The processing equipment needed will depend on the food to be canned or frozen.

The boiling water bath method is a way of canning foods at a temperature of 212°F. This method is recommended for processing fruits, tomatoes, pickles and relishes, and other acid foods. Enough heat is supplied by the boiling water to destroy the bacteria, enzymes, molds, and yeasts which cause spoilage in acid foods.

In canning meats and most vegetables, it takes higher than boiling temperatures to kill bacteria. The pressure canner is designed to keep steam confined until it builds up pressure and a higher temperature is achieved—240°F at 10 pounds pressure.

There are a number of utensils which will be helpful in speeding up the canning or freezing operation. Small vegetable brushes are good for cleaning and washing fruits and vegetables. Large pans or colanders for holding or washing the food are convenient. A jar lifter, a funnel, a ladle with a lip, a sieve or strainer, a food mill, measuring spoons and cups, and a wire steaming or blanching basket are useful items. A food chopper, a blender, and a household scale are helpful for some jobs.

THE PRESSURE CANNER

The first pressure utensils for the home were the large canners. Smaller cookers—sometimes known as pressure saucepans—have been developed for general cooking. These pressure saucepans can be used for canning but are practical only when the amount of food to be processed is small.

The fully loaded canner takes a long time for heating and cooling, and this is taken into account in determining processing times. The pressure saucepan heats and cools more quickly—a big advantage in regular cooking but not in canning, because shortening the processing time may prevent destruction of spoilage organisms. If you use a pressure saucepan, add 20 minutes to the processing time.

Pressure canners and saucepans are made of materials strong enough to withstand pressure. Aluminum, either cast or heavy-gage sheet, is most common. In hard-water areas the inside of an aluminum canner will darken but this does not impair its usefulness.

Covers of pressure canners and saucepans are locked in place so that they cannot be lifted by steam. Older canners are closed with a thumb-screw type closure. Covers on newer canners usually slide into a locked position.

A gauge, whether a dial or a weight, is essential to control pressure. The dial type is used most frequently on canners. Either the dial or the weight with sliding core shows the pressure within the utensil; you must adjust heat to keep the pressure steady. The weight type permits pressure to rise to a definite point and then releases excess steam to keep pressure from going higher.
Gaskets of rubber or a rubberlike material keep steam from leaking out around cover. Most gaskets are removable for replacement.

Safety plugs go into action only if pressure or temperatures become dangerously high. Metal alloy plugs melt when pressure gets too high or canner boils dry. Composition-type plugs are blown out by excessive pressure. Both types are replaceable.

Vents are provided to allow air to be exhausted from the canner and to permit the release of steam as needed. A petcock, safety valve, or weight on the vent is used to control the escape of air or steam.

Checking Out the Pressure Canner

Before the canning season, put water in the canner and bring it up to pressure in the usual way to see that it is in good working order.

Watch for steam leaks. If steam escapes around the cover, examine the sealing edges of utensil and cover; if they are not smooth, clean with fine cleansing powder. If the gasket is reversible, turning it over may improve the seal. A gasket that is worn, stretched, or hardened should be replaced. Leakage makes it difficult to obtain the right pressure and may allow the canner to boil dry.

Have a dial gauge checked for accuracy each session. Many Virginia Cooperative Extension Offices have equipment for testing dial gauges.

Operating the Pressure Canner

Put jars on rack in canner containing 2 to 3 inches of water. More water may be needed for long processing times. Fasten canner cover on securely. Heat the canner rapidly.

Leave petcock open or weight gauge off until steam is coming out in a steady stream--about 10 minutes after the first steam appears. This permits air to be expelled and thus insures that pressure obtained will be true steam pressure.

Close the vent. Watch the gauge closely. When it nears the desired pressure, reduce heat. Adjust heat throughout processing period to keep the pressure constant. When processing time is up, turn off heat or remove canner from heat. Let canner cool until pressure reaches zero. Open petcock or remove weight to let remainder of steam escape. Never hurry the cooling of a canner. This is a frequent cause of loss of liquid from jars.

Loosen the cover as soon as steam stops flowing freely from the vent. Loosening the cover too soon can cause damage to jars and injury to the user. It is sometimes difficult to loosen the cover because of the vacuum which forms in the utensil. Let the canner cool for a few more minutes and try again. Always lift the back edge of the lid first so that escaping steam will be directed away from the face.

Set jars top side up on a rack or folded cloth to cool. Allow space for air to circulate around jars.

Check the seal on the day after canning. If you find a jar which has not sealed, use unspoiled food right away. Or process it again. Check the jar and lid for defects which may have prevented sealing. If using a two-piece metal lid, use a new lid.

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THE BOILING WATER BATH CANNER

Boiling water bath canners are available on the market but any large container may be used if it is deep enough. There should be 2 to 4 inches above the tops of jars to allow water to boil freely. The water bath canner must have a rack and a lid. A pressure canner can be used as a water bath canner if it is deep enough. Put the lid on the pressure canner but do not seal. Leave petcock or safety valve open to allow steam to escape and to prevent the buildup of pressure in the canner.

