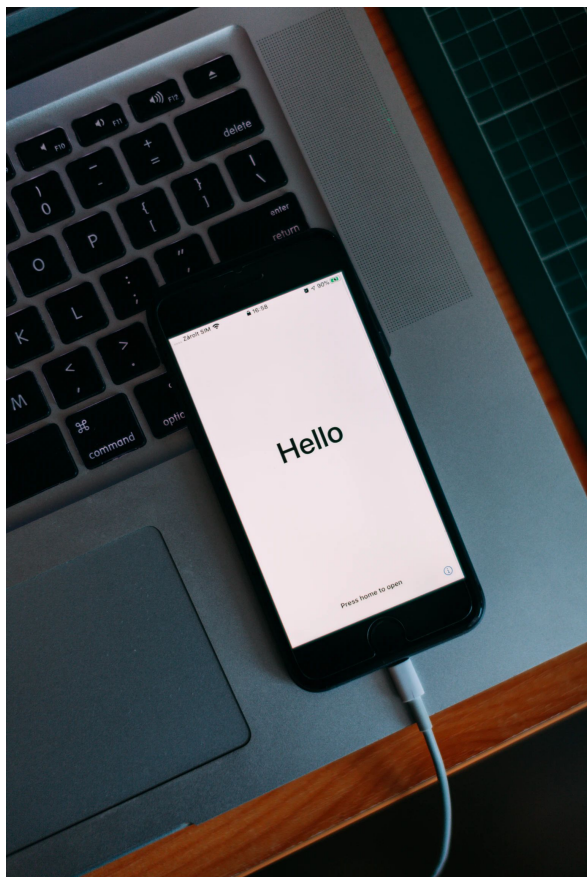


# Home Canning Basics

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# Housekeeping



- Presentation is being recorded - will be emailed to you
- Please remain muted
- Please use Chat Function anytime to send questions or comments
- Visit [gaston.ces.ncsu.edu](http://gaston.ces.ncsu.edu) to join our mailing list and see resources
- Google slides will be shared with you after SurveyMonkey completed

# Trends in Home Canning

- Local foods movement
- Concerns of food safety
- Taste
- Convenience
- Gift ideas



# How Canning Works

Exposes food to heat-process:

- kills microorganisms
- inactivates enzymes

Creates airtight seal:

- prevents recontamination of food



# Home Canning Methods

- Boiling water canning
- Pressure canning

Method determined by acidity of food.



# Acidity of Foods

pH	
1	
2	Pickles
3	Plums Apples, Blackberries Peaches Sauerkraut Pears
4	Tomatoes
5	Okra Carrots Beets, Turnips Green Beans, Spinach Asparagus Lima Beans
6	Peas
7	Corn

**High Acid Foods:  
Process at 212°F in a  
Boiling-Water Canner**



**Low Acid Foods:  
Process at 240°F in a  
Pressure Canner**



## Follow Recipe Exactly

- Prepare food as directed in recipe
- Don't improvise with amount of ingredients
- Follow process times exactly
- Size of jar, size of food, consistency of liquid all have effect on heat penetration





# Altitude Adjustment

- Temperature decreases at a given pressure as altitude increases
- Increase pressure, as altitude increases
- Dial Gauge
  - 0 - 2000 ft: 11 psi
  - 2001 - 4000 ft: 12 psi
  - 4001 - 6000 ft: 13 psi
  - 6001 - 8000 ft: 14 psi
- Weighted Gauge
  - Altitude adjustment requires increase of 5 psi pressure
  - 1001 ft and above: process at 15 pounds pressure





