

Waves and Electromagnetic Radiation

1. Wave Properties

Teaching Strategies and Answers—Quest Check-In—*Light Behavior* (Digital Activity)

STEM **Quest** Light Behavior

Light Waves

Light is a wave. It has all the properties and characteristics of the waves you just learned about.

1. Think back to the questions about light that you recorded when you started the Quest. Have you learned any answers to your questions?

Enter Text Here



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In this activity, students consider how light behaves when it interacts with a mirror or lens.

Teaching Tips Students may not recognize that all light is in the form of waves that travel in straight lines as shown in the pictures in this activity. To demonstrate this, use a flashlight or projector with the lights turned off in your room. Comment on the beam of light that is visible, and explain how the reflection of particles within the beam allows you to see it. When the lights are on, your eye detects light coming from all directions, so the beam of light from the flashlight or projector is undetectable.

Differentiated Instruction *Advanced Learners* Have students who are knowledgeable about light behavior and optics do research on lasers. Students could focus on different aspects of lasers, such as the production of a coherent beam of light at a specific wavelength or a particular application of lasers.

Best Practices Whenever possible, supplement digital activities with hands-on experiences using lenses and mirrors. Have magnifying glasses available for students to reproduce the lensing effect over a book.

Continued

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Integrating Instructional Strategies

Next Gen Science

SEP Developing and Using a Model Students might need help interpreting the diagrams on the third screen of the activity. Each photograph shows three beams of light, each of a different color. In each photograph, the red and blue beams of light are deflected. Tell students that the material used in each lens is identical, so that they hopefully will focus on the differences in shape as the cause of the deflection. Note that the green beam is not deflected, because the beam passes through the middle of the lens.

CCC Structure and Function Examine the structure and function of both lenses and mirrors. Elicit from students ways in which lenses and mirrors are related. Ask what the purpose of a mirror is and how its structure allows the mirror to achieve that purpose. Then repeat the discussion with lenses.

Answers

1. Accept all reasonable responses.
2. Sample answer: The text looks bigger in the lens than it does on the page. The lens changes the light when it moves through it.
3. Sample answer: Similar: Both lenses are curved. Different: Lens A is curved outward on both sides; lens B is curved inward on both sides. When the light beams pass through Lens A, they bend inward toward each other and become more focused; when the light beams pass through Lens B, they bend outward and away from each other.
4. It bounces off the mirrors. It changes direction when it meets the mirror.
5. Sample answer: I can use one type of lens to focus a beam of light and make it more intense. I can use another type of lens to make the beam of light spread out and become less intense. I can use a mirror to change the direction of the light by making the light reflect off the mirror's surface.