.

Cycling takes at least six (6) weeks. Be patient.

Planting Seeds

Sprinkle the seeds across the top of the bed, so that they'll fall between the pebbles and germinate at the bottom. When you have plants, take out the smaller seedlings so the stronger ones can grow.

Harvesting

When harvesting, remove the entire plant — including the root. But leave a little bit for your worms.

Pick out the following:

- Kale
- Cucumber
- Zucchini
- Mustard greens
- Herbs

If you have pests or fungi infiltration, take out the entire plant.

Rotate your harvest time for a constant supply of food. Stick to a growing schedule.

Fish

Watch out if fish…

- Act funny — they may be diseased.
- Get too big — they can eat smaller fish.

Harvest every couple months, or more if you have a larger system. And remember: you can't take old ones out until the new ones are available.

Maintenance Rules

- Don't forget to feed fish — twice a day is optimal.
- Check the tank's water temperature daily.
- Check for bugs/insects from getting out of control — look for chewing marks and residue.
- Check pH levels — should be between 6.8 and 7.0.
- Check ammonia levels — should be less than or equal to 0.5 ppm (parts per million).
- Check nitrate levels — once a month, above 150 ppm = add more plants, take out fish, or expand.
- Check pumps and plumbing — once a month cleaning, and check daily.

Greenhouse

Here are some of the tools and materials you need for your greenhouse:

Good soil:

- Compost
- Potting soil
- Gardening soil
- A little sand
- Perlite

Benches for holding the tray of plants that have sprouted:

- A cedar double-layer bench is durable and efficient.
- Make 2-3 section lengths out of aluminum for the shelves.

Watering system:

- Automatic — drip irrigation and fertilizer system.
- By hand — get a giant hose or watering wand with ultra-fine mists.

Any container to hold the plants in:

- Styrofoam cups
- Yogurt plastic cups
- Any container in general
- Large commercial-type containers

Drainage options on the ground:

- Broken clay pots
- Cracked walnuts
- Marbles
- Charcoal
- Gravel

Seriously. Soak the clay pots in water for a few minutes, so the clay doesn't absorb the moisture from the potting soil.

Natural Insecticides:

- Onions or garlic in a jar of water
- Leave for a week
- Spray that on your plants

Tips

Where to Store Certain Foods

Deep boxes under the benches:

- Carrots
- Beets
- Turnips
- Other root crops

Tub-type containers:

- Tomatoes
- Peas
- Cucumbers
- Pole beans

Any tub with taller veggies:

- Lettuce
- Other low, leafy veggies

You can plant corn and pumpkins in the ground, directly in the floor of the greenhouse.

For indoor plants, leave the water to sit out for a day to get rid of the chlorine, and to keep it at room temperature.

When rinsing the veggies and fruit, do it outside the greenhouse so the dirt and bugs stay out.

Plant tomatoes in the warm part of the greenhouse.

Bench placement for plants:

- Lower bench = starting seeds
- Upper bench = growing flowers

There is such a thing as overwatering — give your plants the water they need (and make sure your watering deep enough to reach the roots - not just the first couple inches of soil. But be careful of overwatering. If you can have drainage holes or a method to measure the amount of water the plants already have/need, that's ideal.

Oh, and keep your greenhouse neat and tidy. You don't want to prepare your food in the greenhouse and make it a mess everywhere. Do that separately.

How Far Apart To Grow Certain Plants

- Bush-type beans — 5 ft between rows
- Cabbage — 1 ft
- Peppers — 1 ft
- Cantaloupes — 2-3 ft
- Squash — 2-3 ft

- Tomatoes and watermelon — 2 ft

Managing Climate

Not all plants are the same. So don't try to please every plant. Keep it a certain temperature for a majority of your plants. Or just partition some of the greenhouse for the plants that need it to be warmer.

Greenhouses need to manage three things:

- Heat/sunshine
- Humidity
- Ventilation

Find a balance that's best for all your plants. That's because mildew and fungus can form on your plants if you don't maintain the right balance between the temperature and humidity in your greenhouse.

(And mildew + fungus = not good).

Panels

Any good plastic will let the sun shine through and keep the plants protected from high winds and frost.

The best choice is twin-wall polycarbonate. You can also get aluminum and glaze that with a twin-wall polycarbonate.

Other panel options include:

- PVC
- Polyethylene
- Copolymers
- Fiberglass

Some won't look good, while others might get discolored over time (which will reduce its efficiency).

You could also have a dome structure, as these bring in more light than a gingerbread house-style greenhouse.

Miscellaneous Tips

For lights, hire an electrician to install them in the greenhouse. Have one light for the growing seeds, and another for the flowering plants. They need separate lights.

Get predator bugs for pest control.

Replace your growing medium annually - especially commercial potting compost.

Have some bubble wrap to insulate the greenhouse in the winter.

