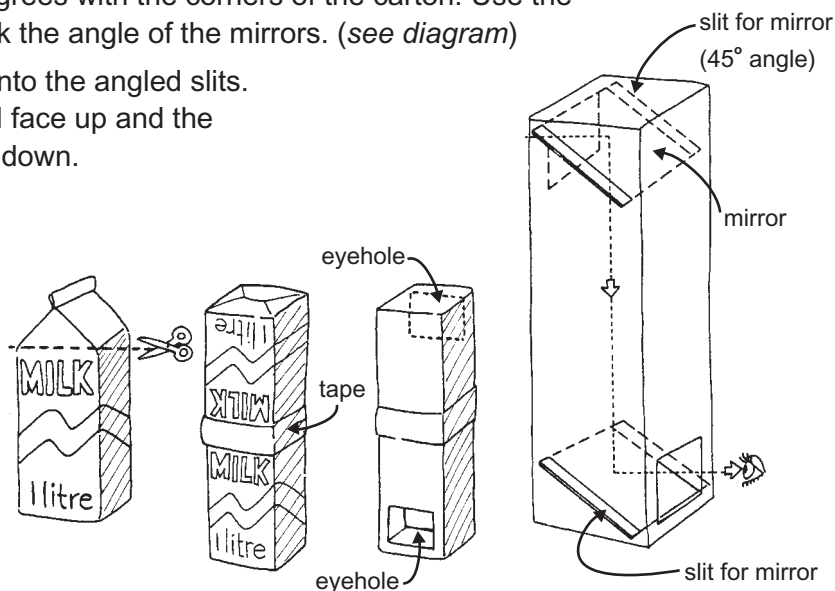


What You Need

- 2 one litre milk cartons
- scissors
- tape
- 2 small mirrors - *they don't have to be identical. Mirrors with handles are fine, as are make-up compact mirrors. It might make it easier if you tape the mirrors to a rectangular piece of cardboard cut to fit the milk carton.*
- a pencil
- protractor

What To Do

- Cut the top off both milk cartons as shown in the diagram below.
- Tape the two milk cartons together end to end.
- Cut two squares out of the milk cartons for eye holes, as in the diagram.
- Cut two lines on each of the other two sides so that they make an angle of 45 degrees with the corners of the carton. Use the protractor to check the angle of the mirrors. (*see diagram*)
- Slide the mirrors into the angled slits. One mirror should face up and the other should face down.
- Now use your periscope to see around corners and over walls.



Focus Questions

- * Try constructing a periscope with more than two mirrors. It may need to be used for a different purpose and be an unusual shape.
- * How does changing the length of your periscope affect it?
- * Another interesting thing you can use mirrors for is writing secret messages. Write your name on a piece of paper. Place a mirror upright underneath your name. You should notice that it appears backwards. Why does it appear to be backwards? Explain why you think so. Practice writing your name and other words backwards. When you place the mirror underneath them you should be able to read your secret messages perfectly. Show your 'secret messages' to your friends. Can they work out your secret code?

BACKGROUND KNOWLEDGE

A periscope uses two mirrors. The mirrors are angled in such a way that the light rays are reflected from the top mirror, downward to the bottom mirror and from there into the viewer's eye.

Light always reflects away from a mirror at the same angle that it hits the mirror. When your periscope light hits the first mirror at a 45-degree angle and then reflects away at that same angle. This reflected light is then bounced

down to the bottom mirror. It hits the second mirror at a 45-degree angle and reflects away at the same angle straight into your eye.

Periscopes can be made to be longer, but the longer the tube is, the smaller the image you'll see. Periscopes in tanks and submarines have magnifying lenses between the mirrors to make the reflected image bigger.