PRISM SET ACTIVITY GUIDE

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A HISTORY OF PRISMS

From the ancient Greeks to current time, people have been fascinated by the properties of light.

Robert Grossetest, from England in the 13th century, stressed the importance of mathematics and geometry in his study of light. He also believed that colors were related to the intensity and were extended from white to black.

In the 14th century, Theodoric from Freiberg explained the rainbow as a result of refraction and internal reflection within raindrops.

Isaac Newton from England discovered that white light is split up into its component colors by passing it through a prism. He concluded that sunlight is composed of light of different colors when refracted by a prism.

An English man, Lord Rayleigh explained how blue color of the sky and red sunsets are due to the scattering blue light by molecules in the earth's atmosphere.

EXPERIMENTING WITH THE REFRACTION IN AN EQUIANGULAR PRISM

Experimenting with an equiangular prism to measure the ray of light entering and leaving it.

Materials provided:

An equiangular prism

Materials to be collected:

4 straight pins, unlined white paper, metric ruler with protractor, cardboard, and scotch tape.

Procedures:

° Place your equiangular prism in the center of a sheet of unlined white paper.
° Hold the equiangular prism with your index finger tightly. Using your pencil, trace its outline on the unlined white paper.

Safety First:

Do not slide your prism off the surface or drop it as it could shatter. Carefully handle the pins.

° Remove the equiangular prism.
° Tape your paper to the cardboard using the scotch tape.
° With your metric ruler find the center of the right side of your prism outline.
° Place a dot at the middle point of the right side of your prism.
° Label that dot, point **A**.
° Place your protractor with the 90 degree mark at point **A**.
° From the center point, place a dot to make a 75 degree angle.
° Label that dot, point **B**.
° Place pins at points **A** and **B**.
° Move your eyes level to the left hand side of the prism.
° Locate pins **A** and **B**. Place the other two pins in line with the images of **A** and **B**.
° Draw a ring around the new pins. Remove them.
° Label the circles, point **C** and point **D**.
° Draw a line from point **B** to point **A**. This is the point where light rays enters the prism.
° Draw a line from point **C** to point **D** . This is the point where light rays leaves the prism.
° Using the metric ruler, draw a perpendicular line using dashes from above point **A** into the drawing.
° Using the metric ruler, draw a perpendicular line using dashes from below point **C** into the drawing.
° Measure the angle from point **A** and **B**.
° Record your measurement.
What is the name of the angle?
° Record your answer.
° Measure the angle from point **C** and **D**.
° Record your measurement.
What is the name of the angle?
° Record your answer.

Analysis:

Your equiangular prism refracts the light ray. As the light ray leaves air, it enters the denser medium of the equiangular prism. This denser medium causes the light ray to be bent towards the perpendicular. As the light ray leaves the denser medium, it is bent away from the perpendicular because it is entering air. Air is less dense than substance being used, the equiangular prism.

Critical Thinking:

If you drew a line from point **A** to point **C**, could you measure the angle of incidence and the angle of refraction inside the equiangular prism?