Shade the plants from the sun with a netting inside the frame. Clip it to the frame to hold the plant supports and bubble wrap plastic.

Nitrogen is the most important fertilizer, but you can also get organic fertilizers in liquid or powder form.

Grow some fish in your water tanks. Just add an air pump and a few other items, and you're good to go.

To heat your greenhouse, use electric heaters first. Then, if you become a pro, use the gas heaters, paraffin heaters and coal heaters. As long as you have a smoke stack and good ventilation, you should be fine.

For humidity levels, get either evaporative coolers or humidifiers.

For people who live in apartments, you can build a very small greenhouse that fits in your window. There are bay window greenhouse kits available, or you can remove an existing window and make a bow greenhouse with several glass segments on it.

Construction

You'll need:

- Sheet of Universal Canopy (10x20 feet)
- 6mm Clear Plastic Roll (20x100 feet)
- 4 to 8 T-Posts
- 15 to 20 Squeeze Clips

- 18 Ratcheting Tie-Downs
- 1 Roll Duct-Tape
- 3 Rolls Heavy Duty 3M Clear Tape
- Heaters, Fans, Gro-lights (optional)

Step 1 — Set Up The Frame

As you insert each piece into the frame, wrap the connection point with a few rounds of duct tape. Stagger tie-downs evenly over the top of the frame. Make them tight, but don't over-tighten them.

Step 2 — Anchor The Corners

Use at least 4 T-posts to anchor the four corners. Drive them 12" into the ground, and wrap at least the top 24" with duct tape to secure the structure and get rid of sharp edges.

Step 3 — Splice The Plastic

Get your 2 pieces of plastic at 30 feet (or 20' x 30'). Splice the 30' sections to give yourself a 38' x 30' piece of plastic.

Let the plastic touch the ground on the end caps. If they overlap too much, they won't reach the ground on both ends. With the extra plastic, you can make your own doors or end caps.

Step 4 — Secure With Clips

Attach the plastic to the pipe legs using clips. Wherever you think the plastic needs the clip, put one there. And if there's a rip, fix it with heavy-duty clear packing tape.

Step 5 — Have A Glass Of [Insert Drink Of Choice Here]

Because you're done.

Watch out for the bacteria called *clostridium botulinum*. It produces a poisonous toxin from canned foods. So just boil the cans for 10 minutes, and add a minute for every 1,000 feet in altitude.

However, you don't have to boil and can eat out of the can if…

- The food is processed in pressure canner.
- The gauge of the pressure canner is accurate.
- It meets updated researched process times/pressures .
- It meets process time/pressure recommendations for sterilizing food.
- The jar lid is firmly sealed.
- Nothing leaked from the jar.
- No liquid spurts out when the jar is opened.
- There's no "off" odors.

Some Random Numbers

- Best storage temp for frozen foods — between 0 and -10 degrees F.
- Best storage temp for canned/dried foods — between 50 and 70 degrees F.
- Max storage temp for canned foods — 95 degrees F.
- Canning temp for fruits, tomatoes, pickles, jellied products in boiling-water carrier — 212 degrees F.
- Canning temps for low-acid vegetables, meat, poultry in pressure canner — 240 - 250 degrees F.

Remember:

- Freezing temps stop microorganisms from growing, but allow some to survive.
- Danger Zone is 40 - 140 degrees F — leads to rapid growth of bacteria, yeast and mold.
- Canning temps destroy most bacteria, yeasts, and molds in acidic foods — as temp increases, the time to kill these decreases.

A Couple of No-Nos

NO open-kettle canning, conventional ovens, microwaves, dishwashers or steam canners (processing times for these are not adequately researched).

NO pressure processes in excess of 15 PSI, jars with wire balls and glass caps, or one-piece zinc porcelain-lined caps.
Have good-quality fresh food. Period. Most county extension offices have recommendations for varieties that are best suited for canning. Only wait a day between harvest and canning - in fact it's best if you can everything 6-12 hours after harvest.

Jars

The best jars are Mason-type and are threaded with self-sealing lids. The wide mouths at 3" are great for filling and emptying, but a normal 2-3/8" wide mouth is fine.

Canners

Get the boiling water canners that are either aluminum or porcelain-covered steel. Most have removable perforated racks and fitted lids. They should be deep enough to cover the top of the jar with at least 1" of boiling water during the processing. You don't want a canner that's 4" wider than the heated element on your electric or gas stove.

How To Use A Boiling Water Canner

1. Fill the canner halfway with clean water (depending on the number of jars and sizes).
2. Preheat water to 140 degrees F for raw-packed foods, or 180 degrees F for hot-packed foods (prep the food while you wait).
3. Load filled jars that have been fitted with lids into the canner rack. Use handles to lower the rack into the water — OR fill the canner with the rack in the bottom, and place one jar at a time using a jar lifter (securely positioned below the neck of the jar). Keep the jar upright at all times.
4. Pour in more boiling water (water should be at least 1" above the jar tops — if they're in there over 30 mins, the water level should be at least 2" above the jar tops).

