

**Topics:** Light, Color,  
Rocks & Minerals

## Materials List

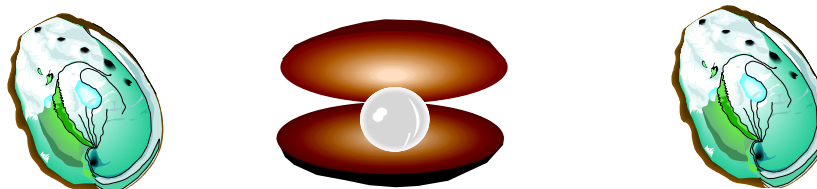
- ✓ Dark construction (paper or cardstock)
- ✓ Plastic storage box
- ✓ Clear nail polish
- ✓ Water
- ✓ Paper towels or newspapers

This activity can be used to teach:  
Next Generation Science Standards:

- Light and vision (Grade 4, Physical Science 4-2)
- Waves: Amplitude, wavelength, energy (Grade 4, Physical Science 4-1)
- Waves are reflected, absorbed, or transmitted (Middle School, Physical Science 4-2)

# The Color in Seashells

Making Colors with a Transparent Film



We live in a colorful world! Beautiful, colorful things, like seashells and opals, seem to shimmer in the light, producing an array of bright colors. In this activity, students can produce colors on cardstock, using the same principles of physics that oysters and abalone use to make their pearls or colorful shells.

## To Do and Notice

1. Fill the plastic box to about  $\frac{3}{4}$  full with water.
2. Place the dark paper or cardstock at the bottom of the container, under the water and hold the cardstock there with one hand.
3. With the other hand, drop one drop of the clear nail polish on top of the water from about 10 cm (4") above the water surface. The nail polish drop should spread out, revealing a rainbow of colors.
4. As soon as colors are seen, pull the cardstock straight up and out of the water, capturing the colored nail polish film. A couple tries might be necessary to master this technique.
5. Place on paper towels or newspapers and allow the cardstock to dry completely.
6. Optional: Use the iridescent cardstock pieces for any creative projects of choice.

## The Science Behind the Activity

Color appears many places in nature for several reasons. Pigments, for example, can cause a substance to reflect specific wavelengths of light and appear the reflected color (i.e. – leaves reflect green light). Pearls, seashells, and some rocks (like opals) seem to shimmer or change color when you look at them from different angles. This phenomenon, known as iridescence, is caused by light reflecting off layers of thin, clear material. These layers are so thin that certain wavelengths of light (depending on the thickness of the layer) interfere with one another, canceling certain colors and intensifying other colors.

In the case of pearls and shells (like abalone and mother-of-pearl), layers of calcium carbonate alternate with layers of water, producing iridescence. In seashells, this substance is known as nacre.

## Resources

For more information on the science behind the activity, see:

The Exploratorium activity “Soap Film in a Can” available in *Square Wheels* by Don Rathjen, Paul Doherty, and the Exploratorium staff.

The HyperPhysics site on thin films at:

<http://hyperphysics.phy-astr.gsu.edu/hbase/phyopt/thinfil.html#c1>

**Web Resources** - (Visit [www.raft.net/raft-idea?isid=45](http://www.raft.net/raft-idea?isid=45) for more resources!)