# Unsafe Canning Practices

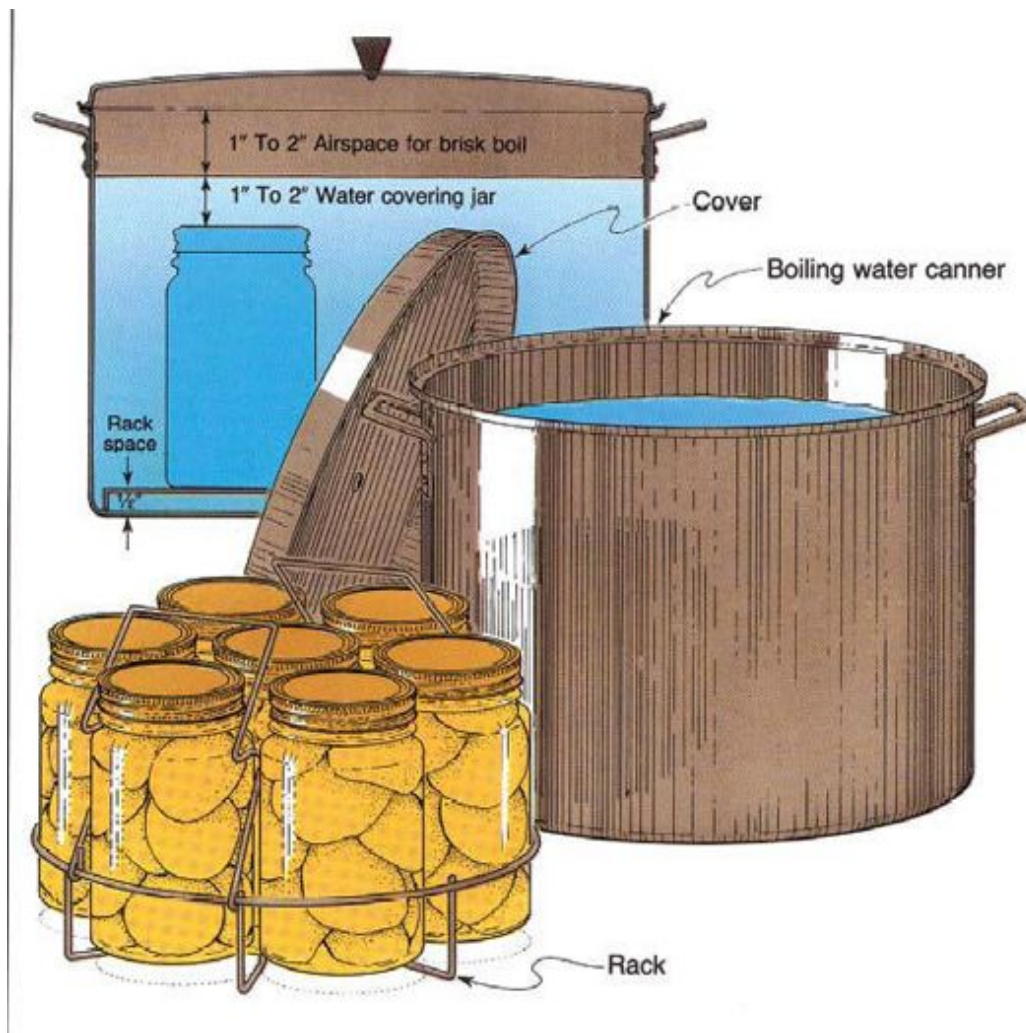


- Open kettle method
- Steam canning
- Slow cookers
- Ovens
- Dishwashers
- Microwave
- Sun
- Pressure saucepans



