



*Principles of*

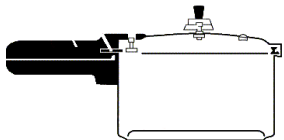
# Home Food Preservation

Presented by:  
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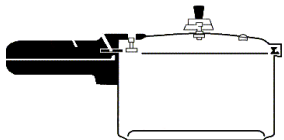
# Food Preservation

- Freezing
- Dehydrating
- Canning
  - Boiling water canning
  - Pressure canning
  - Pickling
  - Jams & Jellies



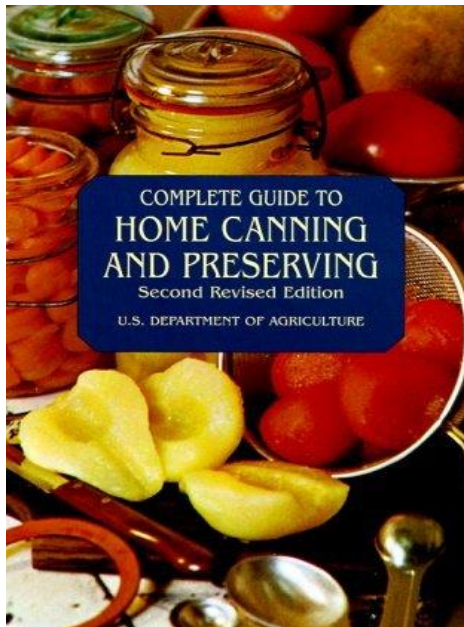
# Food Safety No. 1 Priority

- Use only research tested recipes
  - USDA Complete Guide to Canning
  - USU Fact Sheets
  - NCHFP
  - Ball Blue Book



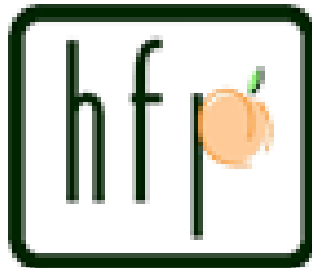


# Research Tested Recipes

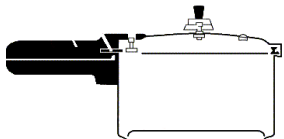


<http://www.rrc.ksu.edu>

<http://www.freshpreserving.com>



<http://www.homefoodpreservation.com>



# Why foods spoil

- Yeast
- Molds
- Bacteria
- Enzymes



## Home Canning Safety

**What makes food spoil?**  
*Bacteria, molds, yeast, enzymes*



**What makes people sick?**

- Bacteria
- Improper canning can result in botulism poisoning, which causes illness and sometimes death.
- Improper storage and handling of canned food

**What should home canners know?**

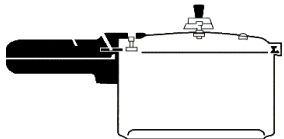
- Few bacteria thrive in acids.
- Use heat to process all home-canned foods:
  - *high-acid foods in a boiling-water canner*
  - *low-acid foods in a pressure canner*

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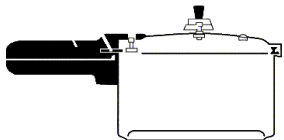
# Types of Preservation

- Freezing
  - Best nutrient retention
  - Quickest
- Drying
  - Most space-efficient
- Canning
  - Best for large quantities



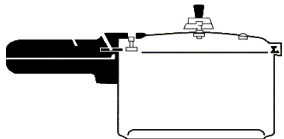
# Freezing Guidelines

1. Freeze foods at 0°F or lower.
  - 24 hours in advance of freezing large quantities of food, set freezer at -10°F or lower.
2. Freeze foods immediately after prep.
3. Do not overload freezer with unfrozen food.
  - ✦ Freeze amount that will freeze in 24 hours (2 to 3 pounds of food per cubic foot).
4. Pack already frozen foods together so they do not thaw.



