

# How to make a solar oven out of a pizza box



## 1. What you'll need

- \* Pizza box
- \* Tin foil (1 roll)
- \* Clear plastic wrap (1 roll)
- \* A newspaper (3 sections, about 10 pages each)
- \* Black card
- \* An aluminium roasting tray painted with black
- \* Non-toxic water based paint
- \* Bubble wrap
- \* Scissors
- \* Craft knife
- \* Masking tape
- \* PVA Glue
- \* Ruler
- \* Protractor

## 2. Get started

### Step 1:

Unfold your pizza box and lay it flat

### Step 3:

Measure out some tin foil to cover the inside of the box

**Did you know** foil reflects visible and infra-red light

### Step 5:

Turn over the box and mark out a square on the lid 3cm in from the edge, use the ruler to draw your lines along the sides and top. Use a dotted line for the final line closest to the middle of the box.

### Step 2:

Use your tape to cover up any openings or gaps in the box

### Step 4:

Glue the piece of tin foil down onto the box, make sure the shiny side of the tin foil is facing outwards and that it is as smooth as possible!

### Step 6:

Use your craft knife or scissors to cut along the three lines on the top and side of the box. Don't cut the dotted line as this will become the hinge. This is easier to do with two people.

**Step 7:**

Bend the window you've created in the box backwards along the hinge so it is open. This bit is now your mirror.

**Step 9:**

Grab one of your sections of newspaper and roll it up tightly, tape it at the ends and in the middle. Repeat with the remaining sections.

**Step 11:**

If you want, you can insulate the bottom of the box with some bubble wrap. Just cut a square to fit inside your newspaper insulation.

**Step 13:**

Add the black painted aluminium tray over the top of the black card.

**Step 15:**

Close the lid of the box, but leave your mirror open (the bit that bends backwards). Put a piece of A4 paper on top of the plastic wrap window to stop the next layer sticking before you've been able to pull it nice and tight.

**Step 17:**

Next, tape the protractor to the side of the box to make an adjustable angle for the mirror. Use a lump of blu-tack at the top of the protractor to hold the mirror in place. Now you're ready to get cooking!

**Step 8:**

Fold the pizza box back together.

**Did you know** newspaper acts as insulation, which keeps the heat in.

**Step 10:**

You'll need to bend your newspaper sections around the inside of the bottom of the box, until all four walls are surrounded. Use masking tape to hold it in place and seal any gaps.

**Step 12:**

Add black coloured card on the bottom of the box.

**Did you know** black absorbs the sun's energy and helps heat the oven.

**Step 14:**

Now you need to double glaze the window. For the first glaze, on the inside of the box, cover the window you made earlier with plastic wrap. Use a little bit of tape at each corner to hold it in place and stretch it so it is tight and smooth. Finish taping it in place and seal all the edges.

**Step 16:**

For the second glaze, repeat the steps from earlier to create another layer of plastic wrap, stretch it so it is tight and smooth. Tape the first three sides then remove the A4 paper to tape the rest and seal the edge.

**Did you know** trapping air between the layers of plastic wrap creates the double glazing.



### 3. Finished? What's next

Visit [Schoolgen.co.nz](http://Schoolgen.co.nz) to check out other projects you can do.

We've also pulled together some cool challenges to get you thinking and innovating! The easiest ones are at the top of each list, the harder ones at the end are for budding scientists and engineers.

More minds are better than one, so get a team together and start throwing some ideas around and come up with a plan of attack.

- ✦ Research how solar ovens are used in the developing world and in disaster zones to cook food or sterilise dirty water.
- ✦ Compare the design features of the solar oven to those of an energy efficient house.
- ✦ Redesign your solar oven or build a different design to collect solar energy. Does it work better? Explain why.
- ✦ Modify the solar oven to become a solar water heater (think about using plastic tubing and black paint). Use convection or possibly a small pump to circulate water through the water heater and into an insulated storage 'tank'.