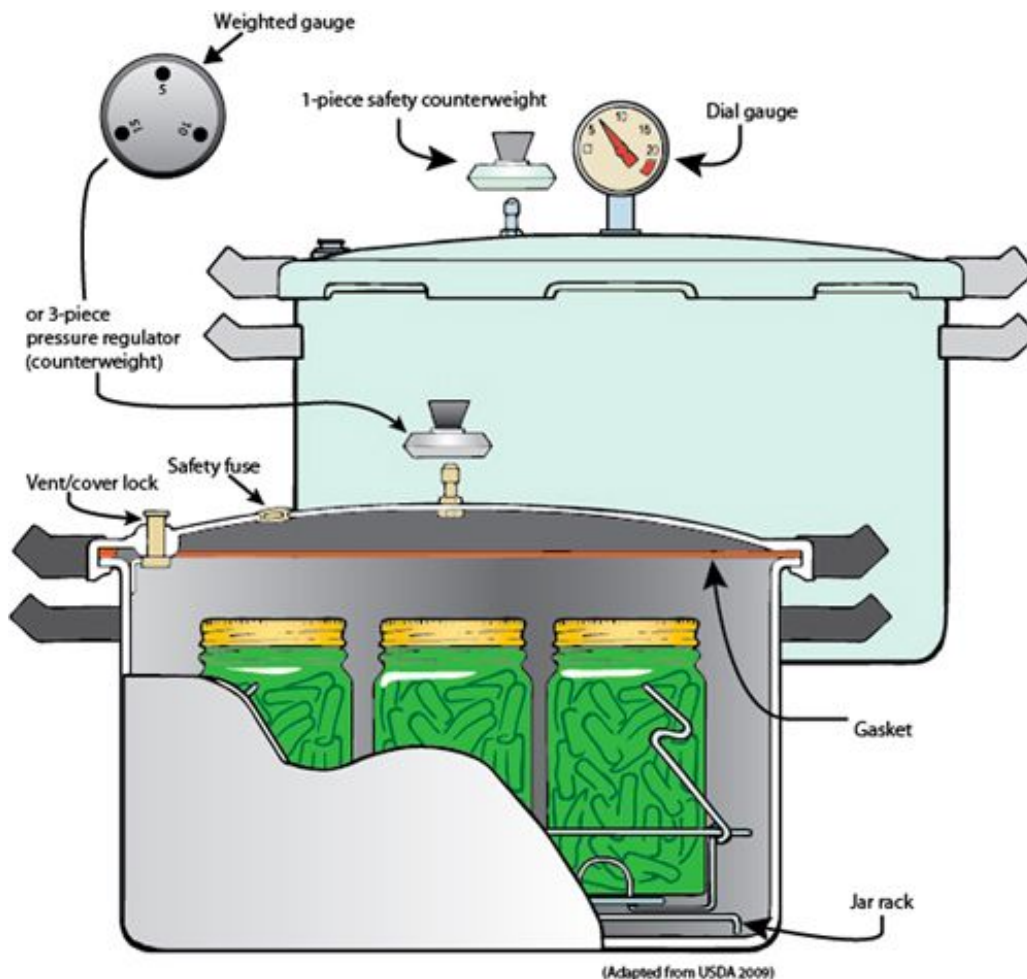
## Boiling Water Bath Canner

# Parts of Boiling Water Canner



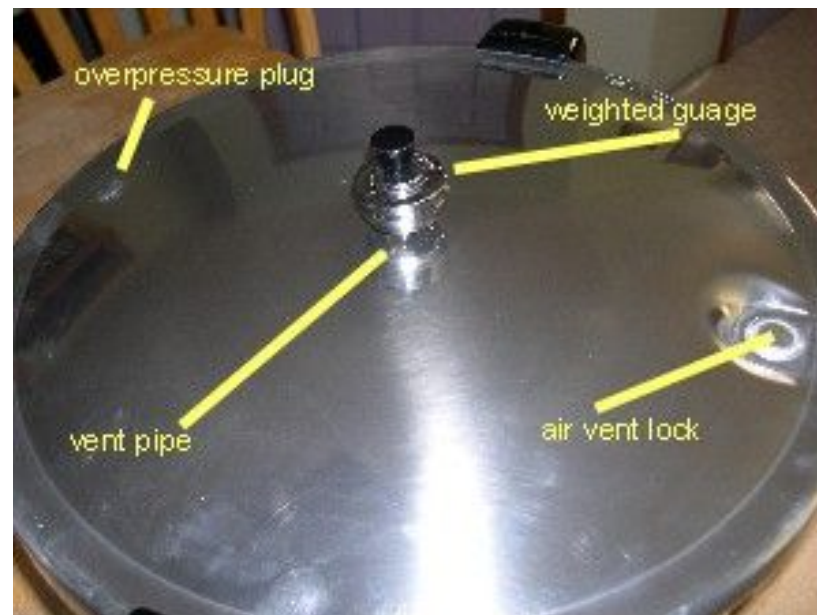
# Parts of Pressure Canner

## Dial Gauge & Weighted Gauge





# Parts of Pressure Canner





## Weighted Gauge



- Regulates pressure inside canner
- Pressure regulator fits on open vent
- Continues to allow some air to be released from canner during process
- Can't be tested for accuracy
- Requires increase of 5 psi pressure for altitude adjustments
- Two types of Weighted Gauges
  - One piece
  - Three piece



## Dial Gauge



- Indicates pressure inside canner
- Must be checked for accuracy
- More flexible in altitude adjustments - small psi increments
- Has dead- or counter-weight to close open for pressurizing
  - Not to be used for indicating pressure
- Pressure is increased or decreased by adjusting heat



# Pressure Canner vs. Pressure Cooker



**DO NOT** use a pressure cooker as  
substitute for pressure canner!



# Knowing your Pressure Canner

- Read instructions thoroughly prior to first time
- Some assembly required upon first use
- Clean and remove manufacturing oils
- Check gasket
- Lightly coat exposed gasket and lugs with cooking oil if necessary
- Check that vent pipes are clear and open before **EACH** use

# Equipment

- Large stock pot or canner
- Canning jars
- Closures & lids
- Wooden spoons
- Knives
- Food Brushes
- Saucepans
- Measuring cups & spoons
- Nonmetallic spatula
- Colander or strainer
- Tongs
- Magnetic lid wand



# Equipment (cont'd)

- Scales
- Timer
- Jar Lifter
- Jar Funnel
- Food mill
- Electric puree device
- Cutting board
- Food processor or grinder
- Crock - for pickles



# Canning Jars

- Often called “mason jars”
- Unique threaded neck
- Only mason jars are recommended for canning
- Wide mouth vs. regular mouth





# Jars and Lids



- Check for nicks, cracks, rough edges
- Can't reuse flat lid
- Keep hot until used
- Remove air bubbles
- Wipe jar lids with wet, clean jars
- Re-adjust headspace if needed
- Adjust two-piece lid 'fingertip tight'

# Closures

Two-piece metal closure includes:

- Screw band
- Flat metal lid – cannot be reused







# Methods of Packing



## Hot Packs

- Preferred method for most foods
- Food cooked prior to putting in jars
- Water should be simmering when jars are placed in canner
- If directions only list hot pack method, use hot pack

## Raw Packs

- For food that loses shape when cooked
- Place unprocessed foods in jars, then boiling water over
- Water should be hot
- Pack firmly

# QUESTIONS ..so far?



# Boiling Water Canning



# Boiling Water Canning

Suitable for high acid foods:

