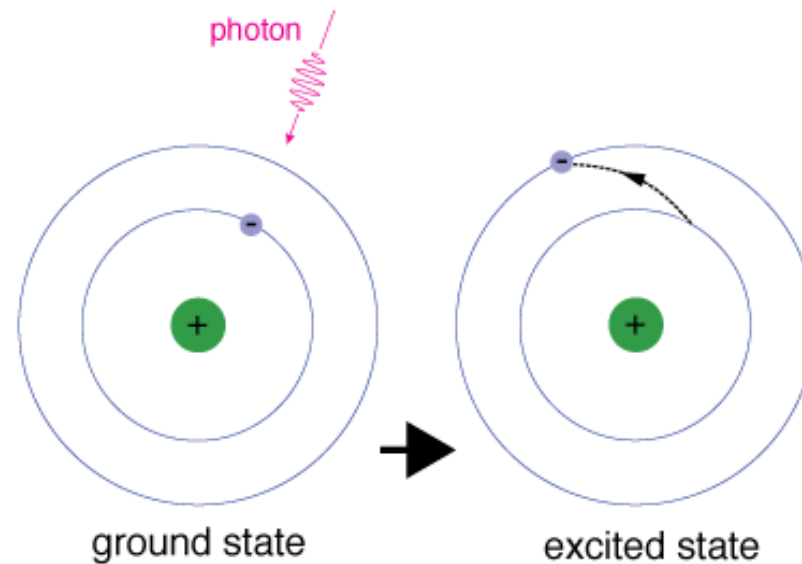


10.1 - Light and Reflection

SNC2D

MRS. FRANKLIN

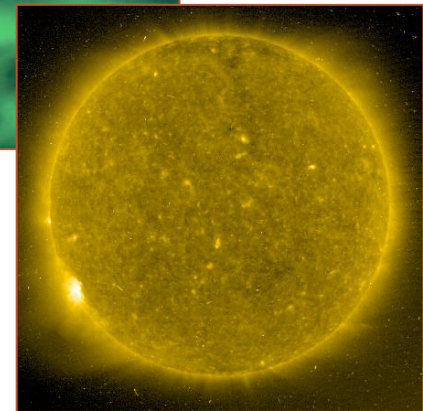
All sources of light must absorb energy that raises the electrons in atoms within a substance to an **excited state**. These excited atoms then release energy, often in the form of **light**.



There are various sources of light, some are artificial (light bulb and candle) and others are natural (organisms).

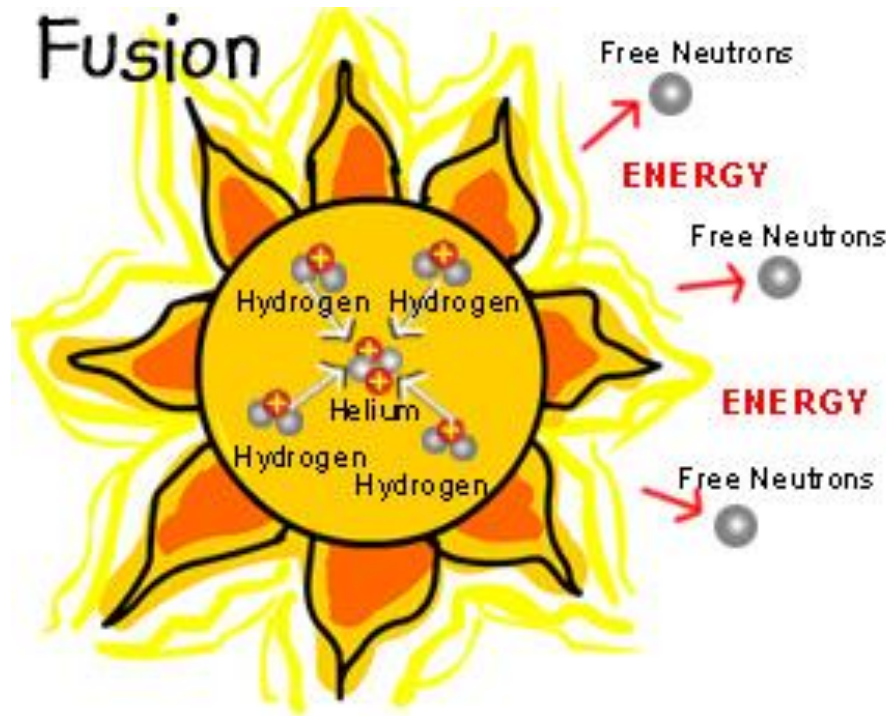
Main types of Light Sources:

- 1) Light from the Sun
- 2) Light from Incandescence
- 3) Light from Electric Discharge
- 4) Luminescence



1) Light from the Sun

The energy emitted from fusion reactions in the sun, emit light. During the reaction, electrons get to an 'excited' state and when returning back to ground state light is released.



