

Lesson Plan

All Kinds of Light

Book: *Rainbows*

Series: Natural Phenomena

Level: Navigator

Objective

To help students learn more about the electromagnetic spectrum by interpreting and analyzing information presented in a diagram.

Supplies

- *Rainbows* book
- Ruler
- Notecards
- Pencils

Before the Activity

Read the *Rainbows* book, or assign it to students to read on their own. Write the following words on notecards: *radio waves, microwaves, infrared light, red light, orange light, yellow light, green light, blue light, indigo light, violet light, ultraviolet light, x-rays, gamma rays, 700 nanometers, 600 nanometers, 580 nanometers, 550 nanometers, 475 nanometers, 450 nanometers, 400 nanometers*

Activity

Open the *Rainbows* book to page 13 and have students look at the “Colors and Wavelengths” diagram. Wavelengths on this page are measured in nanometers. A nanometer is an extremely tiny unit of measurement. It is one billionth of a meter. Show students one millimeter on the ruler. A millimeter is one thousandth of a meter. That means there are one million nanometers in a millimeter.

Wavelengths that people’s eyes can see are known as visible light. However, there are other wavelengths that people cannot see. These wavelengths are shown in the black boxes along the right side of the diagram. Ask students the following questions about the diagram:

- How many nanometers long are red light waves? (Answer: 700)
- How many nanometers long are violet light waves? (Answer: 400)
- Would light with a 475-nanometer wavelength be visible? (Answer: Yes)
- How do you know from the diagram? (Answer: 475 is between 400 and 700, which is the range for visible colors.)

- Would light with an 800-nanometer wavelength be visible? (Answer: No)
- How do you know from the diagram? (Answer: 800 is longer than 700, which is the longest visible wavelength.)
- Is infrared light a part of visible light? (Answer: No)
- How can you tell this from the diagram? (Answer: The box labeled “Infrared” appears above red light, the longest wavelength of visible light.)
- What does the diagram tell you about infrared light’s wavelengths? (Answer: They are longer than 700 nanometers.)
- Is ultraviolet light a part of visible light? (Answer: No)
- How can you tell this from the diagram? (Answer: The box labeled “Ultraviolet” appears below violet light, the shortest wavelength of visible light.)
- What does the diagram tell you about ultraviolet light’s wavelengths? (Answer: They are shorter than 400 nanometers.)

Next, give each student a notecard. Explain that each notecard has the name of a particular wavelength of light. You will call out an order of light wavelengths. Students holding notecards that are part of that set should line up in that order. Students holding notecards that are not part of that set should sit down. If students have notecards with the same wavelength, they should link arms. Use the following orders:

1. Wavelengths that are part of visible light, from shortest to longest
violet/400, indigo/450, blue/475, green/550, yellow/580, orange/600, red/700
2. Wavelengths that are more than 550 nanometers long, from longest to shortest
radio waves, microwaves, infrared light, red/700, orange/600, yellow/580
3. Wavelengths that are not visible, from shortest to longest
gamma rays, x-rays, ultraviolet light, infrared light, microwaves, radio waves
4. Wavelengths that are less than 550 nanometers long, from longest to shortest
blue/475, indigo/450, violet/400, ultraviolet light, x-rays, gamma rays
5. colors in a rainbow, from top to bottom
red/700, orange/600, yellow/580, green/550, blue/475, indigo/450, violet/400
6. all the kinds of light waves, from shortest to longest
gamma rays, x-rays, ultraviolet light, violet/400, indigo/450, blue/475, green/550, yellow/580, orange/600, red/700, infrared light, microwaves, radio waves

Evaluation

Could students answer the questions about the diagram? Could they arrange themselves in the correct orders?

Standards

This lesson may be used to address the Common Core State Standards' reading standards for informational texts, grade 4 (RI 4.7).