# Freezing Guidelines, cont.

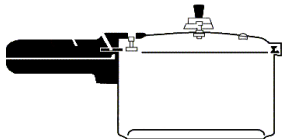
5. Place unfrozen foods in contact with surfaces and in coldest parts of freezer.
6. Leave space around packages so cold air can circulate.
7. When packages are frozen, organize freezer into types of food.
8. Arrange frozen foods so that the foods frozen longer can be used first.
9. Keep a frozen foods inventory up to date.
10. Check thermometer periodically.





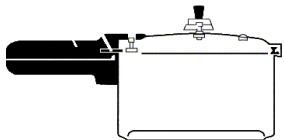
# Sweetened Packs for Fruit

- Syrup Pack
  - Better texture.
  - Not needed for safety.
  - Fruits should be covered with syrup.
    - Place crumpled water-resistant paper in top of container.



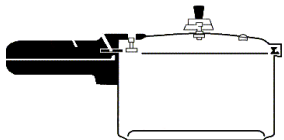
# Sweetened Packs for Fruit

- Sugar Pack
  - Sliced soft fruits (strawberries, peaches, etc.) make their own syrup when mixed with the right proportion of sugar.
  - Layer fruit and sugar in bowl or pan.
  - Allow mixture to stand 15 minutes to make juice or “syrup” before packaging.



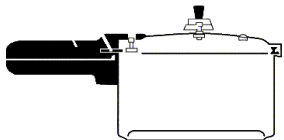
# Unsweetened Packs for Fruit

- Dry Pack
  - Good for small whole fruits such as berries that don't need sugar.
  - Simply pack into containers and freeze.
  - Or may be frozen individually, in single layer, on a tray first.
    - “Tray pack”



# Drying

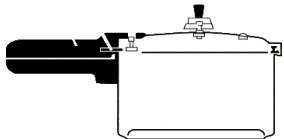
- Optimum temperature for drying food is 140°F
- If higher temps are used, food cooks instead of drying
- Avoid “case hardening” – dried outside and moisture is trapped inside – mold results





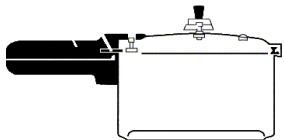
# Drying Out-Of-Doors

- Sun Drying
  - Dry fruits, high sugar & acid make them safe
  - Don't dry vegetables or jerky/meat outdoors
  - Need hot, dry, breezy days
  - Temp of 85°F. or higher, for several days with humidity below 60%
  - Need to cover, watch materials used and control for insects and pests



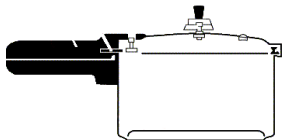
# Room Drying

- Herbs, hot peppers, & nuts in shell are most common air dried foods
- Herbs & peppers – strung on string or tied in bundles and suspended from overhead racks in air until dry.
- Can enclose in paper bags, with openings for air circulation
- Spread nuts in single layer on paper



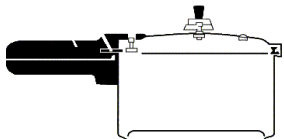
# Oven Drying

- Dehydrators most efficient, but also most expensive investment
- Ovens: slower than dehydrators, unless you have a convection oven, which has a fan
- Take 2 times longer to dry in oven than dehydrator...oven not as efficient and uses more energy



# Using Your Oven

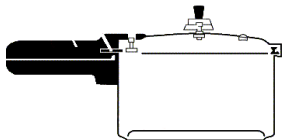
- Dial needs to go down to 140°F
- Leave oven door propped open 2-6 inches
- Best if you place a fan outside oven door
- Oven temp varies...so need accurate oven thermometer to be sure 140 is achieved
- Trays should clear sides of oven & 3-4" shorter front to back of oven, 2-3" between racks in oven





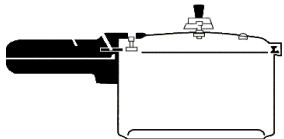
# Safe Canning

- Processing temperature
- Processing time
- Sealed lid



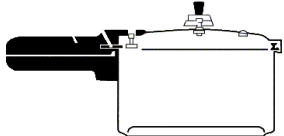
# Determining Safe Processing

- Acid level
- Container & size
- Preparation method
- Consistency of food
- Altitude
- Research



