Six Pack Rings Exploration

Suggested Age: 7-9
Time: 25 minutes

Synthetic polymers are polymers that have been created by humans in a laboratory. Synthetic polymers have many advantages in commercial products because they are widely available and come in many forms. Synthetic polymers can range from very flexible to rigid which makes them a versatile material. Like spaghetti noodles in a bowl, the polymer chains may be tangled in different ways. When a polymer is stretched, its chains untangle, straighten out and slide past one another. If enough force is applied, the sliding chains will completely come apart and the polymer chain will break. The more entanglements there are, the more difficult it is for the chains to untangle and slide past one another, and the longer it takes for the polymer chain to break when it is stretched. Therefore, when you increase these numbers of entanglements, you will increase the strength of the polymer and make it tougher to tear apart.

The strength of a polymer can sometimes make it difficult to degrade which can cause problems when it is introduced into the environment. From the museum show, we learned that the polymer that composes six pack rings becomes brittle when exposed to sunlight. There are additives put into put into polymers that react to sunlight and causes the strong polymer chains to become brittle. This prevents animals from choking or getting caught on the six pack rings. In this activity, we will explore the conditions and how long it takes for the polymer chains to become brittle when exposed to sunlight.

A Bird with a Six Pack Ring Caught on its beak

In this activity we will:

- Discuss how objects photodegrade.
- Work on our observation skills.

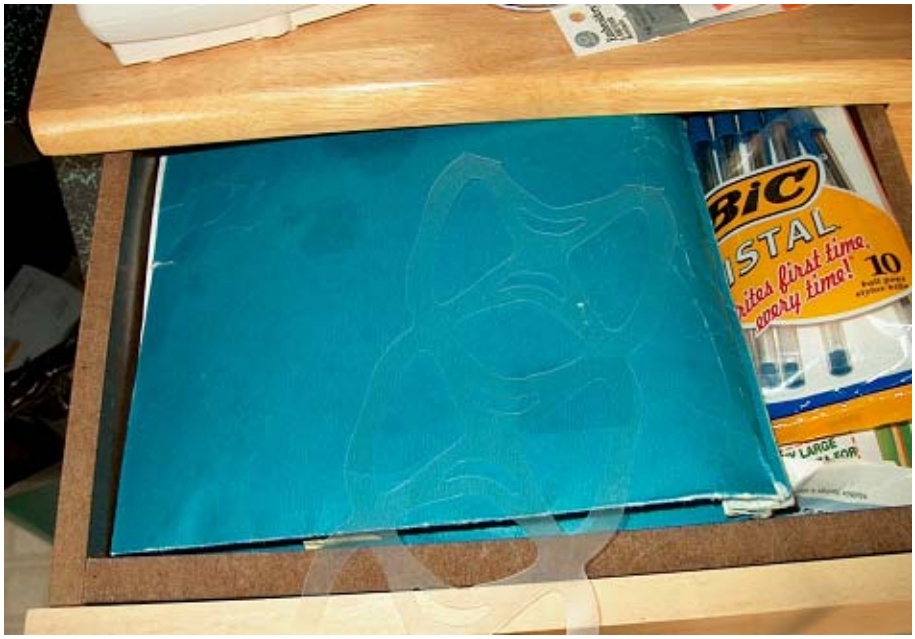
Materials

- Six-pack rings
- Six-Pack Rings Observation Sheet

Activity

We will now be the scientist and predict how long it will take a six-pack ring to **photodegrade**. When an object **photodegrades**, it means that an object will break down when exposed to sunlight. You will take 3 sets of six pack rings or divide a six-pack ring and cut it into three equal parts. Then, find at least 3 places to put your six-pack rings. One location should have sun most of the day and another should be a place, which is completely unexposed to light such as a desk drawer.

The location not exposed to light is your **control.** The **control** is not subjected to your experiment, which in this case is light. The other six-pack rings will be the **variables** in your experiment. The **variables** will be subjected to the experiment that means they will be exposed to light. Be creative with the **variables** in your experiment! You may even want to try exposing your six-pack rings to incandescent light (indoor lighting).



Your control will be put in a place without light.

After you decide where to place your six-pack rings, predict how long it will take for each of the sick-pack rings to become brittle. With a journal, make weekly observations of each six-pack ring. Each week, is the six-pack ring still strong and flexible or does it become brittle? When does each six-pack ring become brittle? Do you notice any changes in color? Also, are there any other observations that you make about each of the six-pack rings? Did it take longer or shorter than you predicted for the six-pack ring to become brittle?

Six-Pack Ring Observation Sheet

Week	Six-pack A observations	Six-pack B Observations	Six-pack C observations
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

Extension Activity

Will heating the six-pack rings in the oven make it brittle? How will it degrade in the cold, winter months versus the warm summer months?