

Light & Shadows – Water Fibre Optics

Light travels in a *straight line but how does light travel down fibre optics that are bent into a curve. (*Excluding Einstein’s gravitational lensing.)

Materials:

- Clear plastics 2L pop bottle
- Flashlight
- Water
- Sink
- Spoon
- 5 mm drill bit and drill
- Large clear bowl



Procedure: (Remember to have your parent’s permission and have them watch and help you.)

- Make a round 5 mm hole in the side of the pop bottle near the base.
- Put your finger over the hole.
- Fill the bottle with water.
- Place the water bottle on the edge of a sink so the water could flow into the sink.
- Shine the flash light through the bottle on the side opposite the hole.
- Remove your finger from the hole and move your hand slowly down the stream of water but keeping it in the stream of water.
- Observe what happenings.

What's Happening:

To explain what is happening fill a clear large bowl with water. Put a spoon in the bottom of the bowl. Place it on the counter near the edge. Crouch down and look upwards at the bottom of the water’s surface. What do you see? It is the reflection of the spoon. The water acts like a mirror so light must reflect off the surface of water. This means that if you shine the light into a stream of water whenever the light meets the side it is reflected back into the water stream. The light stays inside the water until it hits your hand lighting it up. Fibre optics works in the same manner. The light travelling down the length of the fibre reflects back inside the fibre instead of escaping out the side, just like the light did when it traveled down the streaming water.

Extension:

What would happen is you did this activity with cooking oil instead of water. Would you get the same results as you did with water? You could try it with oil but this can get very messy and you shouldn’t pour oil down the drain. See if you can find the answer on the internet.

This activity is based on our Light & Shadows kits. The source for this lab may be found at: <http://www.thenakedscientists.com/HTML/content/kitchenscience/exp/water-fibre-optics/>. Our teaching kits (described on our website) are loaned out FREE to provide classroom teachers and parents of home schooled children an opportunity to explore Science in interesting ways. Please consider volunteering as a classroom guest speaker or offer your business as a field trip location.

Lorne Cooper, Regional Executive Director

PRAXIS, “Making Science Fun”. Contact Praxis at praxis@praxismh.ca, www.praxismh.ca, Tweet or follow us @PraxisMedHat, or friend us on Facebook. Address: c/o 200 7th Street S.W., Medicine Hat, AB, T1A 4K1 Phone: 403-527-5365, Fax: 403-527-6570.