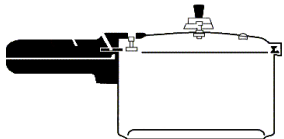
# Items and methods NOT recommended for canning

- Herbs or vegetables in oil or oil and vinegar infusions. (Flavored vinegars OK)
- “Canned” bread (completely dry mixes eg. brownie and cookies without oil, water or eggs are OK)
- Chocolate sauces/ fudge sauces
- Pumpkin butter
- Decorative, untested, jars



# Items and methods NOT recommended for canning

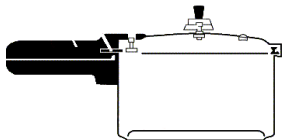
- Turning jars upside down to seal
- Oven canning
- Microwave canning
- Steam canning
- Open-kettle canning
- Slow cookers
- Canning powders





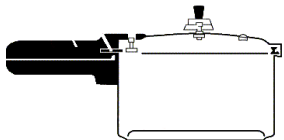
# Acid Level

- pH 4.6. or lower = acid food = BWC processing
- pH above 4.6 = low acid food = pressure processing
- Why? – botulism!



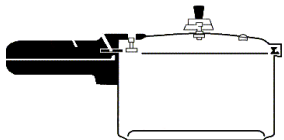
# High Acid Foods

- pH 4.6. or lower
- Use **Boiling water canner**
- Temperature reaches 200-212°F
- Tomatoes/salsa, jams, fruits, pickles



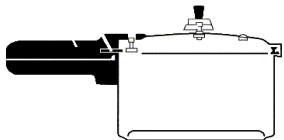
# Low Acid Foods

- pH above 4.6.
- Use **Pressure canner**
- Temperature reaches 240-250°F
- Vegetables, meat, soups, etc.



# Containers

- Mason jars best choice
- 4, 8, 16, and 32 oz. common
- 64 oz. only for juice
- 2-piece metal lids

