

Creating Rainbows

Objective: Students will draw their initial ideas about rainbows then observe rainbows and draw the split spectrum to document their new knowledge.

Key Concept: White light is a mixture of the seven colored lights of the spectrum.

Supplies Needed:

- Crayola® Crayons
- Paper
- Prism, White Paper or Wall
- Mirror, Pan and Water
- Sun or Another Light Source

Procedure and Results:

1. Have a class discussion about rainbows to elicit prior knowledge. Ask the students: "What colors are in rainbows?" "Are all rainbows the same colors?" "Are those colors always arranged in the same order?" Have students draw rainbows.
2. Look for natural rainbows (white light split into the spectrum) around the classroom (DVDs, light split by fish tanks or glass vases.)
3. Create rainbows in the classroom using the prism and/or mirror and water. Have children record each experiment by drawing the objects that caused the light to bend and the spectrum created.
4. Discuss the science behind rainbows. Explain that white light contains all the rainbow colors. When a beam of light shines into water or a prism, it bends or refracts. Each of the colors in white light bends at a slightly different angle because it has a different wavelength. This causes the colors to be split apart into the spectrum. Red has the longest wavelength, violet the shortest and the others fall in a definite order, in between= ROY G BIV (red, orange, yellow, green, blue, indigo* and violet). There are many things that can break up light into its color. Soap bubbles, prisms, raindrops and water can do it by bending (refracting) and reflecting light.

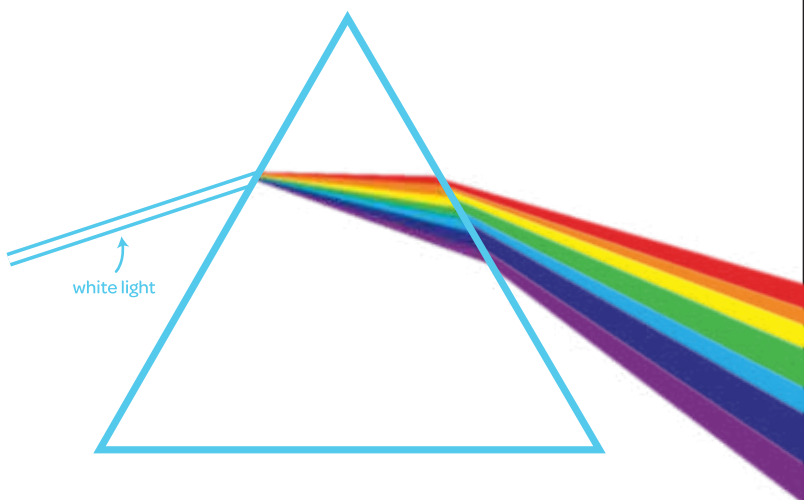
*Many student are unfamiliar with indigo. The art teacher could be helpful in familiarizing students with this color, an important component of rainbows.

Prism

Hold a prism between the Sun and a plain surface. Each color bends at a slightly different angle, which causes the colors to split apart into a rainbow.

Mirror & Water

Create an indoor rainbow, using a mirror, pan of water and light source. Place a clear shallow glass or plastic container in the room where sunlight pours into it. Nearly fill the container with water. Place the mirror in the pan so it is tilted at an angle (the mirror's top edge should lean out of the top and the bottom edge will rest on the bottom). The light will be bent (refracted) and separate into colors as it enters the water (just as it did when it passed through a prism). The mirror will then reflect it onto the ceiling or wall. As the light leaves the water, it will bend again and further separate the colors.



FACT:



White light contains all of the rainbow's colors. It isn't until the light is separated by the prism that you can see all of the colors.