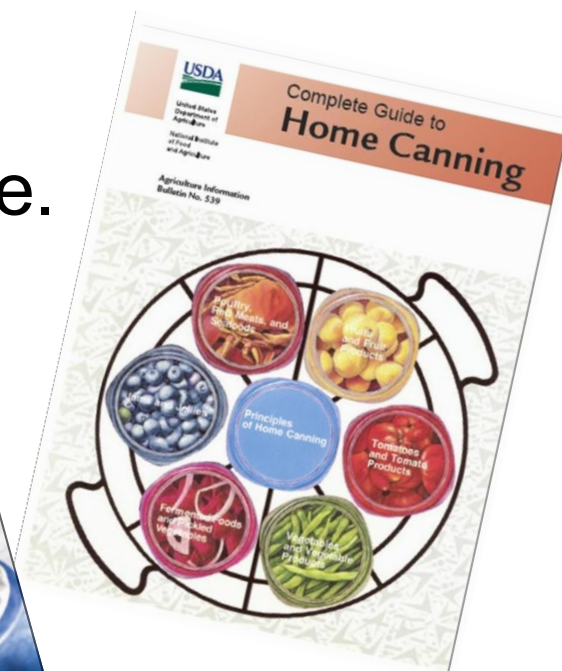
- Fruits
- Pickles
- Soft spreads
- Tomatoes
- Figs



# Select Your Recipe

## Step: Select Recipe

- Ensure recipe is research-based.
- Read directions thoroughly.
- Gather all necessary supplies.
- Do not experiment and alter recipe.





# Prepare Your Gear

## Step: Preparing Jars and Bands

- Wash jars, lids, and screw bands in hot soapy water.
- Rinse with warm water.



# Boiling-Water Canning



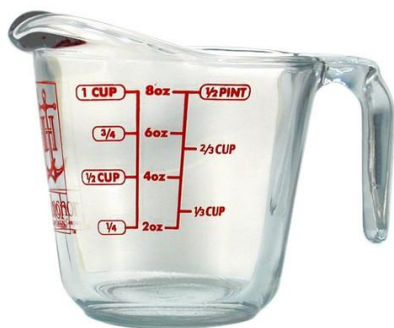
## Step: Preparing Recipe

- Prepare recipe.
- If prep and cooking time is more than 30 minutes – then prepare before heating jars and lids.



## Step: Measure Your Ingredients

- Measure exact amounts
- Know your measurements (pints, quarts, gallons, etc.)
- Have measuring tools: liquid and dry measuring cups, spoons, food scales



# Boiling-Water Heat Processing

## Step: Preparing Lids and Bands

- Fit lids in screwband; place in saucepan.
- Place in water – enough to cover lids.
- Keep on low, simmer. Do not boil.



# Boiling Water Heat Processing

## Step: Preparing Jars

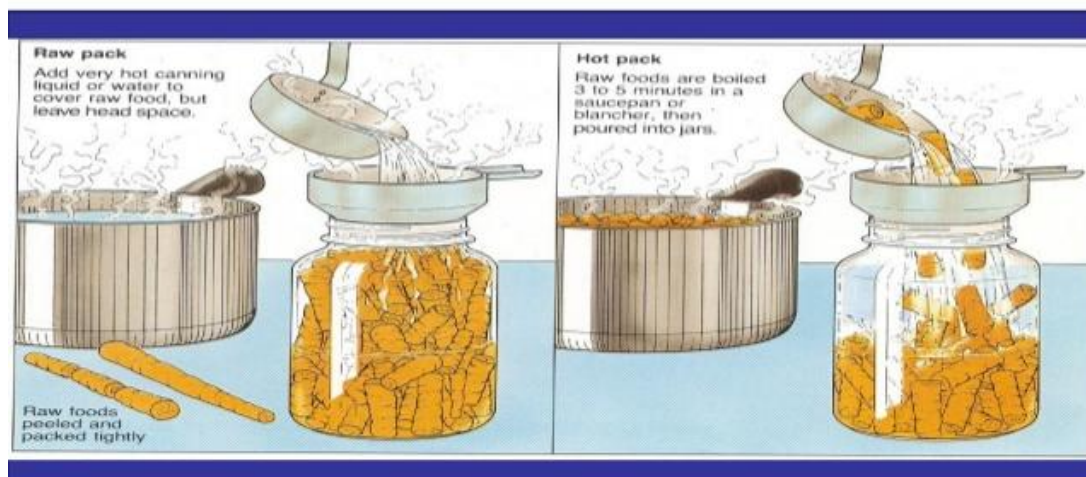
- Fill canner half-full with water.
- Add jars to canner.
- Make sure enough water to cover 1-inch over jars.
- Heat to simmer.



# Raw Pack Method

- Ideal for foods that lose shape when cooked.
- Place raw, unheated food directly in jars.
- Boiling liquid is poured over food to obtain proper headspace.

## Raw Pack & Hot Pack



# Hot Pack Method

- Preferred method for most foods.
- Fewer jars needed.
- Less floating.
- Better color and flavor.
- Easier to pack, foods pliable.





## Hot Pack Method

- Heat food to boiling.
- Pack hot food and boiling hot liquid in jars.
- Foods hot packed should be packed fairly loosely.
- Ideal for tomatoes, large fruits: apples, peaches, pears & plums.