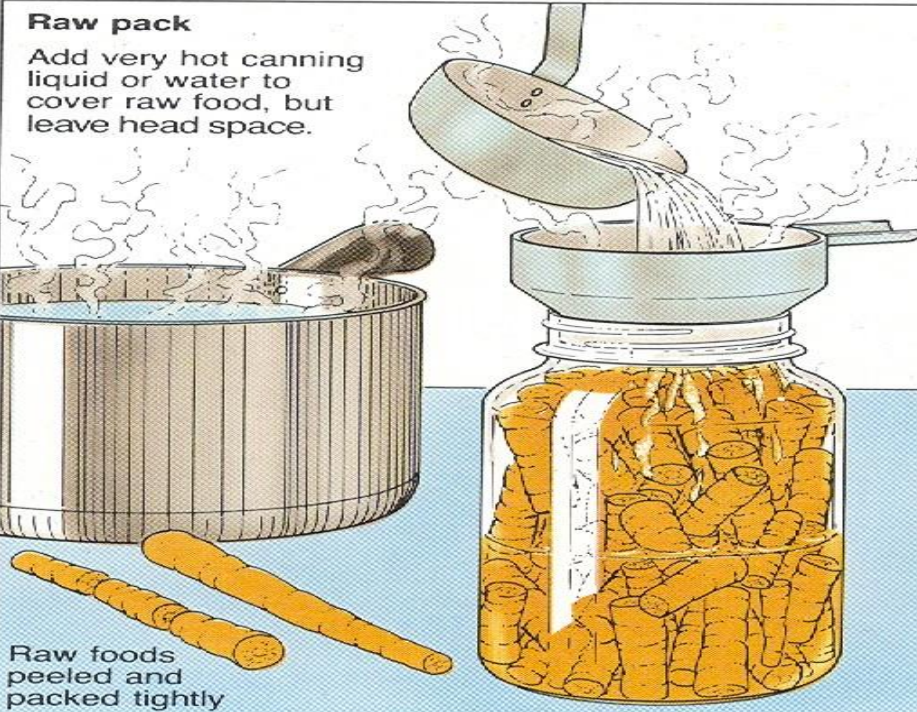




# Raw Pack & Hot Pack

## Raw pack

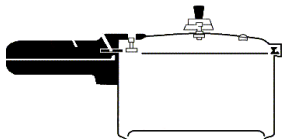
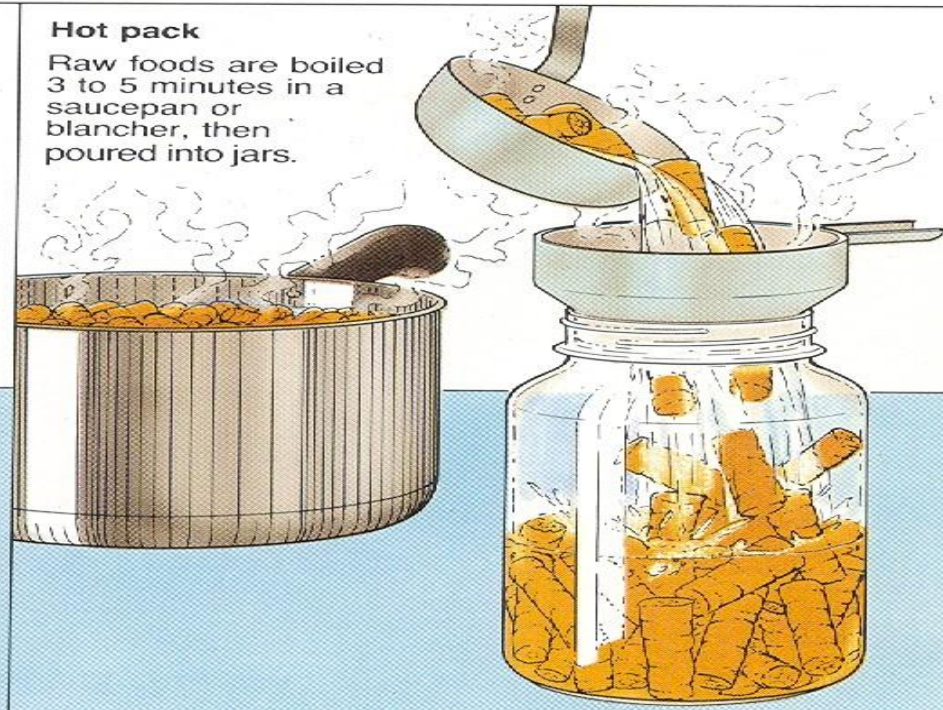
Add very hot canning liquid or water to cover raw food, but leave head space.



Raw foods peeled and packed tightly

## Hot pack

Raw foods are boiled 3 to 5 minutes in a saucepan or blancher, then poured into jars.





# Raw Pack & Hot Pack

## Raw pack

Add very hot canning liquid or water to cover raw food, but leave head space.

### Disadvantages:

- Floating food
- Air bubbles
- Discoloration over time

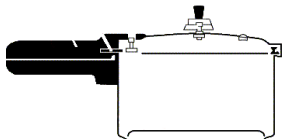
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## Hot pack

Raw foods are boiled 3 to 5 minutes in a saucepan or blancher, then poured into jars.

