

Using Light ▪ 2.1 Review and Reinforce

# Waves and the Electromagnetic Spectrum

## Understanding Main Ideas

Complete the table.

The Electromagnetic Spectrum

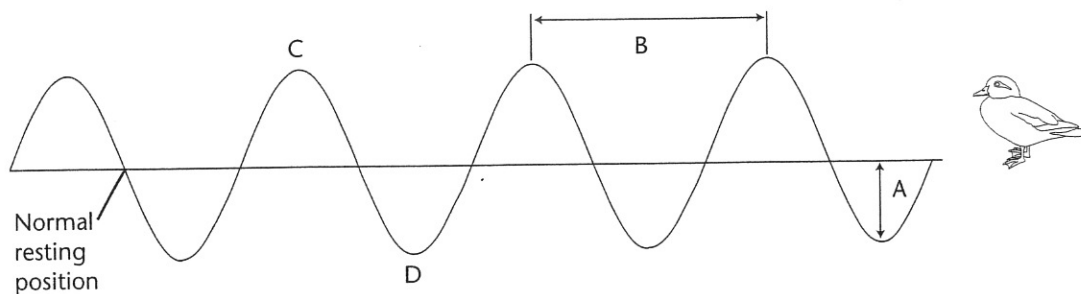
Type of Electromagnetic Radiation	Example of Use
1.	Communication
Infrared rays	2.
Visible light	Seeing
Ultraviolet rays	3.
4.	Check for broken bones inside the body
5.	Treat cancer

Increasing Wavelength ↑

Using Light

## Building Vocabulary

Answer the following questions about the light wave heading toward the bird in the spaces provided.



- The letter A in the figure above represents the \_\_\_\_\_ of the wave.
- The letter B in the figure above represents the \_\_\_\_\_ of the wave.
- The letter C in the figure above represents a(n) \_\_\_\_\_ of the wave.
- The letter D in the figure above represents a(n) \_\_\_\_\_ of the wave.

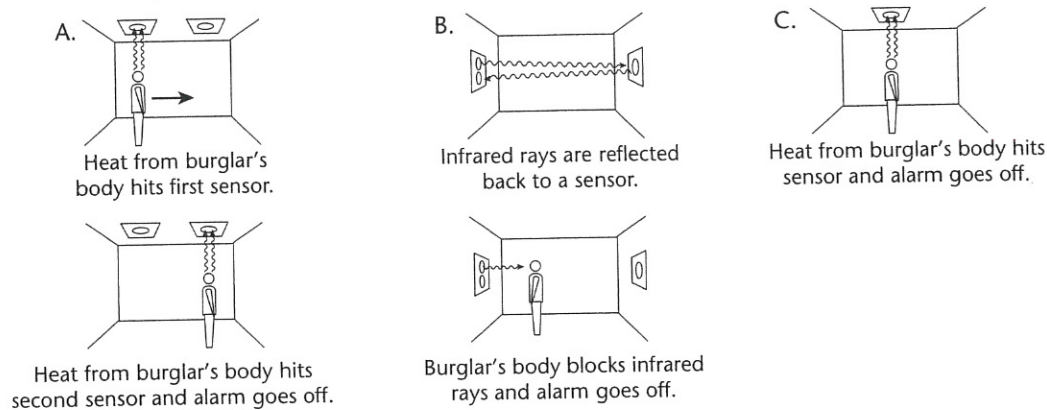
## Using Light • 2.1 Enrich

**Motion Detectors**

Many businesses have burglar alarms that are connected to motion detectors. A *motion detector* is a device that can sense when a person or other object moves through a room. One type of motion detector can sense the infrared rays given off by a person's body. An alarm is set off when infrared rays hit a sensor on the detector. This type of device is called a passive infrared (PIR) motion detector.

Another type of PIR motion detector involves two sensors in different parts of an office. This type of detector is designed to turn on an alarm only after both sensors have been hit by infrared rays from a person's body.

PIR motion detectors only sense infrared rays; they do not transmit them. By contrast, part of an active infrared (AIR) motion detector gives off infrared rays. A second part of the detector in another part of the room reflects these rays back to the first part where they hit a sensor. If someone walks through the path of the invisible infrared rays given off by the detector, his or her body will prevent the rays from hitting the sensor. When this happens, the alarm is set off.



Answer the following questions on a separate sheet of paper.

1. Label each of the motion detectors shown above as one-sensor PIR, two-sensor PIR, or AIR.
2. Suppose a business has a nighttime alarm system with a one-sensor PIR motion detector. What do you think would happen if a lamp close to the sensor was left turned on overnight?
3. Suppose a business has a nighttime alarm system with a two-sensor PIR motion detector. What do you think would happen if a lamp close to one of the sensors was left turned on overnight?
4. Do you think that a motion detector that used visible light instead of infrared rays would work very well? Explain your answer in terms of both passive and active detectors.