During a fusion reaction, hydrogen atoms collide and fuse to form helium.

2) Light from Incandescence

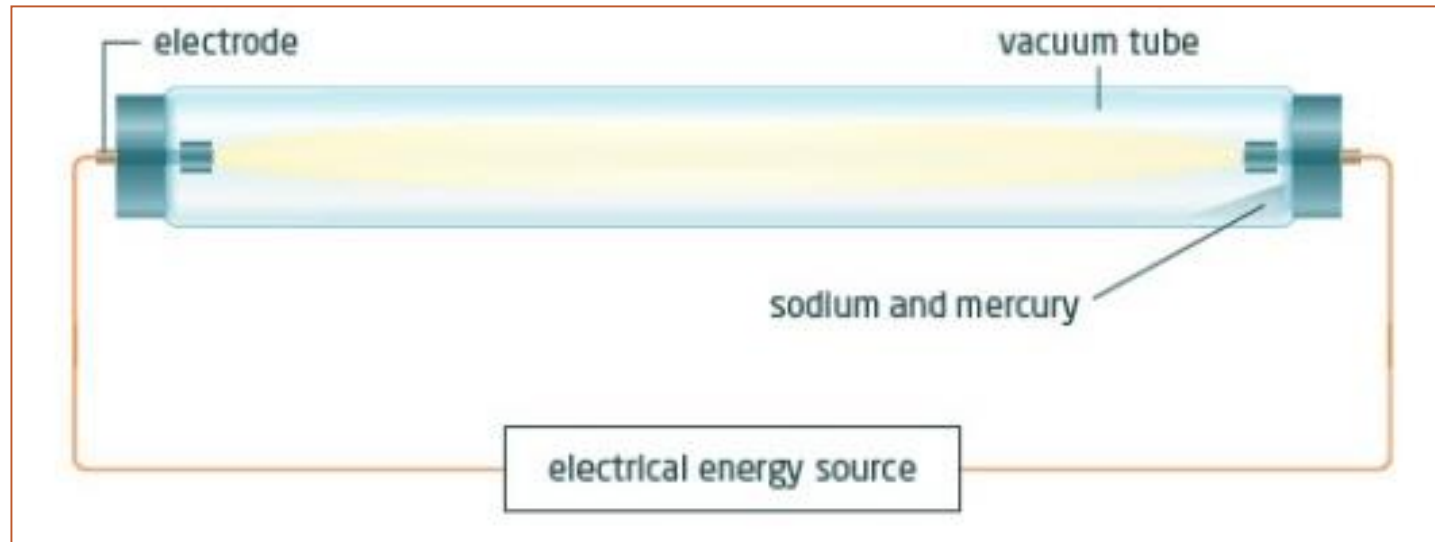
Incandescence stands for 'light that is emitted from a very hot object'. Electrical energy sends off heat into the light bulb and causes 'excitation'. When the electron return to ground state, light is emitted.



The center of the light bulb contains a tungsten wire. When an electrical source is generated, the wire heats up.

3) Light from Electric Discharge

Electric Discharge light sources, emit light due to the presence of heated gas or vapour. The most common type uses sodium vapour and mercury.



When an electric current passes through the sodium/mercury vapour, the electrons are excited. When returning to ground state they emit a yellow light.