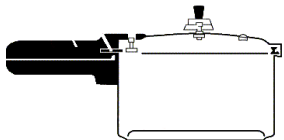
### Disadvantage:

- Texture loss



## 2 Piece Metal Lids

- Always use new lids
- Hand tighten
- Too loose (leaks)
- Too tight (no vacuum)





# Sealing

- Remove air bubbles
- Wipe rim
- Preheat lid (soften sealing compound)
- Attach lid
- After processing  
hear seal “pop”  
remove screw band

1. Add salt, if desired



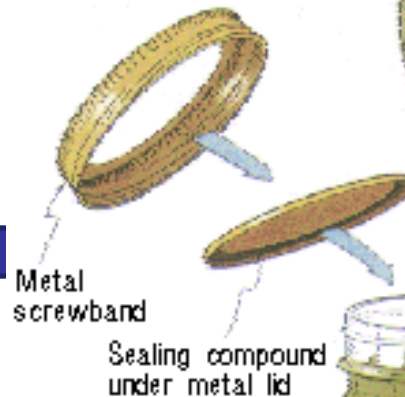
2. Remove air bubbles with plastic utensil



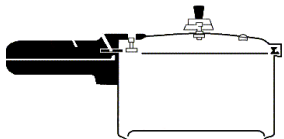
3. Wipe upper rim of jar completely for a good seal



4. Assemble lid

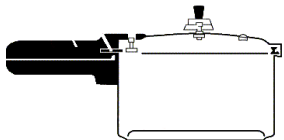


5. Remove screwband for reuse after processing and jar has cooled



# Consistency of Food

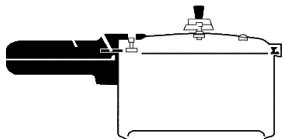
- Affects heat penetration
- Liquid always required
- Reason some foods cannot be canned
  - cubes vs slices
  - pumpkin butter
  - no added thickeners
  - no pasta or noodles



# Altitude

- Affects temperature reached when boiling
- It is temp. reached and not the action of boiling that kills microorganisms
- Higher altitudes need longer boiling water time or higher pressures in pressure canner
- Always use tested recipe/process

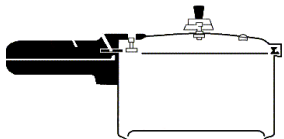
Altitude (in feet)	Temperature when water boils
10,000	194°F
8,000	197°F
6,000	201°F
4,000	204°F
2,000	208°F
0 (Sea Level)	212°F





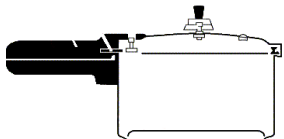
# When to can

- Low quality foods make low quality preserves
- Always preserve the freshest foods (within hours of harvest)
- Before canning:
  - Some fruits may be allowed to fully ripen off the vine
  - Some meats may be refrigerated for 1-2 days



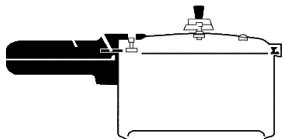
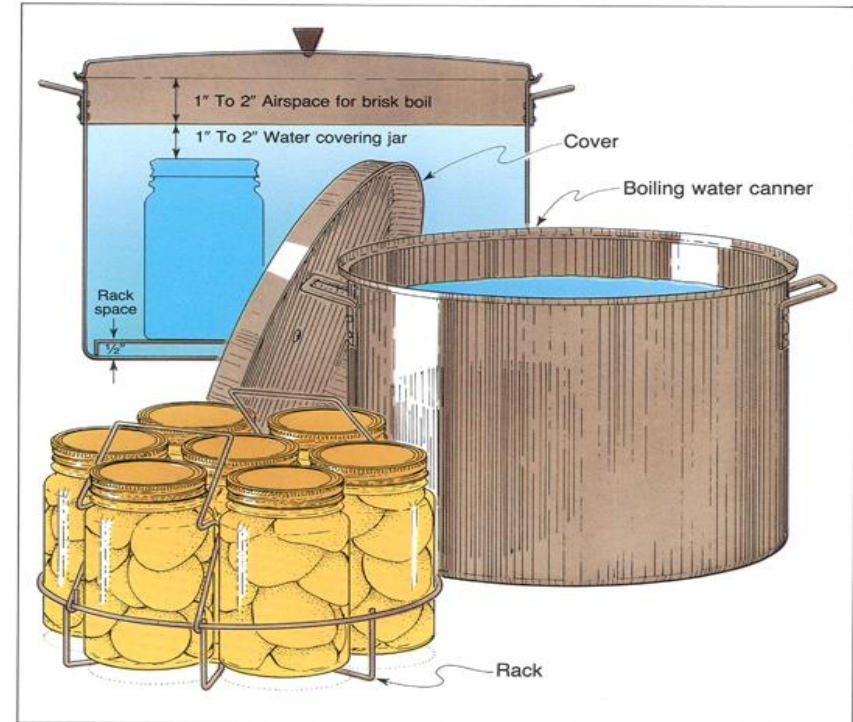
# Preparing Jars

