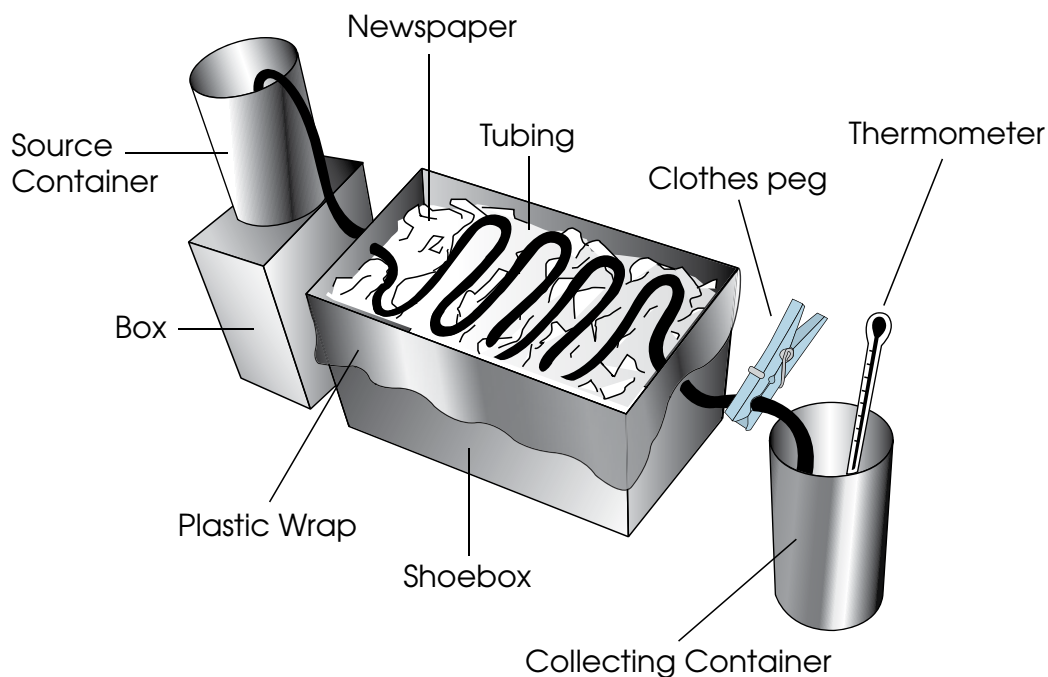




BUILDING A SOLAR WATER HEATER



Modern solar water heaters are complex systems designed to ensure maximum efficiency & reliability. However the basic principle of using the sun to heat water is quite simple and can be easily tested. You can experiment to discover ways of improving the efficiency of this solar water heater.

MATERIALS REQUIRED:

- 1 shoe box & 1 smaller box similar in height
- Newspaper
- 2 small containers (eg. empty soup cans)
- 5 metres black tubing*
- Black paint
- Thermometer
- Cling film
- 1 spring type clothes peg or bulldog clip
- Water
- Scissors

* 3mm black vacuum hose available from Clark Rubber is ideal.



MAKING YOUR SOLAR WATER HEATER

1. Paint the inside of your shoebox black.
2. When it is dry, pack newspaper into the shoebox up to 2cm from the top of the box.
3. Cut a hole in either end, above the level of the newspaper, just big enough for the tubing to fit through.
4. Thread the tubing through each hole leaving around 50 cm of tubing on either side of the box.
5. Arrange the tubing back and forth inside the box.
6. Pack newspaper around the tubing ensuring that all the tubing is still exposed at the top.
7. Place the cling film over the top of the box.
8. Place your water heater in direct sunlight along with a container with the cool water and a container to collect the heated water. Make sure the cold water container is raised above the water heater and the collecting container.
9. Fill the cold water container with cold water and use the thermometer to record the temperature.
10. Place one end of the tube in this container making sure it goes to the bottom.
11. Gently suck on the other end of the tube to draw water through. Once it starts flowing use the clothes peg to pinch the tube and restrict the water flow to a trickle.
12. Place this end of tube in the collecting container.
13. Use the thermometer to test the temperature of the heated water in the collecting container.

HOW EFFICIENT CAN YOU MAKE YOUR SOLAR WATER HEATER?

Use this model as base and conduct experiments on how you could improve it's efficiency.

- What if you replaced newspaper with black paper?
- Would a sheet of glass work better than cling film over the top?
- Would black plastic work better than cling film?
- What if you made the tubing inside the box longer?
- Does the location of the heater make a difference?

Use the Result Chart below to enter your results.

Solar Water Heater (variations)	Temperature before	Temperature after	Difference
Standard model			
Glass cover			
Black paper padding			
Black plastic cover			
Longer tubing			
Others:			