5. Turn on the heat, cover the canner with a lid, and heat until the water boils like a mad person going on a rage fest.
6. Set a timer.
7. Keep the canner covered and maintain the boil. If the container stops boiling, start over and set the timer from the top. This is important for food safety.
8. Add more boiling water.
9. Turn off the timer and heat. Remove the canner lid. Wait 5 minutes.
10. Remove the jars with a jar lifter and place them on a towel at least 1" apart. Let them sit at room temperature for 12-24 hours.

Pressure canners

The modern ones have thin-walled kettles with turn-on lids. They also have:

- Jar rack
- Gasket
- Dial/weighted gauge
- Automatic vent and cover lock
- Vent port closed with a weighted gauge or counterweight
- Safety fuse

Now, the pressure itself doesn't kill the microorganisms, but the high temperatures applied for the right amount of time does.

Always follow your pressure canner instructions. But here are some more useful guidelines:

1. Place the filled jars on the rack with a jar lifter in 2-3 inches of hot water.
2. Leave the weight off the vent port or open the petcock. Let it heat at the highest setting until steam flows freely.
3. Let steam flow (exhaust) continuously for 10 minutes. Now, place the weight on the vent port (or close the petcock). It'll pressurize in the next 3-5 minutes.
4. Start timing when the pressure is reached OR when the weighted gauge begins to jiggle/rock.
5. Regulate the heat under the canner for steady pressure. If the pressure gets too low, start over and reset the timer. This is important for food safety.
6. Turn off the timer and heat, and remove the canner from the heat. Let it depressurize on its own. DO NOT force-cool the canner. If there's no dial gauge, let it depressurize for 30 minutes for pints and for 45 minutes for quarts in a heavy-walled

canner. The newer thin-walled ones will cool rapidly with the vent locks. It's depressurized when the vent lock piston drops to its normal position.
7. Remove the weight from the vent port (or open the petcock). Wait 10 mins, unfasten the lid, and remove it carefully. Lift the lid away from you so that the steam doesn't burn your face off.
8. Remove the jars with jar lifter. Place them on a towel 1" apart, and let them sit for 12-24 hours.

Cooling Jars

Don't you dare open the jars after they've been in the canner. This can cause seal failures and ruin your food. Just let them sit for 12-24 hours. THEN pour more water in the jar.

Most canners hold 7 quart jars or 8-9 pints.

Testing Jar Seals

After cooling, remove the screw bands and test the seals.

Option 1: Press on the middle of the lid with your finger — if the lid springs up when you release your finger, the lid is unsealed.

Option 2: Tap the lid with the bottom of a teaspoon — if it makes a dull sound, the lid is not sealed. Also, if the food is in contact with the underside of the lid, it'll also make a dull sound. You're listening for a high-pitched ringing sound. That's when you know it's sealed properly.

Option 3: Hold the jar at eye-level, and look across the lid. The curve should come down at the center (aka concave). If it's flat or bulging, it's not sealed.

Storing Canned Foods

After every canning session, make sure you've checked that the lids are vacuum-sealed, that you've removed the screw bands, that you've washed the lids and jars to remove food residue, and that you've rinsed and dried the jars.

Then you're good to store the jars.

Make sure you label and date each jar, and keep them in a clean, cool, dark and dry place. Never place your jars where they can get to 95 degrees F.

Never place your jars near any of the following:

- Pipes
- Range
- Furnace
- Direct sunlight

Also, do not place your jars:

- Under the sink
- In an uninsulated attic

If it could freeze, that's fine — some food might get soft, but as long as the freeze doesn't destroy the jars, you're fine. But you can also protect them with newspaper, heavy cartons and blankets.

Recipes

Before we get into the recipes, here's a couple of acronyms for easier use:

HS — stands for headspace. This is how much water you need to fill above the jar while it's in the pressure canner or boiling water canner.

RWAP — this helps you remember the four-step process :

1. **R** - Remove the air bubble.
2. **W** - Wipe the rims of the jars with a paper towel.
3. **A** - Adjust the lids.
4. **P** - Process.

Now for those recipes…

Apple Butter

- 8 lbs apples
- 2 cups cider
- 2 cups vinegar
- 2-1/4 cups white sugar
- 2-1/4 cups packed brown sugar
- 2 tbsp ground cinnamon
- 1 tbsp ground cloves

Yield: 8-9 pints.

Thoroughly wash the apples, and scrub them if they seem waxy. Quarter them, and add them to a slow cooker, along with the cider and vinegar.

Cover and cook until the apples are soft.