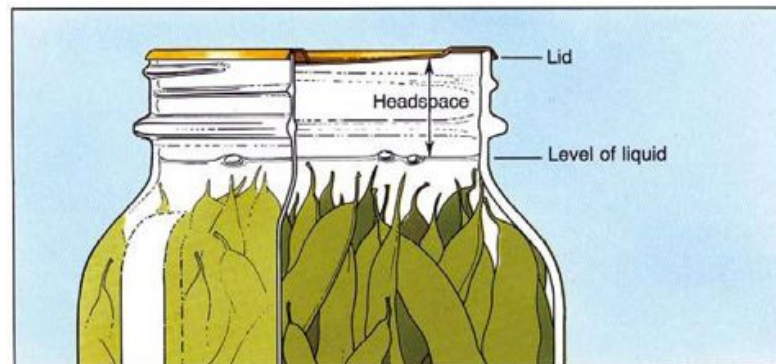
## Step: Fill jars one at a time:

- Ladle quickly into prepared jar.
- Follow recipe for correct fill-level (headspace).
- Remove air bubbles.
- Wipe jar rim and threads.
- Cover with 2-piece lids.
- Screw bands hand-tight.
- Place jar back in water.
- Repeat process until all jars are filled.



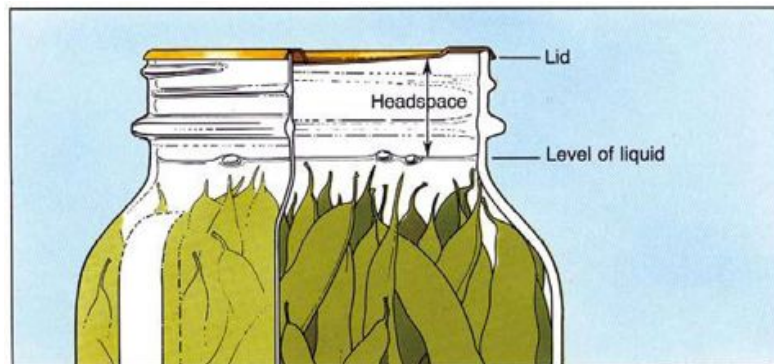


# Headspace



- Unfilled space above food and below lid.
- See recipe instructions for amount.
- Usually:
  - $\frac{1}{4}$ " - jellied fruit products
  - $\frac{1}{2}$ " - fruits, tomatoes and pickles
  - 1" to 1- $\frac{1}{4}$ " low acid foods

# Headspace



## Too little:

- Food may bubble out during processing.
- Deposit on rim may prevent proper sealing.

# Headspace



## Too much:

- Food at top is likely to discolor.
- Jar may not seal properly, because not all air may be forced from jar during process.



# Preserve Your Food

## Step: Process properly:

- Ensure that jars are covered by 1-inch of water.
- Cover pot with lid and heat to a steady boil.
- Boil jars for time specified in recipe.
- Time begins when consistent boil reached.
- Adjust for altitude if necessary.



# Boiling-Water Canning

## *Step - continued:*

- When water comes to a rolling boil, start counting processing time.
- Rapid boil must continue for duration of processing time.



# Boiling-Water Canning

## Step:

- At end of processing time, turn heat off and remove canner lid.
- Let canner cool for 5 minutes.





# Preserve Your Food

## Step:

- Remove jars from water without tilting jars.
- Cool jars **upright** on wire rack or towel on countertop for 12-24 hours.



# Boiling-Water Heat Processing

## Step:

- Check lids for seal – after processed jars have cooled for 12- 24 hours.



# Boiling-Water Canning

## Step:

- After 12 hours, check lids for seal.
- Remove screw bands and press down on center of each lid with finger.
- Sealed lids will be concave and show no movement when pressed.



# Boiling-Water Canning

## Step:

- Jars that have not sealed properly must be refrigerated or re-processed immediately.
- Rinse and dry screw bands.



# Boiling-Water Canning



## Step:

- Jars with good seals should be cleaned and labeled before storage.
- Store canned goods in a cool, dark place.



# QUESTIONS ..so far?



# Pressure Canning



# Acidity of Foods

pH

1

2

3

Pickles

Plums

Apples, Blackberries

Peaches

Sauerkraut

Pears

4

Tomatoes

5

Okra

Carrots

Beets, Turnips

Green Beans, Spinach

Asparagus

Lima Beans

6

Peas

7

Corn

**High Acid Foods:  
Process at 212°F in a  
Boiling-Water Canner**



**Low Acid Foods:  
Process at 240°F in a  
Pressure Canner**



## Low Acid Foods

- Generally all vegetables
- Meats, poultry, seafood
- Soups
- Mixed canned foods



# Canning Low Acid Foods

Temperature of 240°F or above needed to destroy *Clostridium botulinum* spores...can only be reached in pressure canner.





# Step-by-Step Pressure Canning

## Step: Select Recipe

- Ensure recipe is research-based.
- Read directions thoroughly.
- Gather all necessary supplies.
- Do not experiment and alter recipe.



# Step-by-Step Pressure Canning

## Step: Preparing Jars and Bands

- Wash jars and screw bands in hot soapy water.
- Rinse with warm water.



