

## Prisms

A rainbow is the result of nature's prism. A typical prism is a triangular piece of clear glass or plastic that bends light as it passes through the prism's apex. Light slows down as it passes from the air into the denser material of the prism. Different wavelengths of visible light bend at different degrees; violet light bends the most as it passes through the prism and red light the least. It was Isaac Newton who realized that white light was actually made up of the spectral colours of the rainbow.

### **What You Will Need:**

- → A prism (or two)
- → A cardboard box (such as a file box)
- → Colored pencils or pens
- → A sheet of plain white paper
- → A flashlight

### **Procedure**

1. A cardboard box (such as a shoe box) makes a great prism box. Simply cut a small rectangular opening on the side of the box near the bottom edge, about 5 mm in width.
2. Inside the box, place the prism on a sheet of dark paper.
3. Darken the room.
4. Shine the flashlight beam through the hole and adjust the prism
5. Use colored pencils or pens to trace the individual bands of light that you see.
6. In what order are the colours?

### **Other Experiments**

Finally, cut a second hole in the box and arrange two prisms so that their spectrums cross paths. What happens to the various colours of light where they cross?

- Create a water prism using a clear glass or jar filled with water
- Place the container in a well-lit window of a room that is otherwise fairly dark. By moving the container around, you can cause a prismatic effect on the opposite wall of the room.
- Place a bowl of water in a sunlit window and hold up a small mirror at an angle in the water. By adjusting the mirror you should be able to create a prism on the wall.
- A simple CD will create the prismatic colours of the rainbow if you look at the surface under bright light. The thousands of tiny grooves on the surface of the CD cause the light to split into its component colours in

a process called diffraction. Although the light isn't being bent as with a true prism, the grooves are teasing out and reflecting various colours of the spectrum.

- What else can you find lying around in the house to create a prism? If you run out of ideas, you can also go outside on a hot summer day and create a fine spray with a hose. The result is your own rainbow, complete with rain!