Now uncover the slow cooker and mash the apples using a potato masher. Run the pulp through a sieve in order to catch the seeds and skins (the remainder should look like a puree).

Add the dry ingredients and cook, stirring occasionally, until the apple butter darkens and mounds on the spoon.

Test to see if it's done — basically, hold a spoonful away from the steam for 2 minutes. If it's done, the butter remains in a mound on the spoon. Or, you can put it on a plate — if the rim of the liquid doesn't separate around the edge of the butter, it's ready.

Pour into the jar, place in the canner with 1/4" HS, and RWAP.

Apples — Sliced

- 19 lbs for 7 quarts
- 12.25 lbs for 9 pints

Bushel = 48 lbs and 16-19 quarts.

Wash, peel and core the apples. Slice them up and put them in water with ascorbic acid.

Drain the slices in a large saucepan, and add 1 pint of water or some syrup per 5 pounds of apples.

Boil them for 5 minutes, and stir occasionally. Leave 1/2” HS. RWAP.

Applesauce

- 21 lbs for 7 quarts
- 13.5 lbs for 9 pints

Bushel = 48 lbs and 14-19 quarts

Same as sliced apples, but add 1/2 cup water and heat until tender. This might take between 5-20 minutes. Press them through a food mill or sieve – unless you like it chunky (then skip this step). Add sugar to taste. Reheat the sauce to a rolling boil.

Leave 1/2” HS, and RWAP.

Berries

You can use any berries you can think of: Blackberries, blueberries, currants, dewberries, elderberries, gooseberries, huckleberries, loganberries, mulberries, raspberries, etc.

- 12 lbs for 7 quarts
- 8 lbs for 9 pints

24 quart crate = 36 lbs and 18-24 quarts

Wash a few berries at a time. Drain and cap them, and prepare them for a boil. Add 1/2 cup of one or more of the following to each clean jar:

- Syrup of choice
- Water
- Juice

If you’re going to pack it while it’s hot, like blueberries, elderberries, gooseberries and huckleberries...

- Heat the berries in boiling water for 30 seconds.

- Drain and fill and cover with hot juice.
- Leave 1/2” HS.

For a raw pack...

- Fill the hot jars, and shake them down gently.
- Cover with hot syrup or juice or water.
- Leave 1/2” HS.

For both, RWAP.

Figs

IMPORTANT: all home-canned figs must be acidified before canning in a boiling water canner — that way you’re safe from botulism poisoning.

- 16 lbs for 7 quarts
- 11 lbs for 9 pints

Drain the clean figs — no need to peel or remove the stems.

Cover the figs with water and boil for 2 minutes. Drain, and gently boil the figs in light syrup for at least 5 minutes.

Then add ONE of the following:

- 2 tbsp bottled lemon juice per quart
- 1 tbsp bottle lemon juice per pint
- 1/2 tsp citric acid per quart
- 1/2 tsp citric acid per pint

Fill it up, and leave 1/2” HS, and RWAP.

Grapes — Whole

- 14 lbs for 7 quarts
- 9 lbs for 9 pints

Lug = 26 lbs and 12-14 quarts

Harvest the green seedless grapes 2 weeks before you're supposed to can them.

De-stem, wash and drain the grapes. Put them in a very light syrup.

If you're hot packing it, blanche the grapes in boiling water for 30 seconds. Drain them, then do what you'd do for a raw packing.

Raw packing? Fill the jar with grapes and hot syrup.

Leave 1" HS, and RWAP.

Peaches

- 17.5 lbs for 7 quarts
- 11 lbs for 9 pints

Bushel = 48 lbs, 16-24 quarts

Dip the peaches in boiling water for 30-60 seconds until the skin loosens. Dip them quickly in cold water, and slip the skins off. You can cut them in half and remove the pits and slice them if you want. Keep them in ascorbic acid to prevent them from going to the dark side. Boil in syrup, or pack the peaches in water/apple juice/white grape juice.

If you're hot packing, boil them in a large saucepan. With the cut side down, put the halves in the jar in layers.

For raw packing, add hot water, juice or syrup in the jar and leave 1/2" HS. And RWAP.

PSA About Tomatoes

DO NOT can tomatoes from dead or frost-killed vines. Green tomatoes can be canned, but they'll be acidic.

For any tomatoes, add...

- 2 tbsp bottled lemon juice OR 1/2 tsp citric acid per quart
- 1 tbsp bottled lemon juice OR 1/4 tsp citric acid per pint

Add them directly to the jars before filling with tomatoes. To offset the taste, add sugar.

Crushed Tomatoes (No Added Liquid)

- 22 lbs for 7 quarts
- 14 lbs for 9 pints

Bushel = 53 lbs, 17-20 quarts

Wash and dip them in boiling water for 30-60 seconds until the skin splits. Then dip them quickly in cold water, slip off the skins and remove the cores.

