

## Noel's Treasures from Trash



To build this Solar water heater you will need:

This vintage 'Noel's Treasure' shows you how to make a simple solar water heater, and is perfect for summer

(an aluminium can

(aluminium foil

(a manila folder or other thin cardboard

(a pin

(some black paint

(a set square and a ruler or tape measure

With the sun high in the sky, it's a good time of year to make a simple solar water heater. One type is an aluminium can painted black, which can heat water to around 20°C above air temperature. We can improve on this by collecting heat using a reflector shaped like a parabola.

## The parabola

This is a special curve that makes light coming straight into the reflector focus at a single point in front of it. This parabolic dish uses the same principle as the sophisticated solar trough on the front cover of this issue of ReNew

To draw your parabola for the water heater, put an aluminium drink can on a big sheet of paper and draw around the tin to make a circle. Draw two lines at right angles through the centre of this circle, one vertical and one horizontal.

Measure 15cm from the centre of the circle along the vertical line and draw a line at 90° across the end of your vertical line. This is the baseline. Put a pin in the middle of the circle, where the first two lines cross. This is the focal point.

Holding one end of the set square against the pin, with its 90° corner touching the baseline, draw a series of lines starting at the corner of the square where it touches the baseline out toward the edge of the paper. There is no need to draw lines from the pin to the baseline. The lines you have drawn form a parabola that focuses at the pin. You can see

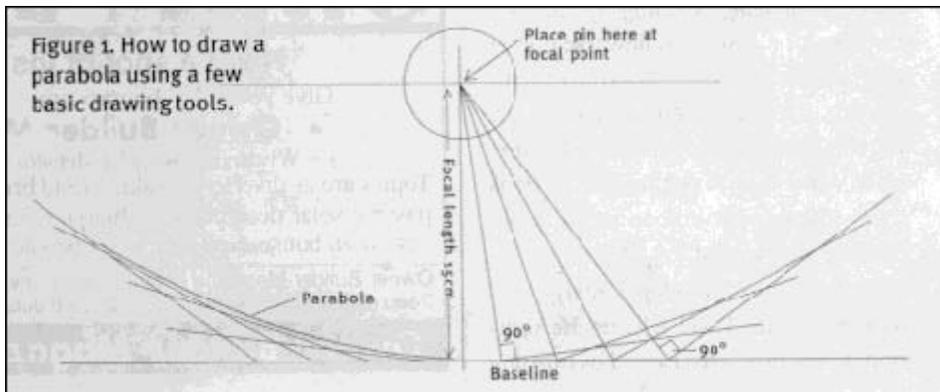


Figure 1

How to draw a parabola using a few basic drawing tools

## Making the reflector

Our reflector will be made of cardboard covered in aluminium foil and will be about 30cm wide. To make the reflector, get a piece of cardboard about 20 x 30cm. A piece of manila folder board or one side of a breakfast cereal box is ideal. Cover the cardboard with aluminium foil, shiny side out, using paste or tape. Along the long side, make 2cm deep cuts into the cardboard about 1cm apart.

Bend the cardboard segments at right angles, alternately one out, one in. These will be the 'feet' of the reflector.

Stick the parabola you drew earlier onto a piece of thick cardboard and pin or tape the reflector along the line of the parabola.

It should look something like the photo above. You have now made a parabolic reflector.

### The water tank

Paint your aluminium can a dull black, and when the paint is dry, fill the can with water and stand it at the focal point of the parabolic reflector. Face the reflector towards the sun and in about half an hour you will have hot water. The heater will work a little better if you fix the can to the parabola and tilt it back towards the sky.

You will have to move your reflector to keep it facing the sun, which moves at about 15 degrees per hour. This is called tracking.

Good luck and have fun!