



Solar pasteuriser

Most of the milk we buy in Australia is pasteurised.

Pasteurisation is a process involving heating liquids rapidly to kill harmful organisms. Interestingly, the liquid does not have to be heated to boiling point for pasteurisation to occur.

Task 1

Work in a small group to build a solar pasteuriser. It must be made from recycled materials and heat water to a temperature of 70 C for 15 minutes to be considered a successful pasteuriser.

What you need:

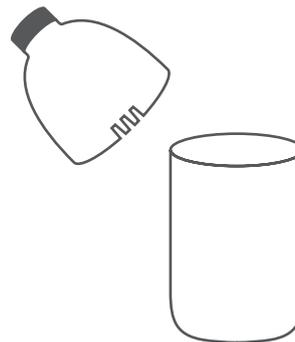
- Clear plastic drink bottle (at least 1 or 1.5 litres)
- Aluminium can (375ml)
- Black paint
- Thermometer
- Cardboard box (or a large piece of thick cardboard) and a 3cm square piece of cardboard
- Aluminium foil
- Scissors and/or craft knife
- Water

Constructing the solar pasteuriser:

Step 1: Paint the can black and set aside to dry.



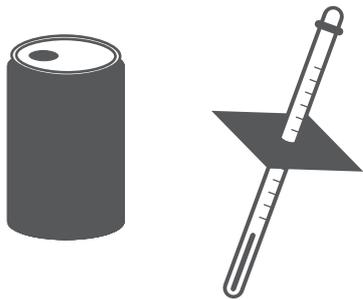
Step 2: Cut the top off the drink bottle. Ensure that the bottle is cut at the widest point to allow the aluminium can to be fitted inside it.



Step 3: Cut three or more tabs (slits) in the top section of the bottle.

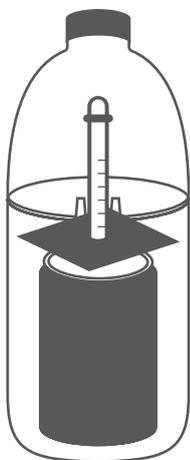
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Step 4: Pierce a hole in the centre of the 3cm square piece of cardboard and insert the thermometer through the hole – the cardboard should sit firmly around the thermometer.



Step 5: Fill the can with water and place the thermometer into the can – the cardboard should rest on the top of the can and the thermometer should stick out enough to be read easily.

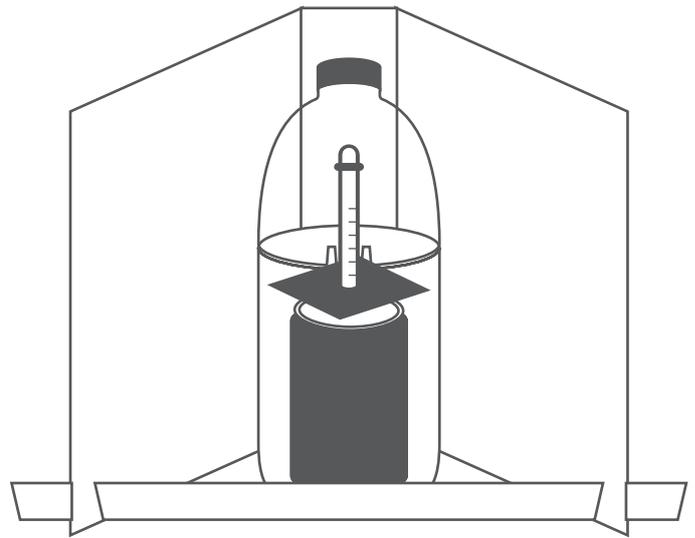
Place the can inside the bottle and put the top section back on the bottle using the tabs (slits) to hold it in place.



Step 6: Place the solar pasteuriser in a sunny position and record the temperature at regular intervals (in Table 1).

If the pasteuriser is not reaching the required temperature (70 C for 15 minutes) follow the additional steps below.

Step 7: Use the guide provided (see page 4) to produce a solar reflector out of the cardboard box (or thick cardboard). Cover the reflector in aluminium foil. If you do not want to make the reflector you can simply cover one side of the bottle with foil.



Step 8: Locate the reflector and pasteuriser in full sun. For maximum effectiveness make sure the shadow of the pasteuriser appears in the centre of the back panel. Rotate the reflector gently to keep the shadow in this position.

Step 9: Record the temperature at regular intervals (in Table 2).

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Name: _____

Record the temperature of the water in the solar pasteuriser in the tables below.

Table 1 – Solar pasteuriser with no reflector

| | | | | | | | | | |
|---------|--|--|--|--|--|--|--|--|--|
| Time | | | | | | | | | |
| Temp °C | | | | | | | | | |

Table 2 – Solar pasteuriser with reflector (or aluminium foil)

| | | | | | | | | | |
|---------|--|--|--|--|--|--|--|--|--|
| Time | | | | | | | | | |
| Temp °C | | | | | | | | | |

Answer the following questions:

1. What was the highest temperature reached without the reflector?
 2. What was the highest temperature reached with the reflector (if used)?
 3. Was the required temperature of 70°C reached?
 4. If yes, was it maintained for the required 15 minutes?
 5. If the required temperature was not reached what modifications do you think you could make to the pasteuriser to increase the temperature?
- _____
- _____
- _____
- _____
- _____
- _____
- _____
- _____

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Solar reflector guide