Trim off any bruised or discolored parts and quarter them. Heat a few in a large pot, and crush with a wooden mallet or spoon as you add more tomatoes to the pot. Once these first few are boiling, add the rest to the pot and stir constantly.

Boil gently for 5 minutes, and add bottled lemon juice or citric acid.

Fill the jar, and leave 1/2" HS, and RWAP.

Standard Tomato Sauce

For Thin Sauce:

- 35 lbs for 7 quarts
- 21 lbs for 9 pints

Bushel = 53 lbs, 10-12 quarts

For Thick Sauce:

- 46 lbs for 7 quarts
- 28 lbs for 9 pints

Bushel = 53 lbs, 7-9 quarts

This process is similar to making tomato juice.

Simmer in a large saucepan until it's your desired consistency. Boil until its volume is reduced by almost 1/2 for thick sauce, and 1/3 for thin sauce. Add bottled lemon juice or citric acid, and add 1 tsp salt per quart if you want.

Fill the jar, leave about 1/4" HS, and RWAP.

Easy Hot Sauce

- 8 cups canned/diced tomatoes undrained
- 1-1/2 cups seeded, chopped Serrano peppers
- 4 cups distilled white vinegar (5%)
- 2 tsp canning salt
- 2 tbsp whole mixed pickling spices

Yield: 4 half-pints

When dealing with hot peppers, don't touch your face. Always wash your hands with soap before touching the eyes (or anywhere else on your face).

You can also wear plastic or rubber gloves.

Place some mixed pickling spices in a spice bag, and tie the ends firmly. Mix all the ingredients in a Dutch oven or a large saucepan. Boil and stir occasionally. Let it simmer for 20 minutes until the tomatoes are soft. Then press them through a food mill or sieve. Return the liquid to the pot, and heat to a boil for 15 minutes.

Fill the jar, leave 1/4" HS, and RWAP.

Asparagus

- 24.5 lbs for 7 quarts
- 16 lbs for 9 pints

Crate = 31 lbs, 7-12 quarts

Make sure you pick asparagus that are 4-6" long, and are tender, tight-tipped spears.

Wash and trim off the tough scales, and break off the tough part of the stems. Wash them again. You can either can them whole or cut them into 1” pieces.

For hot packing, cover the asparagus with boiling water for 2-3 minutes. Loosely fill with 1” HS.

For raw packing, fill the jar as tightly as possible with 1” HS.

And RWAP.

Carrots

- 17.5 lbs for 7 quarts
- 11 lbs for 9 pints

Bushel (w/o tops) = 50 lbs, 17-25 quarts

Get the small carrots, and wash, peel and rewash them. You can either slice or dice them.

If you’re hot packing, cover with boiling water, bring to a boil, and let it simmer for 5 minutes. Fill with 1” HS and RWAP.

If you’re raw packing, fill the jar tightly with 1” HS and RWAP.

Corn

- 31.5 lbs (in husks) for 7 quarts
- 20 lbs for 9 pints

Bushel = 35 lbs, 6-11 quarts

Ideally, you want ears that are slightly immature. They’re jumping on the bed after lights out, throwing temper tantrums… oh, not that kind of immature.

Well, you know what I mean.

Husk the corn, remove the silk and wash it off. Blanch for 3 minutes in boiling water. Cut the corn from the cob — about 3/4 of the entire kernel. Don't scrape it off. Please.

For a hot pack, add 1 cup of hot water for every quart of kernels in the saucepan. Heat it to a boil, and let it simmer for 5 minutes. Add 1 tsp salt per quart, and fill the jar with 1" HS.

For a raw pack, don't press down on the kernels or shake them down. Fill it up as much as you can with 1 tsp salt per quart, and fill with 1" HS.

And, as always, RWAP.

Mixed Vegetables

- 6 cups sliced carrots
- 6 cups cut, whole kernel sweet corn
- 6 cups cut green beans
- 6 cups shelled lima beans
- 4 cups whole/crushed tomatoes
- 4 cups diced zucchini

Yield: 7 quarts

You can also substitute with other veggies, EXCEPT:

- Leafy greens
- Dried beans
- Cream-style corn
- Squash
- Sweet potatoes

Wash, trim, slice and combine all the veggies in a large pot. Add enough water to cover it all. Add 1 tsp of salt per quart. Let it boil for 5 minutes, and fill the jar with 1" HS.

And RWAP.

Mushrooms

- 14.5 lbs for 9 pints

- 7.5 lbs for 9 half-pints

Don't you dare can those wild mushrooms.

Instead, get the brightly-colored, medium-sized domestic mushrooms with short stems, unopened caps and ZERO discoloration. That's how you're going to make sure you don't die from eating mushrooms.