Using the Boiling Water Bath Canner

Place the boiling water bath canner on heat. Fill with hot water to a depth at least one inch above jars.

Prepare and pack food. Adjust jar lids.

Place the jars of food on the rack in the canner far enough apart to allow the free circulation of water around them. The water in the canner should be boiling and should cover jars to a depth of at least one inch. Start counting processing time when the water again reaches a good rolling boil. Keep the water boiling all during the processing period.

Remove jars from the canner as soon as the processing time is up. Set jars top side up on a rack or folded cloth to cool. Allow space for air to circulate around jars.

PACKAGING MATERIALS FOR CANNING

Glass jars are made in different shapes and sizes and are tempered (strengthened) for heat and cold. The Mason jar is the most widely used type. It is generally made in a round-square shape, and with standard or wide mouth. Mason jars are available in half-pint, pint, quart, and half-gallon size. They have a screw thread neck and a sloping shoulder. The jar with a standard mouth seals on the top or on a sealing shoulder, depending upon the type of lid used. The wide mouth jars seal on top.

Be sure all jars are perfect. Discard any with cracks or chips as these defects can prevent sealing. Wash jars in hot, soapy water and rinse well.

Glass jars and lids need not be sterilized before using if food is to be processed in a boiling water bath or pressure canner. They should be clean. Jars for jellies, jams, and pickles which will not be processed should be sterile.

The two-piece metal lid is a lid and screw band combination. The lid is fitted with a sealing compound, and no other rubber is needed. The lid is used only once but the band may be reused. Most manufacturers recommend that the lid be held in boiling water for a few minutes before use to soften the sealing compound.

To use, wipe jar rim clean after produce is packed. Put lid on with sealing compound next to glass. Screw metal band tight by hand. This lid has enough give to allow air to escape during processing. There is no need to tighten the screw band after taking jars from canner.

Test the seal on the day after canning by pressing the center of lid, or tap with a spoon. The lid should stay down and give a clear, ringing sound when tapped.

The one-piece zinc lid is lined with porcelain. It is used with Mason jars and rubber rings. The flat rubber ring acts as a gasket.

To use, fit wet rubber ring down on jar shoulder but do not stretch unnecessarily. Fill jar; wipe rubber ring and jar rim clean. Screw cap down firmly and then turn it back 1/4-inch. Screw cap down as soon as you take jar from canner.
Test the seal on the day after canning by tilting the jar. Look for leakage around the rubber ring.

**TIN CANS** Some persons prefer tin cans for home canning. Plain tin cans are satisfactory for corn and hominy. Cans with R-enamel are recommended for beets, red berries, red or black cherries, plums, pumpkin, rhubarb, and winter squash. Community canneries stock tin cans for use there. Procedures and times are different for processing in tin cans.

**PACKAGING MATERIALS FOR FREEZING**

Many different packaging materials are used in the freezer. Some do a better job of keeping the food at the peak of quality than others. These are the characteristics of a good packaging material.

1. **It should be moisture and air tight.** No moisture should escape from the package and no outside moisture or air should get into the package.

2. **It should be durable at freezer temperatures.** Some materials like cellophane and waxed paper crack at freezer temperatures.

3. **It should suit the food.** Most fruits and vegetables can be shaped to fit the container, but meats and baked products cannot be.

4. **It should be strong.** This is especially important when wrapping meat.

5. **Some people prefer packaging materials which can be reused.** Certainly, one could afford to pay more for a container that can be used several times.

**MISCELLANEOUS**

**ALTITUDE** affects processing. The times given in this series of leaflets are for use at altitudes of less than 2,000 feet. If the altitude is greater than 2,000 feet, you'll need to increase processing time if using a boiling water bath canner or increase pounds pressure if using a pressure canner. In the **BOILING WATER BATH** canner, add 1 minute to processing times less than 20 minutes; 2 minutes if processing time is more than 20 minutes for each 1,000 foot increase in altitude. In the **PRESSURE CANNER**, process at 11 1/2 lbs. pressure at altitudes of 2,000 to 3,000 feet, at 12 lbs. if altitude is 3,000 to 4,000 feet, and at 12 1/2 lbs. pressure at altitudes between 4,000 and 5,000 feet.

**OPEN KETTLE CANNING** is recommended only for jams, jellies, conserves, marmalades, preserves, relishes, and some pickles. These products contain a large amount of sugar or vinegar which helps preserve them. In the open kettle method, the food is cooked in an uncovered kettle and poured boiling hot into sterilized hot jars. Each jar is quickly sealed before another is filled.

**OVEN CANNING** is NOT RECOMMENDED. There may be a buildup of pressure in the jar which breaks the seal or even, at times, causes the jar to explode. It takes longer for food in the center of the jars to reach the desired temperature than in the boiling water bath so the total processing time would have to be longer. Light fruits may darken before the temperature gets high enough to destroy the enzymes.

Information adapted from USDA Home and Garden Bulletins by Jo Anne Barton, Extension Specialist, Foods and Nutrition.