

## Types of Light - Fill in the blanks

Light travels as particles called photons, which move in a straight line when in a vacuum. However this straight line is actually an Electromagnetic wave, meaning that light has both electric and magnetic fields.

However, there are different types of light sources. Light from the sun and other stars is considered a source of natural light, whereas light from a flashlight or lamp is from an artificial source.

Light that is emitted by a very hot object is called incandescan. This type of lighting is produced when electricity passes through a Tungsten wire, which then heats up.

Incandescent lighting was first discovered/invented by Joseph Swan and Thomas Edison, who is usually credited with the invention.

Incandescent light bulbs however are a very inefficient source of lighting, as only about 5% of the energy used is given off as light energy, whereas 95% is lost as heat energy.

Due to this inefficiency, fluorescent lights have replaced many incandescent light bulbs in homes. Fluorescent lighting works by passing electricity through a tube (bulb) containing Mercury atoms, along with an Inert gas like argon. This produces ultraviolet light. This type of light is not visible to us, but is converted to visible light by a powdery substance called Phosphor, which coats the bulb.

While more efficient than incandescent bulbs, fluorescent lights still have a couple of problems. Firstly, the initial surge of energy may not be sufficient to excite the mercury atoms, and secondly, once heated the mercury atoms would increase the conductivity as time passes, increasing the chance of the bulb overheating. Due to this, we add a fluorescent light \* ballast to help overcome these issues.

Light that is generated by the energy released in a chemical reaction is called chemiluminescence. Light produced in this way in animals is called bioluminescence.

Forensic scientists often use chemiluminescence at crime scenes to identify certain bodily fluids. This is done by spraying a mixture of Luminol and hydrogen peroxide onto the area. Blood will then show a blue glow when viewed under UV light in the dark, as iron in the blood acts as a catalyst in the chemical reaction, making it visible to the naked eye.

Fireflies produce their own light, however they do not use hydrogen peroxide to oxidise their luciferin (like luminol), instead they use oxygen.

Many other animals use bioluminescence to their advantage. Some reasons they may use this is to attract mates, to lure in prey for food, or for protection, to scare of potential predators.

The colour of the bioluminescence produced is dependent on the wavelength of the photons emitted by the reaction. Colours with shorter wavelengths travel farther, which is why most bioluminescence in the ocean is in the form of blue-green light.

### Word Bank

~~Light~~

~~Ultraviolet~~

~~Photons~~

~~Electricity~~

~~Ballast~~

~~Phosphor~~

\* Chemiluminescence = spelling

~~Straight~~

~~Shorter~~

~~Excite~~

~~Electric~~

~~Mercury~~

~~Magnetic~~

~~Joseph Swan~~

~~Heat~~

~~Bioluminescence~~

~~Electromagnetic~~

~~Artificial~~

~~Thomas Edison~~

~~Iron~~

~~Farther~~

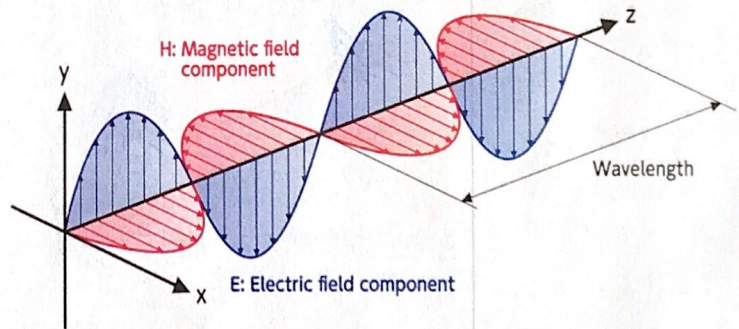
~~Ineandescence~~

~~Inert~~

~~Tungsten~~

~~Luminol~~

~~Natural~~



fireflies  
→ oxygen

prey  
mates  
wavelength

luciferin  
protection