

Bending Light

WHAT YOU'LL NEED:



TWO SMALL MIRRORS
(that are the same size)



TWO EMPTY
ONE QUART
MILK CARTONS
(washed out)

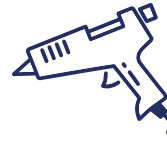


PACKING TAPE



SCISSORS

&



HOT GLUE

You might have heard of or seen a periscope used in submarines. It probably looked like a pipe coming out of the top with someone's eye looking around from the end of the pipe. But what exactly is a periscope? A periscope is a tool that is used to look over or around something. It may be different shapes and sizes, but the general design is that it has two parallel mirrors set at 45-degree angles. When light comes in one end, the first mirror bends the light towards the second mirror. Then, the second mirror bends the light towards the eye of the person looking into it. Whatever the periscope is pointed at is reflected in the bent light so that the person using the periscope can see it even though they are not looking at the object themselves.

DIRECTIONS:

1. Stand in front of a mirror and look into it. What can you see?
 - Try moving to different parts of the room so that you're not exactly in front of the mirror.
 - Now what can you see? Is it the same as before or can you see anything new? Is there anything that you could see before that you can't see now?
2. Cut the triangular tops off the cartons. Make sure the inside is completely washed out – you don't want your periscope smelling funky!

DIRECTIONS CONTINUED ON NEXT PAGE >>

DIRECTIONS CONTINUED

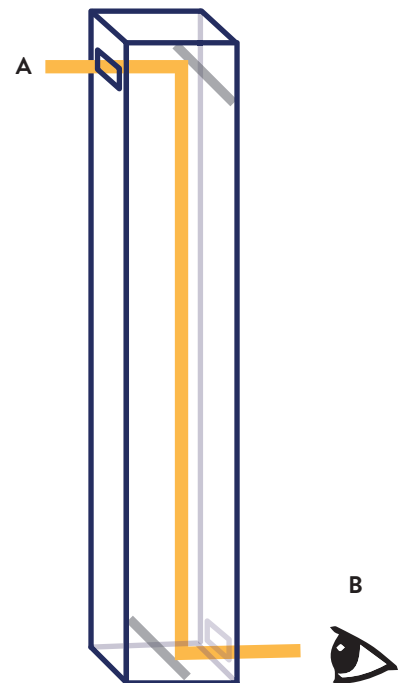
3. Tape the cartons together to make one long rectangle box.
4. Trace the outside of the mirror on one side of the box. Then, cut out the outline using scissors.
5. Put the mirror in at a 45-degree angle, so that it is slanted down towards the rest of the box. Glue the mirror in.
6. Trace the other mirror on the opposite side of the box – on the other end and other side. Insert the second mirror so that it is at a 45-degree angle and slanted towards the box. The mirrors should be slanted towards each other.
7. Time to use your periscope. Hold it upright and look in one of the holes. What can you see?



EXTENSION ACTIVITIES:

- Use your periscope in different ways. Try sitting under a table and holding your periscope above it. What can you see now?
- Can you use your periscope to look around corners?
- Why might someone use a periscope as a tool? What situations would it be helpful as?
- Draw a picture of your periscope. Draw the path of the light as it comes in through the top hole, bends off the first mirror towards the second mirror, and bends off the second mirror to your eye.

Diagram of the periscope. A and B are the holes on opposite and opposing sides and the gray rectangles show the angle of the mirrors. The yellow line shows the path of the light coming in the hole and to your eye.



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Thanks for exploring with us!