

Name:

# Looking at Light (Teacher Version)

## Humans & Light

Look at the image on the right.

How many sources of artificial light do you see? *Anything electric.*

How many real sources of light do you see? *The candles, fire, stars, element on stove.*

If the power went out, how many people would have to stop what they are doing? *All but those by the fireplace.*

What objects give off both light and heat? *Actually, even light bulbs and computer screens get warm. Mostly the fire sources and element though.*



## Let's Build a Kaleidoscope!

### Materials:

- 3 Acrylic mirror strips (2cmx23cm)
- Roll of colourful electrical tape
- Soft steel binding wire
- Marble



### Instructions:

1. Lay the 3 mirror strips face-down in a row, slightly spaced. Put a strip of electrical tape across the back at the top and bottom.



2. Fold the mirrors into a triangular prism with the shiny side facing inward, and apply tape to the sharp edges outside.



3. Bend the wire in half and cradle the marble with it so it is held snugly. This might take some fiddling and some patience.



4. Tape the wire to the bottom of the mirror prism, trying to keep the marble covering the hole for the best effect.



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## Questions to Consider:

Describe what you see:

*A reflected pattern of colours and shapes.*

Why do you see repeated images and patterns?

*Light is being reflected to all three mirrors, causing duplicates.*

What happens when you change the position of the marble?

*New angles of the marble's interior is seen through the kaleidoscope, so the patterns change as well.*

How do you think adding or taking away mirrors would affect what you see through the kaleidoscope?

*More mirrors would give more surfaces for the light from the marble to reflect against, producing more images to see from the eyepiece.*



## Fish-Eyed: Teleidoscope

Ever hear of this sort of contraption? It's called a **teleidoscope**.



Instead of seeing objects *inside* itself like a kaleidoscope does, a teleidoscope works by having a round lens at the end of a tube so that images from *outside* the apparatus are brought in and reflected.

Below is a regular fish-eye image. How do you think the repeated pattern is produced in a teleidoscope?

*It is reflected by different mirrors, similar to the internal workings of a kaleidoscope.*



Name:

## **Image Sources:**

### **Humans & Light:**

1. ESL Printables:

[http://www.eslprintables.com/Vocabulary\\_worksheets/The\\_house/index.asp?page=15](http://www.eslprintables.com/Vocabulary_worksheets/The_house/index.asp?page=15)

### **Let's Build a Kaleidoscope!**

1. Redwell Heating: <http://www.redwellheating.com/home/our-products/mirror-heaters.html>
2. Racers Tape: <http://www.racerstape.com/rtp.html>
3. Trade Korea: [http://www.tradekorea.com/products/spring\\_stainless\\_wire.html](http://www.tradekorea.com/products/spring_stainless_wire.html)
4. Public Domain Pictures: <http://www.publicdomainpictures.net/view-image.php?image=1183>
5. All other images are from: <http://bgsctechclub.wordpress.com/category/kaleidoscope/>

### **Questions To Consider:**

1. Pixels: <http://pixels.com/featured/dotted-wishes-no-7-kaleidoscope-joy-mckenzie.html>

### **Fish-Eyed: Taleidoscope:**

1. Xenlite: <http://xenlite.easystorecreator.com/items/teleidoscopes/giant-teleidoscope-detail.htm>
2. Steven Cerio: <http://www.stevencerio.com/2010/09/kaleidoscope-and-teleidoscope/>
3. Nikon Web: <http://www.nikonweb.com/fisheye/>