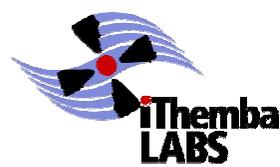


# Up Periscope!

Build a mirrored tube that lets you see around corners and over walls!

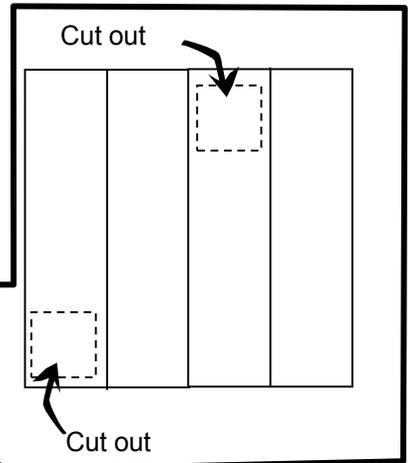


## What you need:

- 1 piece of cardboard
- Two small mirrors (flat, square ones work best)
- Utility knife or blade.
- Ruler
- Masking tape

## What you do:

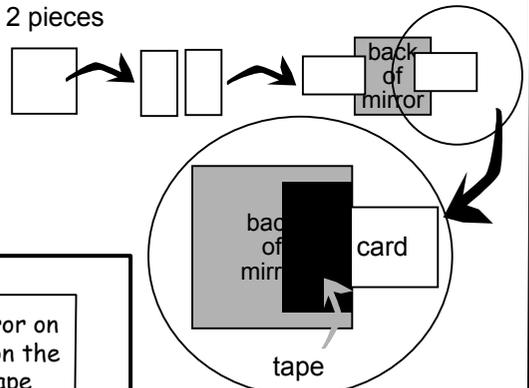
**1** Using the knife, cut out the 2 square holes marked on the cardboard - be careful not to cut the surface underneath the card board or yourself. (Keep the piece that you cut out - you'll see why later!)



**2** Fold the cardboard along the lines (but don't stick it closed yet).

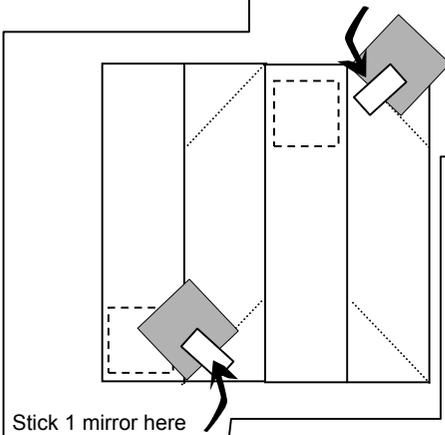
**3** Take the 2 square pieces that you cut out and cut them in half. Tape a piece to either side of the back of the mirrors - make sure that the tape is level with the sides of the mirror. (Clean the mirror when you've finished.)

Cut into 2 pieces

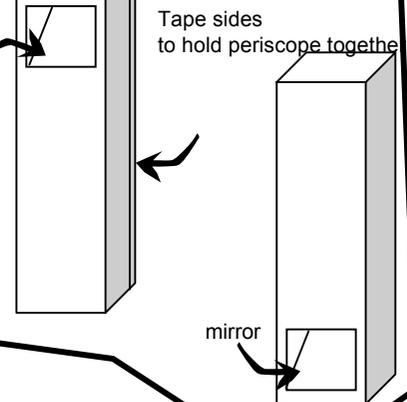


Stick 1 mirror here

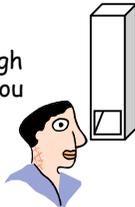
**4** Position the mirror on the dotted line on the cardboard and tape one side down firmly. Do the same with the mirror on the other side.



**5** Fold the cardboard, then firmly stick down the other side of both of the mirrors on the other dotted line. Use enough tape - you don't want it to come loose. Trim a piece from the side of your periscope where the cardboard overlaps into the window. Tape down the side of your periscope.



**6** Hold the carton up to your eye and look through the hole that you cut. You should see your ceiling through the top of the carton. If what you see looks tilted, adjust the mirror and tape it again.



**7** Now you have a periscope! If you look through the bottom hole, you can see over fences that are taller than you. If you look through the top hole, you can see under tables. If you hold it sideways, you can see round corners!

**How does your periscope work?** Light always reflects away from a mirror at the same angle that it hits the mirror. In your periscope, light hits the top mirror at a 45-degree angle and reflects away at the same angle, which bounces it down to the bottom mirror. That reflected light hits the second mirror at a 45-degree angle and reflects away at the same angle, right into your eye.

Periscope comes from two Greek works, **peri**, meaning "around" and **scopus**, "to look". A periscope lets you look around walls, corners or other obstacles. Submarines have periscopes so that sailors inside can see what's on the surface of the water, even if the ship itself is below the waves.