Trim off the stems and discolored parts, and let the mushrooms soak in cold water for 10 minutes to remove any dirt. Wash them in clean water, and leave the small ones whole — cut up the big ones. Cover with water in a saucepan, and let it boil for 5 minutes. Fill with 1" HS and add 1/2 tsp of salt per pint.

For better color on the mushrooms, add 1/8 tsp ascorbic acid powder OR 500 mg tablet of vitamin C.

And RWAP.

Sweet Potatoes

It is NOT recommended to dry pack sweet potatoes.

- 17.5 lbs for 7 quarts
- 11 lbs for 9 pints

Bushel — 50 lbs, 17-25 quarts

Put in a can within 1-2 months after harvest. And pick the small- to medium-sized potatoes. You want them mature, not too fibrous, and not too sweet.

Wash them and boil or steam until they're partially soft (about 15-20 minutes). Remove the skins and cut the medium potatoes so that all the pieces are similar in size. Don't you dare mash or puree the pieces.

Fill the cubes of potatoes with 1" HS, and add 1 tsp of salt per quart.

And RWAP.

Meat Stock (Broth)

For beef — saw and crack the fresh beef bones, rinse them and place in a large stockpot. Cover the bones with water, and cover the pot and let it simmer for 3-4 hours. Remove the bones, cool the broth and pick off the meat. Skim off the fat and add meat trimmings to the broth, and reheat to boiling. Fill the jars with 1" HS and RWAP.

For chicken and turkey — put the bones in the stockpot, and add water to cover the bones. Cover the pot and let it simmer for 30-45 minutes or until the meat can strip away easily from the bones. Remove the bones, cool the broth, strip the meat, discard the excess fat and return the meat trimmings to the broth. Reheat to boiling. Fill the jars with 1" HS and RWAP.

Dill Pickles

Use for each gallon capacity of container.

- 4 lbs 4" pickling cucumbers
- 2 tbsp dill seed OR 4-5 heads fresh/dry dill weed
- 1/2 cup salt
- 1/4 cup vinegar (5%)
- 8 cups water OR (optional) 2 cloves garlic, 2 dried red peppers, 2 tsp whole mixed pickling spices

Wash the cucumbers, and cut off the blossom end and discard it. Leave about 1/4" of the stem attached. Place half of the dill and spices on the bottom of the container. Then add more cucumbers and the remaining dill and spices. Dissolve the salt in vinegar and water, and pour that over the cucumbers.

Add a cover (like a dinner plate) and weight (other jars). Store the cucumbers between 70-75 degrees F for 3-4 weeks. If you're in a cooler place, 55 degrees F is OK, but it'll take 5-6 weeks. And you don't want them to be over 80 degrees F — they'll turn as soft as a doughy beer gut on a 45-year-old man.

If you regularly remove the mold and surface scum, and keep them in a fridge, these pickles can last in the original container up to 6 months. But canning them is better.

Pour the brine into a pan, heat it to a boil, and let it simmer for 5 minutes. Filter the brine through a paper coffee filter to reduce the cloudiness (if you want).

Fill the canner with 1/2” HS and RWAP.

Quick Fresh-Packed Dill Pickles

- 8 lbs of 3-5” pickling cucumbers
- 2 gals water
- 1-1/4 cups canning/pickling salt (divided)
- 1-1/2 qts vinegar (5%)
- 1/4 cup sugar
- 2 qt water
- 2 tbsp whole mixed pickling spice
- 3 tbsp whole mustard seed (1 tsp per pint jar)
- 14 heads of fresh dill (1-1/2 heads per pint jar) OR 4-1/2 tbsp dill seed (1-1/2 tsp per pint jar)

Yield: 7-9 pints

Wash the cucumbers and cut off the ends.

Dissolve 3/4 cup of salt in 2 gallons of water, and pour this over the cucumbers. Let it stand for 12 hours. Drain them out, and combine the vinegar, 1/2 cup of salt, sugar, and 2 quarts of water. Add the mixed pickling spices, and heat to a boil. Fill the jars with cucumbers, and then add 1 tsp mustard seed and 1-1/2 heads of fresh dill per pint. Cover with a boiling pickling solution, and leave 1/2” HS.

And RWAP.

Quick Sweet Pickles

- 8 lbs of 3-4” pickling cucumbers
- 1/3 cup canning/pickling salt
- 4-1/2 cups sugar
- 3-1/2 cups vinegar (5%)
- 2 tsp celery seed
- 1 tbsp whole allspice
- 2 tbsp mustard seed
- 1 cup pickling lime (optional)

Yield: 7-9 pints

Slice and cut them into strips. Place in a bowl and sprinkle the concoction with 1/3 cup salt. Cover with a couple of inches of crushed or cubed ice. Put in the fridge for 3-4 hours and add ice if needed. Drain it well.

Combine the sugar, vinegar, celery seed, allspice, and mustard seed in a 6-quart kettle. Heat it to a boil.