# Step-by-Step Pressure Canning

## Step:

- Place rack in pressure canner.
- Add 2 to 3 inches of water to canner.
- Place jars in canner.



# Step-by-Step Pressure Canning

## Step:

- Bring water to a simmer over medium heat and maintain simmer until ready to use jars.
- Do not boil.



# Step-by-Step Pressure Canning

## Step: Preparing Lids and Bands

- Fit lids in screwband; place in saucepan.
- Place in water – enough to cover lids.
- Keep on low, simmer. Do not boil.





# Step-by-Step Pressure Canning

## Step: Filling Jars

- Prepare recipe.
- Remove jars one at a time to fill.
- Leave headspace.
- Remove air bubbles.
- Wipe jar rim as needed.



# Step-by-Step Pressure Canning

## Step: Filling Jars

- When all jars are filled, adjust water level in canner as needed.
- Place lid on canner and lock into place.
- Leave weight off vent pipe.



# Step-by-Step Pressure Canning

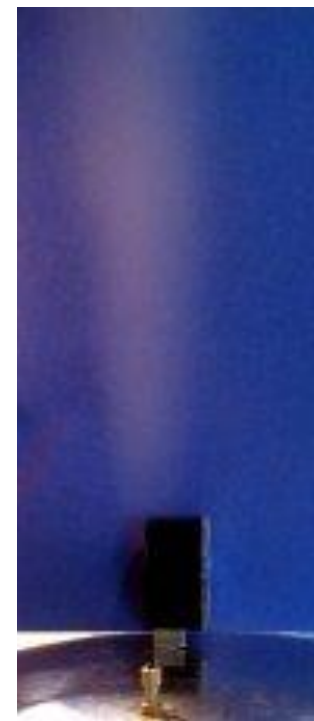
## Step:

- Over medium-high heat, bring water to boil.
- Water is boiling when steam starts coming out of vent in steady stream.
- Vent steam from canner for 10 minutes.



# Venting the Canner

- Also called “exhausting” the canner.
- Eliminates air from canner so processing takes place in a pure steam environment.
- USDA instructs to vent ALL pressure canners.
- Without proper venting, up to 30% of sterilizing value of a 20-minute process may be lost.



# Venting the Canner

- Steam must flow freely from open vent port in lid for 10 minutes prior to pressurizing:
- After putting filled jars in pressure canner, fasten lid in place.
- Leave ventport open and turn heat on high.



# Venting the Canner

- When water boils, steam will start to come out of open vent.
- Wait until there is a constant, strong funnel of steam, then start timing 10 minutes.
- At end of 10 minutes, place weight in place to start pressurizing canner.





# Step-by-Step Pressure Canning

## Step:

- Bring pressure to appropriate level based on your altitude instructions



# Step-by-Step Pressure Canning

## Step:

- With weighted gauge, start processing time when weight jiggles 2 – 3 times per minute or maintains a slow, steady rocking motion.



# Loss of Pressure

- Results in under-processing.
- If pressure drops below target anytime during process time, bring canner back up to pressure and start timing process over from beginning.



# Fluctuating Pressure

- Large and/or quick variations in pressure during processing may cause loss of liquid from jars.
- If variation is a drop in pressure after process has begun, process must be started over.



# Step-by-Step Pressure Canning

## Step:

- When processing time is up, turn off burner.
- Allow pressure to drop to 0 by itself.
- When pressure is at 0, open vent or take off weighted gauge.



# Step-by-Step Pressure Canning

## Step:

- Let jars sit in canner for 10 minutes to adjust to lower temperature in room.
- Open canner – away from face.





# Step-by-Step Pressure Canning

## Step:

- Remove jars and allow to cool.
- Place jars upright – 1 to 2 inches apart in draft-free place.
- Let cool, undisturbed for 12 to 24 hours.



# Step-by-Step Pressure Canning

## Step:

- Check lids for seal – after processed jars have cooled for 12 to 24 hours.



# Step-by-Step Pressure Canning

Jars that have not sealed properly must be refrigerated or re-processed immediately.



# QUESTIONS ..so far?



# After the Canning Process



## Storage

- Remove screw bands from vacuum sealed cooled jars
- Wash lid to remove food residue
- Rinse and dry jars
- Label and date jars
- Store in a clean, cool, dark, dry place
- It is unadvised to store above 95°F:
  - Near hot pipes, a range, or furnace
  - Under sink
  - Uninsulated attic
  - Direct sunlight





# When Jars Don't Seal Properly



If not sealed within 24 hours of processing, product must be:

- refrigerated OR
- reprocessed

# Using Home-Canned Food

- Visually check before using.
- Do not use products that have come unsealed, or show signs of spoilage.
- When in doubt, throw it out.



# Storing Home-Canned Foods

Use home-canned foods within 1 year.



# Causes of Spoilage



- Inadequate heat penetration.
- Water not one inch or more above tops of jars.
- Water not kept at a rolling boil.
- Not adjusting processing time/pressure for altitude.

