

How to make an hourglass!

What is an hourglass?

Hourglasses have been in use for around 1000 years to measure smaller amounts of time. They were used for measuring speed at sea, scientific experiments, and for boiling eggs in the kitchen! These days people generally use stopwatches and mobile phones although you might still find one in a boardgame. They consist of two symmetrical glass bulbs joined together by a narrow neck, often with a frame around them to protect and stabilise them. They are filled with a powdered substance like sand.

What you will need.

2 plastic bottles, without lids (clean, completely dry and the same shape).

Some cardboard

A pencil

Scissors

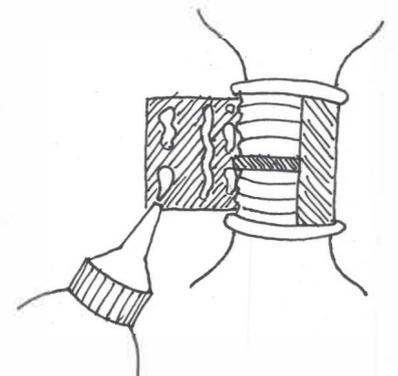
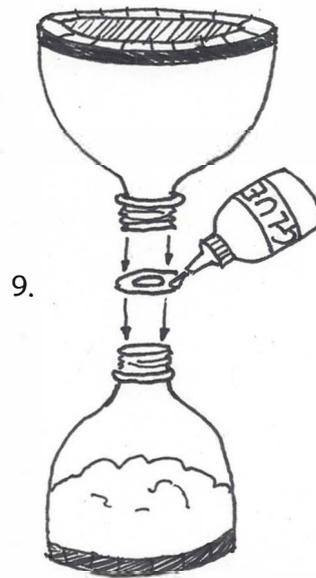
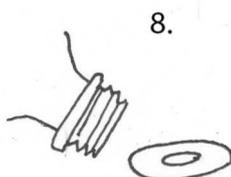
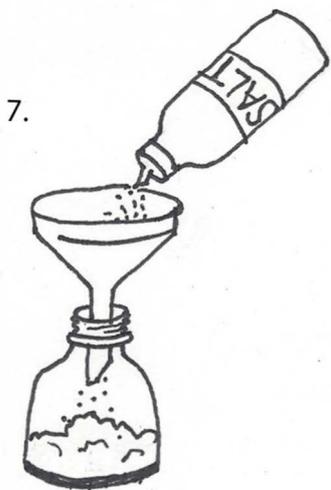
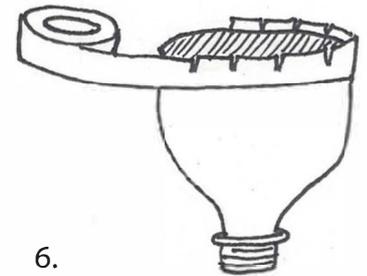
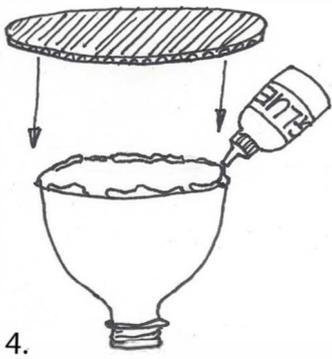
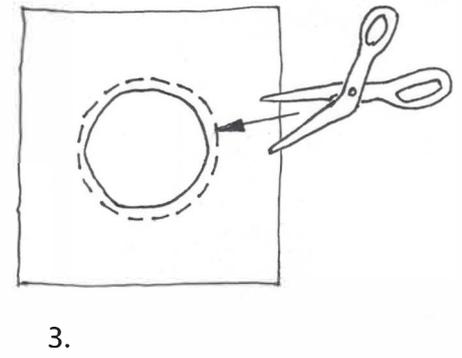
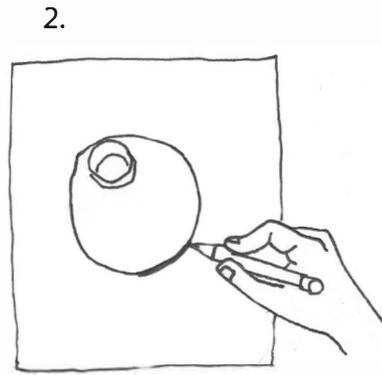
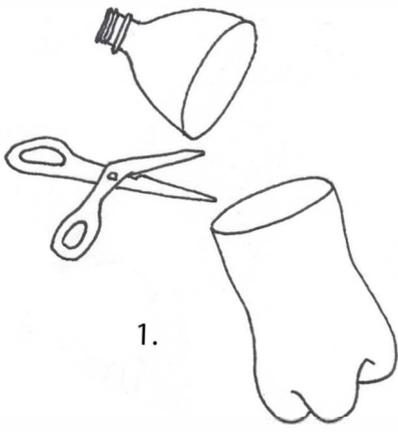
Sand or fine salt

Glue (suitable for sticking plastic)

Tape

Instructions.

- 1) Get an adult to help you cut down both bottles (about a third of the way from the neck if you are using large bottles, or half way along if you're using 500ml bottles).
Tip: some bottles have reinforcing ridges around them- if your bottles have these, make use of them as they will help you cut a straight line.
- 2) Place the bottles on the cardboard, cut side down, and draw around them to create two circles on the cardboard.
- 3) Cut these circles out, slightly bigger than your drawn circle.
- 4) Using the glue, stick the large card circles to the cut edges of the bottles, making sure there are no gaps between the card and the bottle.
- 5) Once the glue is dry, trim the excess card off the edge of the bottles.
- 6) Now stick tape around the edge of the bottles to seal and reinforce the joints between the card and the plastic. *Tip: if you leave a lip of tape sticking up, you can snip this all the way around to create tabs, which can be folded neatly to the bottom of the 'glass'.*
- 7) Fill one of the bottles with the sand or salt, so that it is about $\frac{1}{2}$ full.
- 8) Draw a circle around the neck end of the empty bottle onto the cardboard and cut it out. Then cut a hole about $\frac{1}{2}$ cm-1cm wide in the centre to make a 'washer'.
- 9) Stick this washer to the neck of the bottle full of sand, using the glue. Once this is dry, take the empty bottle and glue its neck on top of the washer.
- 10) Measure the width of the necks of the bottles, and cut a strip of card to the same width and long enough to wrap around the bottles so that there is a slight overlap. Glue this onto the bottle necks to reinforce them. *Tip: We used corrugated cardboard and cut it so the ridges ran along the width of the card. Whilst the glue is drying, you can use string to secure the card in place, so that it doesn't try to unwrap.*



Once the glue has set you will be able to turn it over, and hey presto, you'll have an hourglass! Try timing how long the sand or salt takes to move from one chamber to the other. Do this a few times and you should get an idea of the *duration* of the hourglass. It is very unlikely yours will run for an hour, so will more likely be something like a '20 second' glass! The amount of sand will change the duration, as will the coarseness of the sand and the size of the hole in the washer. Try experimenting with different sizes and quantities to see how you can change how long it takes for.