For hot packing, add the cucumbers and heat slowly until the vinegar solution returns to a boil. Stir it occasionally to make sure the mixture heats up evenly. Fill the jars, and leave 1/2" HS.

For a raw pack, fill the jar and add hot pickling syrup. Leave 1/2" HS.

And RWAP.

How to Test Jelly: Sheet or Spoon Test

Dip a cool metal spoon into a boiling jelly mix, and raise the spoon 12" above the pan — basically, out of the steam. Turn the spoon so the liquid runs off the side. It's done when the syrup forms two drops that flow together. It should form a sheet, or should hang off the edge of the spoon.

Skim off the foam after you remove it from the heat.

Pear-Apple Jam

- 2 cups peeled, cored, finely chopped pears (2 lbs)
- 1 cup peeled, cored, finely chopped apples
- 6-1/2 cups sugar
- 1/4 tsp ground cinnamon
- 1/3 cup bottled lemon juice
- 6 oz liquid pectin

Yield: 7-8 pints

Crush the apples and pears in a large saucepan and stir in the cinnamon. Thoroughly mix the sugar, lemon juice and fruits, and bring it all to a boil over high heat, stirring constantly. Immediately stir in the pectin. Bring it to a rolling boil, and let it boil hard for 1 minute. Leave 1/4" HS and RWAP.

Blueberry Spice Jam

- 2-1/2 pints ripe blueberries
- 1 tbsp lemon juice
- 1/2 tsp ground nutmeg/cinnamon
- 5-1/2 cups sugar
- 3/4 cup water
- 1 box powdered pectin

Yield: 5 half-pints

Wash and crush the blueberries, one layer at a time, in a saucepan. Add lemon juice, spice and water. Stir in the pectin, and bring to a rolling boil over high heat, stirring frequently.

Remove from the heat, skim off the foam, and fill the jars with 1/4" HS. And RWAP.

Grape Plum Jelly

- 3-1/2 lbs ripe plums
- 3 lbs ripe Concord grapes
- 1 cup water
- 1/2 tsp butter/margarine to reduce foaming (optional)
- 8-1/2 cups sugar
- 1 box powdered pectin

Yield: 10 half-pints

Don't peel the plums — just wash and pit them. Crush the grapes and plums one layer at a time in the saucepan with water. Boil it and let it simmer under a cover for 10 minutes. Strain the juice through a jelly bag or a double layer of cheesecloth. Measure the sugar, and set it aside. Combine 6-1/2 cups of juice with butter and pectin in a large

saucepan. Bring it to a hard boil, stirring as often as you see a mosquito in the summer — constantly.

Add sugar and return it to a full rolling boil — go hard for 1 minute. Remove from the heat and skim off the foam. Fill the jar with 1/4" HS, and RWAP.

The Ultimate Guide to Beekeeping

Before starting, make sure you contact people in your area first. They know what to do with your local bees. And ask your neighbors and friends if they're allergic to bees. It might not work out well if your child always needs an Epipen around the house because of your hobby.

As for location, you don't want the hives too low because of the cold and damp air. And you don't want them too high or else the wind will force them to never return to the hive. Keep it close to flowers, plants and water — not your neighbor's swimming pool.

When to Examine The Colony

The best time is when there's a good nectar flow going on. The older workers are hunting for food, so there are less bees in the hive. You can use this time to check and see how everyone's doing.

Don't check in the summer. There are more bees in the hive, and they'll be defensive since they'll see you as a robber trying to steal honey from them.

Don't leave the colony open for more than a few minutes.

It also depends on the mood of the bees, which depends on the weather and the time of day. Angry bees will attack when it's…

- Rainy weather
- Cool temperatures
- Early morning
- Late afternoon

Instead, inspect during the following times:

- Sunny days

- Middle of the day

Most Important Tool

Smoke. That's it. Use it in moderation, and spray it in the…

- Entrance of the hive
- Smoke frames while the hive is open

Always work quickly and carefully. Puff a little bit of smoke into the entrance of the hive first. Start on the lower box first. Lean the frame against the hive, and remove the honey.

Oh, and gloves are stupid. You might lose control of the hive. Just get in there. The pain will go away — you wuss.

Clothing/Equipment

- Veil — never remove when you're in the hive
- Avoid dark/rough textured clothes — wear something smooth, white/light colored
- Overalls
- Boots over coveralls
- Windbreaker jackets
- Make sure your pants, veil, and sleeves all fasten securely.

If a bee gets into your clothes, squeeze them out through the clothing. Step away and open up the overalls to let them out.

Don't use cologne, hairspray, perfumes or other scented products that might irritate the bees.