## Causes of Spoilage - cont'd

- Processing time not followed.
- Standard jars and lids not used.
- Cracked or chipped jars used.
- Using “recycled” lids.





# Reasons Jars Do Not Seal



- Jars tilted or turned upside down.
- Lids not properly treated.
- Jars not heat processed.
- Improper processing methods used.
- Fluctuating temperatures
- Rapid cooling.



# Reasons Jars Do Not Seal

- Faulty sealing surface on jar.
- Rusty or bent screw bands used.
- Bands not screwed down properly.
- Food lodged under lid.
- Screw band tightened and then re-tightened after processing.



# QUESTIONS ..so far?



# Soft Spreads

- Butters
- Jams
- Jellies
- Marmalades
- Preserves



*Soft spreads can be processed safely  
in boiling water canner.*

# Key Ingredients in Soft Spreads

## Pectin:

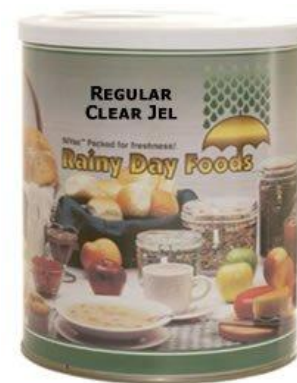
- Natural substance found in varying amounts in fruits that causes jelly to gel.
- Slightly under-ripe fruit contains more pectin than fully-ripe fruit.



# Commercial Pectin

## Advantages:

- Easier for beginners
- Greater yield from measure of fruit
- Better color
- Less chance of failure
- Shorter cooking time





# Without Added Pectin

When making soft  
spreads without  
added pectin, use  
 $\frac{1}{4}$  under-ripe  
and  $\frac{3}{4}$  ripe fruit.





# Key Ingredients in Soft Spreads



## Sugar

- Functions as preservative.
- Do not alter amount used.
- Granulated white sugar most typically used.

# Using Sugar Substitutes

## Artificial Sweeteners

- Cannot be interchanged for sugar in recipes.
- Use a recipe that specifies an artificial sweetener or lower-sugar pectin product.



# Key Ingredients in Soft Spreads



## Acid

- Needed for gel formation.
- Typically higher in under-ripe fruit.
- Lemon juice (commercial – not fresh) or citric acid may be added if more acid required.
- Contributes to flavor and tartness.

# Tips for Success

- Use reliable recipes.
- Follow directions carefully.
- Measure ingredients carefully.
- Never reduce amount of sugar.
- Never double recipe.



# QUESTIONS ..so far?



# Fermented Foods & Pickled Products





# Fermented Foods & Pickled Products



- Brined or fermented pickles
- Fresh pack or quick process pickles
- Fruit pickles
- Relishes

*These foods can be processed safely  
in boiling water canner.*

## Fermented Pickling



- Brined Pickles or Fermented Pickles go through curing process in brine (salt and water) solution for one or more weeks
- Lactic acid produced during fermentation helps preserve product

# Vinegar Pickling (Quick Process/Fresh Pack)

- Fresh Pack or Quick Process Pickles are covered with boiling hot vinegar, spices and seasonings
- Easy to prepare and have tart flavor
- Have better flavor if allowed to stand for several weeks after they are sealed

# Choosing Produce

- Garden fresh – use within 24 hrs after picked
- Cucumbers deteriorate quickly
- Select uniform size



# Choosing Produce

- Use pickling variety of cucumber
- Do not use waxed cucumbers
- Remove 1/16 inch slice from blossom end of vegetables



# Key Ingredients in Pickled Products

## Salt:

- Preserves food.
- Adds flavor and crispness.
- Table salt/iodized salt make brine cloudy.
- Iodized salt may darken pickles.





## Selecting Salt

- Use pure granulated salt or canning & pickling salt
- Do not alter amount used



# Key Ingredients in Pickled Products

## Commercial Vinegar

- Preserves pickles
- Gives tart taste to pickles
- Use 5 - 6% acidity vinegar
- Do not use homemade vinegar



# Selecting Vinegar

- Cider vinegar may discolor
- Do not dilute vinegar
- Do not decrease amount in instructions



# Other Ingredients in Pickled Products

## Sugar

- Provides firmness and flavor
- Use granulated or beet sugar
- Follow directions carefully
- Brown sugar, honey, and maple syrup may be also called for in instructions.



# Selecting Sugar

Sugar substitutes – not recommended unless manufacturer's instructions for pickling are followed.



# Other Ingredients in Pickled Products

## Spices & Herbs

- Provides flavor
- Use only fresh spices and herbs
- Whole fresh spices are preferred
- May used spice bag or cheesecloth to impart flavor





# Other Ingredients in Pickled Products

## Water

- Hard water – negative effect on pickle quality
- Hard water can prevent pickles from curing
- Use soft or distilled water



# Other Ingredients in Pickled Products

## Firming Agents

- Alum - used for firming fermented pickles
- Lime – use food grade, must remove excess lime to make pickles safe
- *Lime and alum not needed for crisp pickles*



# Recommended Firming Method

- Soak cucumbers in ice water for 4 – 5 hrs prior to pickling is safer method.



