Lens & Prism Set

Designed to meet these objectives:

Science
- Students will perform simple experiments.
- Students will collect and share information.
- Students will observe and investigate properties of light energy.

Students explore light, refraction, color spectrums, and more…making amazing discoveries as they go! Before you use your new set, be sure to explain how the lenses and prism work, noting the unique properties of each one. Later, you can place the set in a learning center for plenty of hands-on exploration!

What’s Included
- Concave lens
- Double concave lens
- Double convex lens
- Prism

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Ages 6+
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Getting Started
To introduce your prism and lenses, explain that light is a form of energy that can be seen. Refraction is the bending of light as it passes through different objects or substances. Lenses bend light and make objects look smaller or larger, depending on the type of lens. Reflection is the bouncing of light off of different surfaces. The way the light reflects makes objects appear as a certain color.

Single concave lenses curve inward. They make objects appear smaller.

Double concave lenses are just like single concave lenses, only they are curved on both sides and have even greater refractive abilities.
Double convex lenses are curved outward and make objects appear larger. Like the double concave lens, the double convex lens is curved on both sides and bends light more than a single lens.

When white light hits a prism, the prism splits the light in different directions, creating a visible spectrum—all the colors of the rainbow in one continuous band.

**Note:** Some activities in this guide require additional materials, which are noted in *italics* under the “Materials” section for each activity.
Glossary of Terms

**Concave lens**: a lens that curves inward and makes things appear smaller

**Convex lens**: a lens that curves outward and makes things appear larger

**Energy**: the ability to move things or do work; light is a form of energy

**Lens**: a piece of glass, plastic, or other transparent material with convex or concave edges through which light rays are refracted

**Light**: a form of energy sensed by the eyes; the visible part of electromagnetic radiation; sunlight is made up of light beams of different colors

**Prism**: a solid, transparent object with identical ends and flat sides that are parallelograms; a prism separates white light into a spectrum

**Reflect**: to bounce off a surface or return light from an object

**Refract**: to deflect from a straight path, such as the refraction of light

**Spectrum**: a visible continuum of colors presented when white light is separated into red, orange, yellow, green, blue, indigo, and violet
Suggested Activities

Lens Exploration

Materials:
- Concave lens
- Double concave lens
- Double convex lens
- Science journal

Create a KWL (know, would like to know, learned) chart on the board. Have students discuss as a group what they know and what they want to know about lenses. What kinds of lenses can they think of? What do they do? How are they useful in everyday life, and in science?

Divide students into groups of three or four, and ask each group to examine the different lenses. How are they alike? How are they different? What might they see through each lens? Invite students to record their thoughts in a science journal.

Now have students look through each lens at different objects in the classroom, both near and far, and record their observations in their journals and on the KWL chart. What does each lens do? How are they alike or different?
Make a Convex Lens

Materials:
• Concave lens
• Double concave lens
• Double convex lens
• Science journal

Ask students to predict what a convex lens will do. How will it be similar to the double convex lens in the first activity? How will it be different? Have them test their hypotheses by making a single convex lens. Match the curved side of the concave lens with the double convex lens. This makes a single convex lens!

Encourage students to look at some words in a book with the single convex lens and the double concave lens. How does the printing look with each lens? What happens as they move the lenses away from the print?
For an extension activity, invite students to bring in small objects from home to look at through each lens. Ask them to guess what the objects will look like through each lens. Then, have them view the objects and draw in their science journals what they see. Suggested objects include coins, pebbles, leaves, and petals.

**Flashlight View**

**Materials:**
- Concave lens
- Double concave lens
- Double convex lens
- Prism
- *Flashlight*
- *White paper*

Place the lenses and prism in a learning center with a flashlight. Encourage students to shine the light through each lens over a piece of white paper. How does the light beam change when it shines through each lens? What does the lens do to the light? What happens when the light shines through the prism? Where does it enter and exit?
Rainbow Paper
Materials:
• Prism
• White paper

Try this experiment on a clear, sunny day. Position the prism between the sunlight and the paper. Be sure to caution students not to look at the sun through the prism.

What appears on the paper? Explain that white light is made up of different colors of light with different wavelengths. When white light passes through the prism, the light rays refract, or bend, at different angles. This allows you to see a spectrum of all the colors in white light: red, orange, yellow, green, blue, indigo, and violet.