Equipment

- 1 metal covered top
- 1 inner cover
- 1 bottom board

- 2 standard 10-frame hive bodies, each body containing 10 frames
- 1 queen excluder
- 2 shallow 10-frame supers with frames
- 1 bee smoker
- 1 hive tool
- 1 pair of bee gloves
- 1 pair of coveralls
- 1 bee veil

Have them all examined by the Apiary Inspection Service

How To Get Bees

Catch them in a jar like you would a butterfly or fireflies.

One way is to introduce a queen bee ASAP to the swarm. However, that can be unpredictable.

Instead, you can buy an entire established colony, or a few bees with a queen in a separate container.

How to Manage Your Queen

If the colony isn't going well, introduce a new queen. But the colony might kill her, so place her in a cage with wire gauze around it, and let the worker bees eat the candy entrance to the queen so they can save her. Working with bees and their queen is just like a video game or a mythical story about saving the queen from the castle (except this time it's guarded by a candy entrance).

You can mark the queen with your own color-coded system.

Also, rather than attempting to raise a queen bee yourself, save yourself the trouble and just buy a couple of queen bees. You'll be better off in the long run.

Substitutes for Nectar

- 1 part sugar, 1 part water

OR

- 2 parts sugar, 1 part water late in the season for the winter time

OR

- high fructose corn syrup

Feed them to each colony individually at night.

And don't spill any, or else robber bees will come and snatch them away.

Pollen Substitute

Brewer's yeast plus 50% sucrose syrup

Place these patties wrapped in wax paper inside plastic bags to keep them wet. You can also feed the yeast dry without the syrup.

Use this as a backup plan in the wintertime. A fatter bee will produce more in the winter — but natural pollen will help them produce more.

If You Live in the Suburbs…

Your neighbors better love you and support your decision to have bees in your hood.

Bees only fly 3-4 feet off the ground to find food. Force the bees to fly above a fence or a plant hedge at least 6 feet off the ground.

Make sure the hive is in a sunny location, and the hive is elevated about 4-6" off the ground for good air flow and to keep the bottom board dry.

And always have a constant warm water supply nearby.

Bacterial Diseases

- American Foulbrood
- European Foulbrood

The American Foulbrood, or AFB, is the most serious disease.

The larvae look chocolate brown and they melt into a gooey mass on the floor of the cell. If you poked a stick into the mass, it'll look like melted cheese coming out. And it smells terrible.

To prevent AFB, always use new equipment and clean your tools regularly.

The European Foulbrood, or EFB, is another disease that's not as serious as the AFB. The larvae have an off-white color that turns into brown over time, and they're twisted in various positions in the cell. They usually die before they're capped. The disease will go away on its own over time.

To prevent EFB, stimulate the nectar flow by re-queening the colony. Or add terramycin/

For most other viruses, use these preventative measures:

- Clean your tools.
- Re-queen your colony.
- Replace the old combs.

Pests

Varroa mites are the worst. They look like ticks, and they ruin the drone bees.

For Varroa mite treatment…

- Fill a quart jar 1/4 full of bees.
- Cover the jar.
- Insert a 2-second blast from an aerosol oil cooking spray OR aerosol ether-based engine starter fluid.
- Shake for 20 seconds.
- Turn the jar on its side, and look for mites on the side of the jar.
- Remove the bees.

- Rinse the jar in alcohol.

You can also use CheckMite+ strips. These are pieces of waxed paper sprayed with aerosol oil cooking spray and covered with a square of mesh wire on the bottom board. Check it after one hour for mites.

You can also have a local NCDA bee inspector check out your hive for Free.

How To Deal With Bee Stings

Don't pull the stinger out, since that'll produce more bee venom.

Instead, scrape the stinger out with a fingernail. Puff a little smoke in the sting area, and get away from the hives.

Wash with water to remove the odor. Apply sting relief medication or a cold compress.

A natural solution: Add 1 part meat tenderizer to 4 parts water. Put this on for no more than 30 minutes. Then run cool water on it 10-30 minutes after spraying the solution on the sting.

Raw onions or taking any antihistamine orally should work. Hydrocortisone creams also soothe the pain.

If anything, don't you dare scratch the bee sting. It'll get infected. Wait it out for 4-5 days.

Processing Honey

Look out for:

- Watery honey running from open cells.
- Bubbly honey.
- Honey weeping through the caps.

If you're selling the honey, you have to have Trading Standards inspect every little detail. But if you're not, don't worry about the feds.

All you have to do is keep the floors and surfaces washed.

The temperature should range between 70 - 95 degrees F. The hotter it is, the more runny the honey will get. Lower temperatures make the honey thicker.

How To Cut Comb Honey

You can cut the honey out of the frame and eat with a wax comb. The super frames (aka main frames) are fitted with a thin foundation. Lay that frame on a clean tray, and cut out the whole comb with a sharp knife. Don’t use the hollow parts at the edge.

Then, store in a deep freeze in special plastic boxes.