Lesson Time: 20–25 minutes

Make a Rainbow!

Objectives & Outcomes

Lesson Objectives: Through a kinesthetic activity, students will model how white light is split into the seven colors of the rainbow.

Lesson Outcomes: *Students will be able to...*

- identify the seven colors that make up the rainbow
- explain how a rainbow forms

Subject Area Connection: Language Arts

Getting Ready

Teacher Preparation: To prepare for this lesson, gather the paper and crayon supplies.

Materials Required:

- blackboard or white board and markers
- paper for painting
- crayons; specifically: white, red, orange, yellow, green, blue, dark blue, and purple
- blue water color paint
- paintbrushes

Key Vocabulary

spectrum: band of colors seen in the rainbow.

prism: triangular piece of clear glass that can bend light.

Background

Everyone has seen a rainbow in the sky. Rainbows aren't magic—their formation can be explained by science. White light from the sun can be refracted (bent) when it passes from one medium to another. When this white light enters a raindrop, each component of the white light is bent a different and specific amount. This way, the white light is split into its components: red, orange, yellow, green, blue, indigo, and violet.

The visible spectrum of light seen in a rainbow can be produced using a glass prism. Students may have seen "mini-rainbows" at home if light passes through a chandelier and is reflected onto a wall. Spraying a garden hose in the sunshine can produce a similar visible spectrum.

"**Rainbows aren't magic**—their formation can be explained by science."

Introduction and Modeling

Begin by asking students if they have ever seen a rainbow. With students, create a list on the board of the colors seen in the rainbow. Ask students if they know how a rainbow forms. Tell students that science can explain it—rainbows aren't magic. Explain that light from the sun is made up of many different colors. The bands of colors are called a spectrum. When light passes through air and then water (like a raindrop), the light bends. Something that bends light is called a prism. Each color bends a different amount so the white light from the sun gets split up. Tell students that they are going to "act out" what it's like to make a rainbow!

Procedure

1. Assign students to represent one color in the visible spectrum: red, orange, yellow, green, blue, indigo, violet.
2. Arrange seven students in a horizontal line in front of a doorway. This represents white light.
3. The students will pass through the door all at once (or as close to that as possible) and "split off" from one another, the way light does when it passes through a prism.
4. Students will confirm they are in the correct order of the visible spectrum by calling off in "ROY G BIV" order.
5. Repeat activity with another set of seven students until all students in the class have had an opportunity to participate.

Discussion Questions

- What does a prism do to white light?
- What are the seven colors of the rainbow?
- Have you ever seen a double rainbow? Can you think of how that forms?
- What kind of weather is it when you see a rainbow?

Evaluation

Students create a crayon resist painting of a rainbow. To do this, students create a rainbow with crayons, being sure to press hard. Then, using diluted watercolor paint they gently brush the blue sky all around the rainbow. This creates a post-rainstorm effect.

Tips for Tailoring This Lesson

For Higher Grade Levels

- Students can investigate glass prisms to see how they work.
- Students go on a scavenger hunt to look for colors of the rainbow.

For Lower Grade Levels

- Ask students to put their crayons in "rainbow" order.
- Read *The Rainbow Fish* by Marcus Pfister to students.

Alignment to Standards and Frameworks

Common Core State Standards: College & Career Readiness

Anchor Standards for Speaking and Listening

CCRA.SL.2. Integrate and evaluate information presented in diverse media and formats, including visually and quantitatively, as well as in words.

Anchor Standards for Language

CCRA.L.6. Acquire and use accurately a range of general academic and domain-specific words and phrases sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when encountering an unknown term important to comprehension or expression.

Partnership for 21st Century Framework

Partnership for 21st Century Framework: the framework comprises the skills, knowledge and expertise students should master to succeed in work and life in the 21st century. Partnership for 21st Century Skills www.p21.org

Critical Thinking and Problem Solving

Use Systems Thinking

- Analyze how parts of a whole interact with each other to produce overall outcomes in complex systems

Next Generation Science Standards

Next Generation Science Standards: based on the Framework for K–12 Science Education developed by the National Research Council. Publisher: Achieve, Inc. on behalf of the twenty-six states and partners that collaborated on the NGSS. ©2013 www.nextgenscience.org

1-PS4-3.

Plan and conduct investigations to determine the effect of placing objects made with different materials in the path of a beam of light.