- Wash jars before every use in clean soapy water
- Rinse well
- Sterilize jars and lids in boiling water only when boiling water canning less than 10 minutes



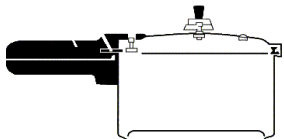
# Boiling Water Canner

- Aluminum or porcelain-covered steel
- Flat bottom
- Not more than 2" wider than burner
- Jar rack or bottom rack needed



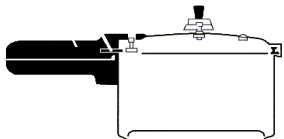
# Boiling Water Canning

1. Fill canner halfway with water.
2. Preheat to 140°F for raw pack and 180°F for hot packed foods.
3. Load filled jars with lids into rack and then lower into water.
4. Add more boiling water to cover jars at least 1 inch.
5. Turn heat to highest setting until water boils vigorously.
6. Start timer once water boils vigorously.



# Boiling Water Canning

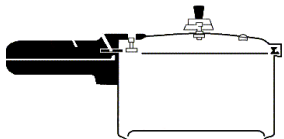
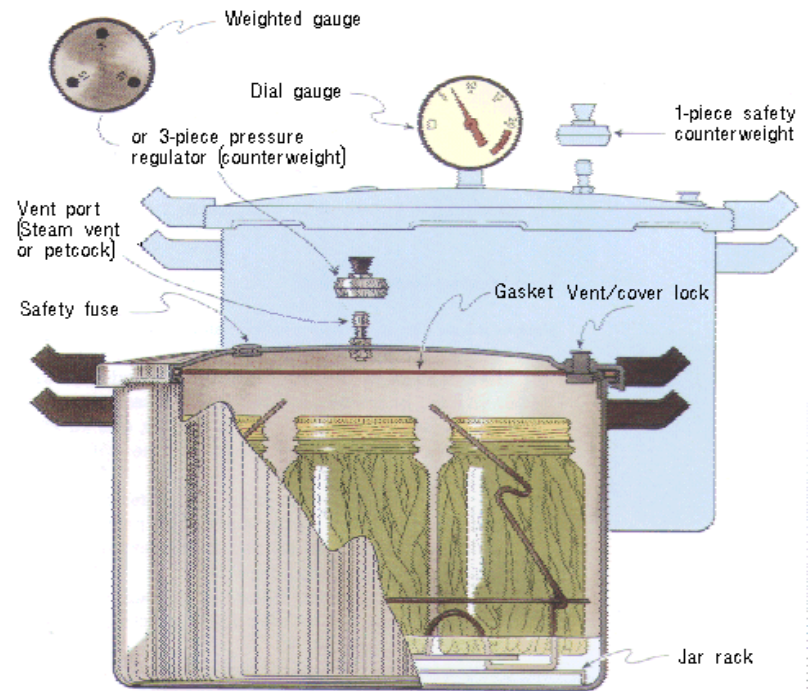
7. Cover and turn down heat until gently boiling.
8. Add more boiling water as needed.
9. When time is up turn off heat and remove lid.
10. Remove from canner and set on a towel at least 1 inch apart to cool.
11. After lids seal (pop) remove screw bands.





