

Make a Periscope

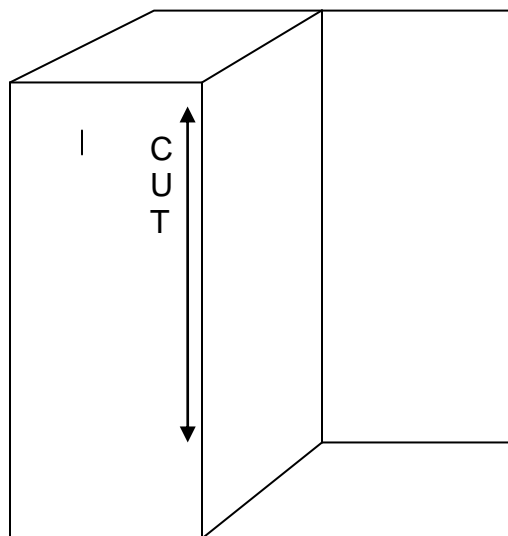
A periscope allows you to observe people without being seen. Submarines use periscopes to search for targets or threats in the air or the sea. Follow the directions below and you can create your very own periscope that's great for seeing around a corner or through a window without being seen yourself.

You will need:

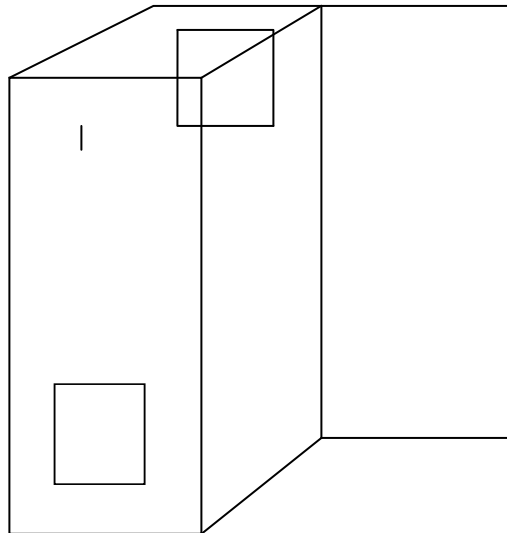
- Two empty 1 litre rectangular milk or juice cartons
- Scissors
- Duct tape and glue
- Two mirrors that will fit into the cartons
- Cardboard to glue your mirrors onto (cereal boxes work well)

Instructions:

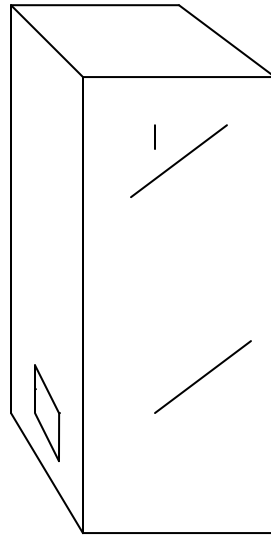
1. Cut the peaked tops off both cartons.
2. Insert one carton with the top cut off into the top of the other carton, stopping about halfway down.
3. Tape both cartons together with the tape. Use a lot of the tape. You should now have a long cube.
4. Cut through one side of the container from top to bottom and open it up (see diagram below). This will make it easier to place the mirrors and make the peek holes.



5. Cut the two peek holes. One should be at the bottom and the other should be at the top on the other side of the carton (see the diagram below).



6. Make two diagonal slits in the top and bottom of each side of the carton and repeat for the other side of the box (see the diagram below). **Tip:** *Make the slits on the side of the carton that is not cut open so that you can insert a piece of paper through them (the paper should be long enough to touch the other side of the carton). This will tell you where you need to make the slits on the opposite side of the carton.*



7. Glue each mirror to a piece of cardboard that is long enough to fit from side to side of the carton and that is just a little larger than your mirrors. Fit the mirrors into the slits and make sure they face towards the middle of the box.
8. Close the side of the carton, making sure that the mirrors are securely in the slits. Tape the flap in place with a lot of tape. Your periscope is now ready to use.

How to use the periscope:

Hold the periscope upright and look into the hole at the bottom. You'll see what's caught in the reflection from the mirror opposite the top hole. **Be careful not to point your periscope at bright lights or the sun.**

Why this works:

Light always reflects away from a mirror at the same angle that it hits the mirror. Here, light hits the top mirror at an angle and reflects away at the same angle, and bounces it down to the bottom mirror. That reflected light then hits the second mirror at an angle and reflects away at the same angle, right into your eye.