# Equipment for Fresh Pack Pickles

- Heating pickling liquids: use stainless steel, aluminum, glass or unchipped enamelware saucepan
- Do not use copper, brass, galvanized or iron utensils



# Equipment for Fresh Pack Pickles

- Short-term soaking: use crocks, saucepans, or bowls made from stoneware, glass, stainless steel, aluminum or unchipped enamelware
- Do not use aluminum for soaking vegetables in lime



# Equipment for Fermentation

- Use stoneware crocks, large glass jars or food-grade plastic containers
- Do not use aluminum, copper, brass, galvanized or iron containers
- Large enough for several inches of space between top of food and top of container

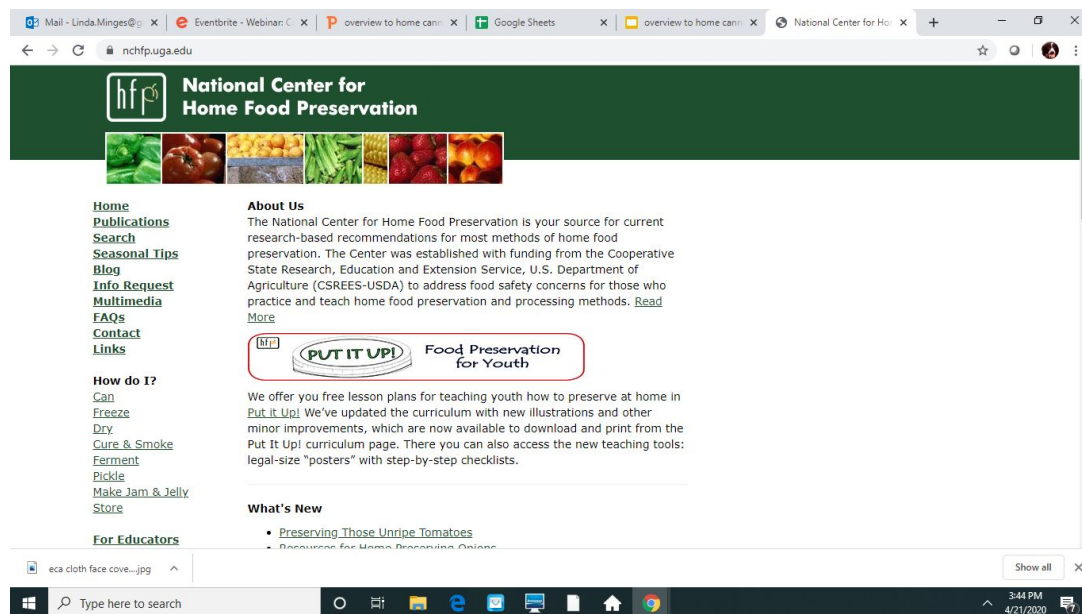




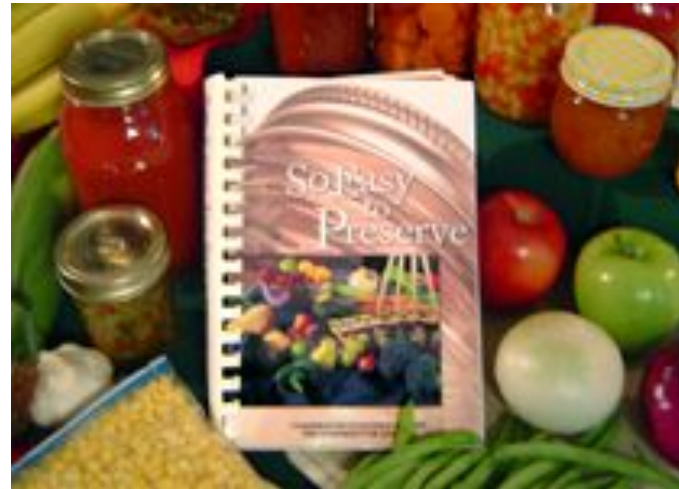
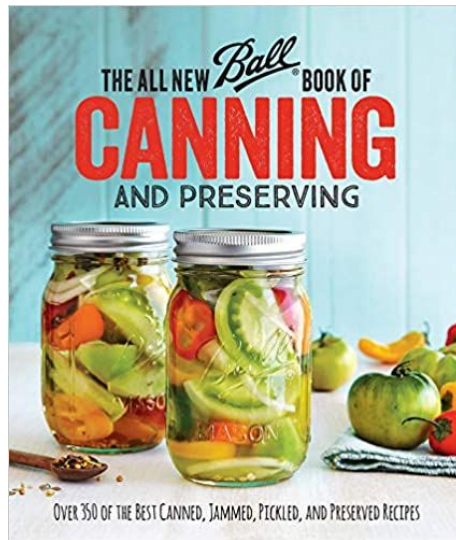
# Canning Resources

National Center for Home Food Preservation

- <https://nchfp.uga.edu/>



# Canning Resources



# QUESTIONS