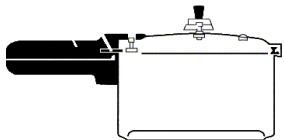
# Pressure Canner

- Aluminum or steel
- Lid with gasket
- Flat or concave bottom
- Weighted or dial gauge
- (check dial gauge annually)
- Pressure safety valve
- Jar rack



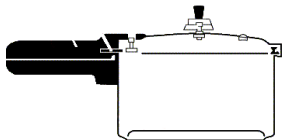
# Pressure Canning

1. Put 2-3 inches of water in canner, lower rack of filled and lidded jars into canner and fasten cover securely.
2. Heat until steam escapes from vent port.
3. Let steam vent for 10 minutes, then place weight on vent port or close petcock. Allow to pressurize.
4. Begin to time when recommended pressure is reached.
5. Adjust heat to regulate a steady pressure on gauge.



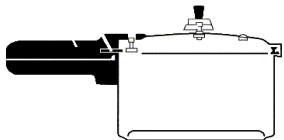
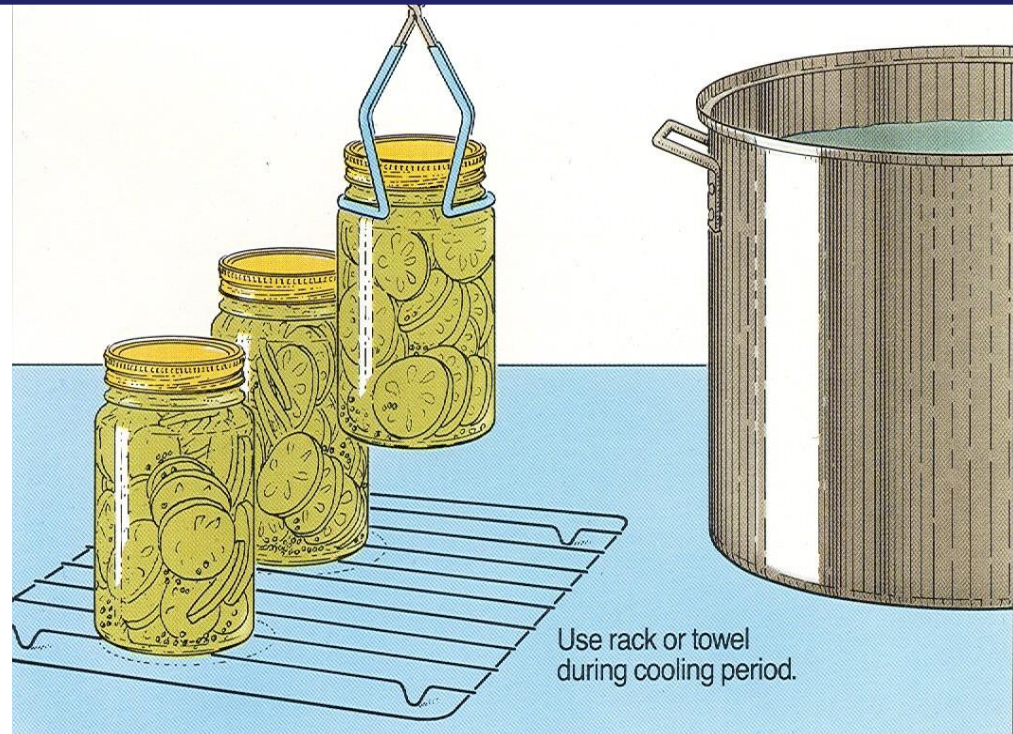
# Pressure Canning

6. If pressure drops below required amount, reset time to zero.
7. When time is completed, turn off heat and let the canner depressurize. DO NOT force-cool the canner-may result in food spoilage.
8. After canner is depressurized, remove the weight from the vent. Wait 5 minutes, remove lid and avoid steam.
9. Remove jars and place on towel or rack to cool.



