

**Rainbows**

## Journal Assignment

Please answer the following questions in your journal as completely as you can. Your entry will be evaluated on the thoroughness and thoughtfulness of your answers and the reasoning you give in support of your answer.

Draw a rainbow. What colors are in a rainbow? What is the order of colors? Which color is on top?

What conditions do you need for a rainbow?

What is your explanation for a rainbow?

### Exploration with Prism and Light

**Prediction:** What happens when light from the Sun or an overhead projector shines through a prism?

---



---



---



---



---



---



---

**Part 1: Light from a bulb**

**Materials (per group):**

- An equilateral glass prism
- Tape
- Cardboard box - a box that contained photocopier or printer paper is ideal
- White paper
- Scissors or utility knife
- Colored pencils or crayons
- Overhead projector, slide projector or strong flashlight
- A dark room

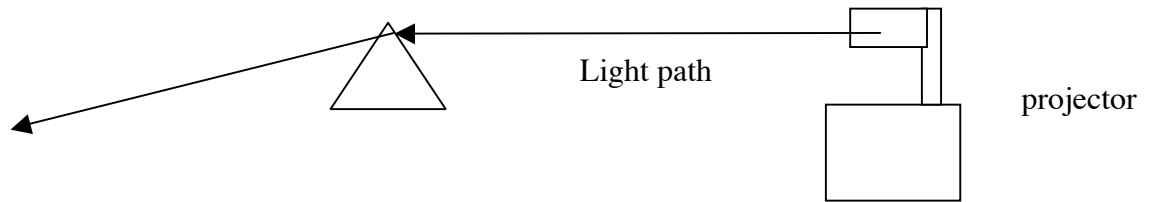
**Procedure:**

1. Cut a notch in the top of one edge of the narrow side of the box. The notch should be just big enough to hold the prism **securely**.



2. Position a strong, focused light source about 4 to 5 feet from the box. Put the sheet of white paper in the bottom of the box.

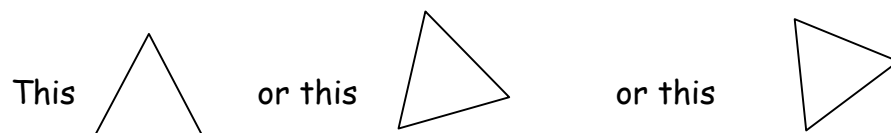
3. Insert prism into notch and secure with tape, if necessary. One flat side of the prism should be down. The opposite **edge** should be horizontal and perpendicular to the light source. (The box is not shown in the figure below.)



4. Adjust the height of the prism. The prism should be in direct line with the light from the projector. You may have to rotate the prism slightly to get the light coming through it to be projected onto the white paper in the dark bottom of the box. You should see a small "rainbow"! Continue to rotate the prism until the "rainbow" doesn't have any white light in the middle.
5. Try placing the light source and the prism at different distances from each other. Does this make a difference? What is the difference?
6. When you get the best possible "rainbow", go to the next step.
7. Using colored pencils or crayons, draw what you see on the white paper.

**Observations:**

1. What colors do you see? Look carefully. Attempt to describe as many different colors as you can.
2. What is the order of colors?
3. Draw the experimental set-up showing the prism and light source from the side. Note especially the angle of the prism. How much was it rotated?



**Part 2: Light from the Sun****Materials (per group):**

1. An equilateral glass prism
2. Tape
3. Cardboard box - a box that contained photocopier or printer paper is ideal
4. White paper
5. Colored pencils or crayons
6. A support stand with short horizontal rod and rod clamp
7. Direct sunlight

**Procedure:**

1. Use the same experimental equipment that you used in Part 1. Position the prism in the sunlight.
2. Turn the prism so that the "rainbow" is projected onto the bottom of the box.
3. Draw the "rainbow" on white paper.

**Observations:**

1. What colors do you see? Look carefully. Attempt to describe as many different colors as you can.
  
  
  
  
  
  
  
  
  
  
2. What is the order of colors?

3. Are there any differences between the "rainbow" from the projector and the "rainbow" from sunlight?

**Making Conclusions**

Scientists call the “rainbow” that you saw in the exploration a **light spectrum**. When you shine light from the projector on white paper, the paper looks white. When you place white paper in sunlight, the paper looks white. When you shine light from the projector or sunlight through a prism, a light spectrum appears. Think about the results from **Mix It Up**. Think carefully about all your evidence. Answer the following question in a short essay (1 to 2 pages)

What does your evidence tell you about visible light from the projector or from the Sun?

**Rainbows-Revisited**

## Journal Assignment

You have just completed one exploration of the properties of light. You have used a prism to create a light spectrum, and you have seen how water drops create a spectrum (rainbow). Use your new experiences as you answer these questions. Please answer the following questions in your journal as completely as you can. Your entry will be evaluated on the thoroughness and thoughtfulness of your answers and the reasoning you give in support of your answer.

Draw a rainbow. What colors are in a rainbow? What is the order of colors? Which color is on top?

What conditions do you need for a rainbow?

What is your explanation for a rainbow?

**Inquiry Reflection – Prisms and Rainbows**

These questions are designed to make you think about the process scientists use to explore and discover. Reflect upon and answer these questions in your journal. You will be evaluated upon the completeness of your answers and the depth of your thinking, not upon the correctness of your answers.

How is the structure of **Exploration with Prism and Light** different from **Exploration with Colored Light and Colored Paper**? Why is the structure different?

What is the function of the questions in the **Observations** sections of **Exploration with Prism and Light**? Would your responses have been different if you had just been asked to record your observations?

How is the **Making Conclusions** assignment in Lesson 2 - Prisms and Rainbows different from the **Making Conclusions** assignment in Lesson 1 - Mix It Up?