



What are the six common sources of light?



Common light sources include incandescent, fluorescent, laser, neon, tungsten-halogen, and sodium-vapor bulbs.

Objects that give off their own light are **luminous**.
The sun is luminous, as are all light sources.

Incandescent Light



How does an incandescent light source generate light?



The color of any object depends on what the object is made of and on the color of light that strikes the object.

Incandescent Light

The light produced when an object gets hot enough to glow is **incandescent**.

The filaments in incandescent light bulbs are made of a substance called tungsten.

Incandescent bulbs give off most of their energy as heat, not light.

DOK Question

Hypothesize why this is important.

Fluorescent Light



How does a fluorescent light source generate light?



Fluorescent light bulbs emit light by causing a phosphor to steadily emit photons.

Fluorescent Light

In a process called **fluorescence**, a material absorbs light at one wavelength and then emits light at a longer wavelength.

A **phosphor** is a solid material that can emit light by fluorescence.

A fluorescent bulb is a glass tube, containing mercury vapor, that is coated with phosphors.

DOK Question

Hypothesize why this is important.

Laser Light



How does a laser light source generate light?



Laser light is emitted when excited atoms of a solid, liquid, or gas emit photons.

Laser Light

Light in which waves have the same wavelength, and the crests and troughs are lined up, is **coherent light**.

- A **laser** is a device that generates a beam of coherent light.
- A beam of coherent light doesn't spread out significantly from its source, so the light has a relatively constant intensity.
- The energy it carries may be focused on a small area.

DOK Question

Hypothesize why this is important.

Neon Light



How does a neon light source generate light?



Neon lights emit light when electrons move through a gas or a mixture of gases inside glass tubing.

Neon Light

Many lights called neon lights contain gases other than neon, including helium, argon, and krypton.

- Helium gas gives off a pink light.
- A mixture of argon gas and mercury vapor produces greenish-blue light.
- Krypton gas produces a pale violet light.
- Pure neon emits red light.

DOK Question

Hypothesize why this is important.

Sodium-Vapor Light



How does a sodium vapor light source generate light?



As electric current passes through a sodium-vapor bulb, it ionizes the gas mixture. The mixture warms up and the heat causes the sodium to change from a solid into a gas.

Sodium-Vapor Light



Sodium-vapor lights contain a small amount of solid sodium, in a mixture of neon and argon gases.

The current of electrons knocks electrons in sodium to higher energy levels. When the electrons move back to lower energy levels, the sodium atoms emit light.

DOK Question

Hypothesize why this is important.

Tungsten-Halogen Light

-  How does a tungsten halogen light source generate light?
-  Inside a tungsten-halogen bulb, electrons flow through a tungsten filament. The filament gets hot and emits light.

Tungsten-Halogen Light

Tungsten-halogen light is produced in much the same way as incandescent light.

A tungsten-halogen bulb has a small amount of a halogen gas, such as iodine, bromine, or fluorine.

The halogen gas reduces wear on the filament, so tungsten-halogen bulbs last longer than incandescent bulbs.

DOK Question

Hypothesize why this is important.

Assessment Questions

1. The light produced when an object becomes hot enough to glow is
 - a. incandescent.
 - b. fluorescent.
 - c. phosphorescent.
 - d. coherent.

ANS: A

Assessment Questions

2. The most efficient source of lighting rooms of a building is
- incandescent light.
 - flourescent light.
 - sodium-vapor light.
 - tungsten-halogen light.

ANS: B

Assessment Questions

1. Neon lights emit coherent light, in which the waves all have the same wavelength and wave crests and troughs are lined up.

True

False

ANS: F, Lasers