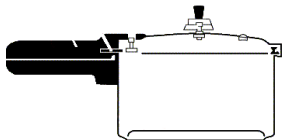
# Cooling Jars

- Do **NOT** retighten lids
- Cool at room temp.  
12-24 hours on a rack  
or a towel





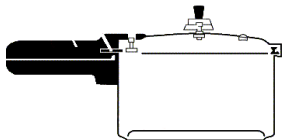
# Testing Seals





# Reprocessing

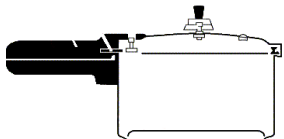
- If any jar fails to seal or is suspected of not being fully and properly processed it **MUST** be -  
-immediately refrigerated, then reprocessed (full time with new jars or lids within 24 hours) or eaten



# Storing Canned Foods

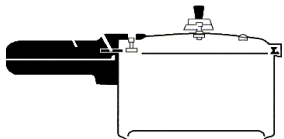
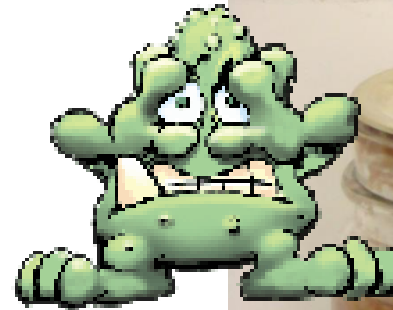
- Remove screw band
- Label and date jar
- Do not allow to freeze or overheat
- Shelf life: 12-18 mos. boiling water canned & 18-24 mos. for pressure canned

**Clean  
Cool  
Dark  
Dry**



# Spoilage of Canned Foods

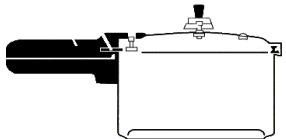
- Check for swollen lid or seal breakage.
- When opening look, smell, and listen for anything unusual:
  - off smells
  - spurting liquid



# Remember!



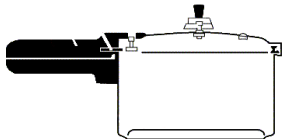
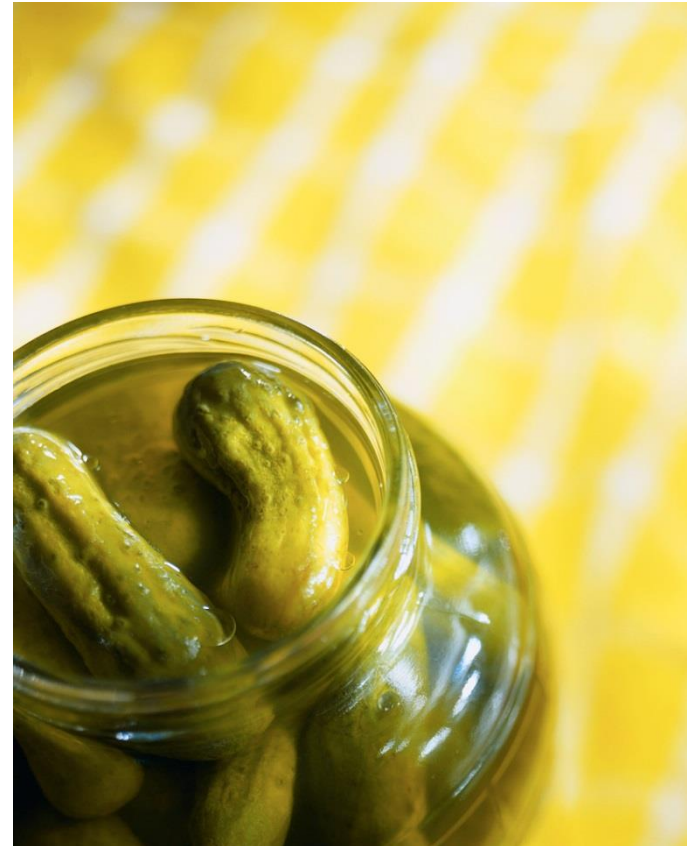
- Keeping food safe is your #1 Priority
- Always use the freshest ingredients
- Use Mason Jars with new lids
- Test gauge yearly
- If in doubt... Throw it Out!



# Questions?

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*Authors: Judy Harris, Debra Proctor, and Brian Nummer  
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