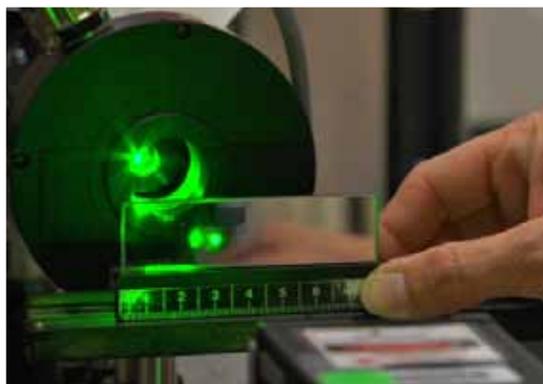




Laser Dazzlers

Laser Beams Designed to Deter Drivers



San Antonio, TX (Brooks City-Base Air Force Research Lab)—Using specially designed lasers, Air Force engineers have developed a way to force approaching vehicles to slow down from a distance. The bright light from the laser beams impairs the drivers' vision. It doesn't harm their eyes, but it does make them slow down or stop. This gives soldiers extra time to decide whether the people approaching pose a threat.

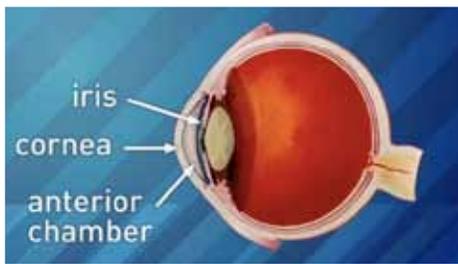
"Lasers are all around us. A laser beam is a very coherent, concentrated beam of light."

Gordon Hengst, electrical engineer

Framework	Standards
Middle School	<ul style="list-style-type: none"> NSES - B.iii.3 ➤ Light interacts with matter. NSES - C.i.4 ➤ Specialized cells form tissues. NSES - C.iii.3 ➤ Behavior is a response to an internal or environmental stimulus. NSES - F.i.v.1 ➤ Risk analysis considers the type of hazard. STL - 3.F ➤ Knowledge from other fields of study are applied to technology.

Content Illustrated

➤ Cross section of the eye.



Content



Life Science

- The human eye is made up of the cornea, anterior chamber, iris (which controls the size of the pupil, through which light enters), the lens (which focuses the light), and the retina (which captures and relays the light images).
- An afterimage is caused by the delayed regeneration of photon-capturing molecules in the retina.

Physical Science

- A laser aligns photons to create a pure, directional, focused light.
- Laser light has a sharply tuned frequency, so its color is pure.

Technology

- Laser stands for Light Amplification by Stimulated Emission Radiation.
- Unlike flashlights or light bulbs, which send light in all directions, laser light energy is directed in only one direction.
- A simulator is used to safely test the amount of energy that will adversely affect the human eye.

Engineering

- Driver defeat is designed to impair a driver's ability to see by shining a laser onto the car.
- Tests are conducted to see how much laser energy a driver can safely take before it impairs the ability to drive.
- Variables manipulated include the timing of flashes, wavelength (color), and power.
- The goal is to create afterimages that defeat a person's ability to see for a short time. The natural response is to slow down.

Guiding Questions

To think about as you watch:

- How can you safely flash light in someone's eyes without damaging them?

Suggested Activities

- Research how people's eyes adjust to bright lights.

Keywords

afterimage
beam spreader
cornea
driver defeat
eye
frequency
iris
laser
photon
pupil
retina
wavelength

➤ *Laser Dazzlers* can be found online at www.ndep.us/Laser-Dazzlers. Visit www.ndep.us/LabTV for a list of process skills modeled in webisodes.