4) Luminescence

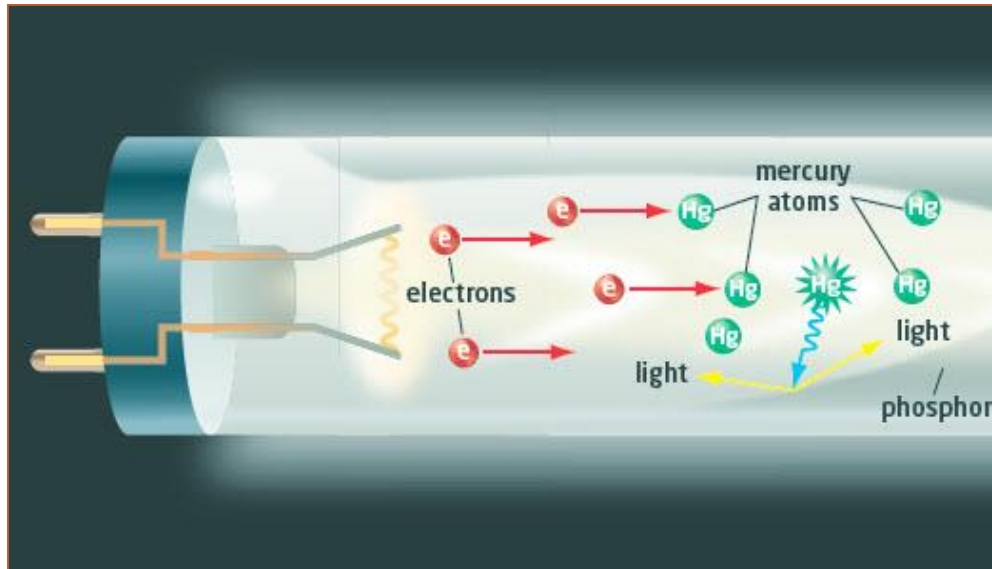
Luminescent light can excite electrons in the atom without relying on a heat source.

Types of luminescent lights:

- a) Fluorescence
- b) Phosphorescence
- c) Chemiluminescence
- d) Bioluminescence

a) Fluorescence

A fluorescent bulb contains mercury vapour, an inert gas (argon) and phosphor (powder). When the electrodes receive an electrical input, they release electrons into the bulb, which collide and excite the mercury electrons.



When electrons return to ground state, light is emitted as ultraviolet light. The phosphor converts the UV light into visible light.

a) Fluorescence

There are many types of fluorescent lights around us:



Body fluids contain fluorescent molecules.



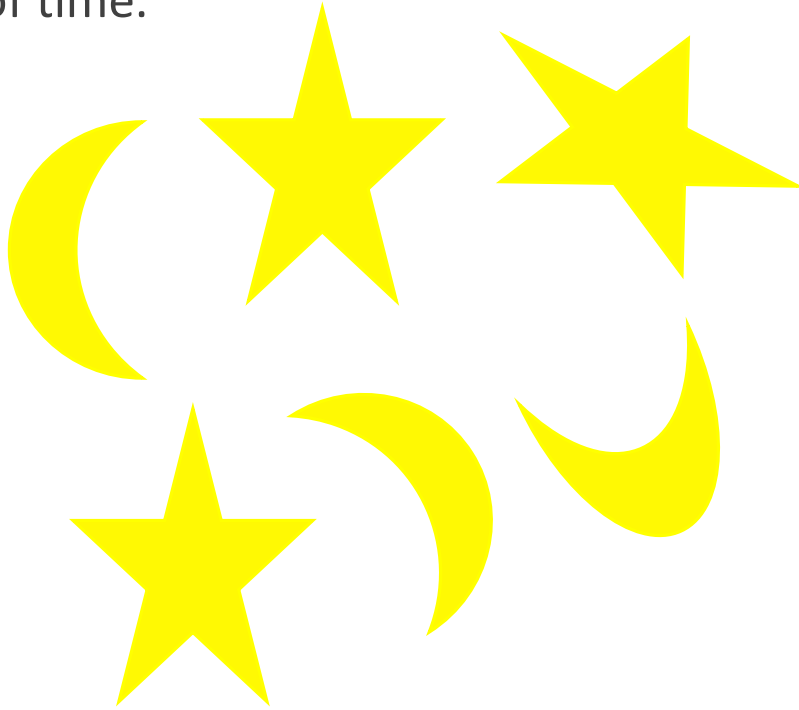
If abnormal tissue is found in the mouth it can fluoresce when under blue light.



Many important documents contain fluorescent molecules.

b) Phosphorescence

Some items contain phosphorescent material that is able to absorb ultraviolet light in the environment. This light excites the electrons in the phosphorescent material for prolonged periods of time.



Most glow-in-the-dark objects use phosphorescence.

c) Chemiluminescence

Chemiluminescence occurs when chemical react together and produce light.



d) Bioluminescence

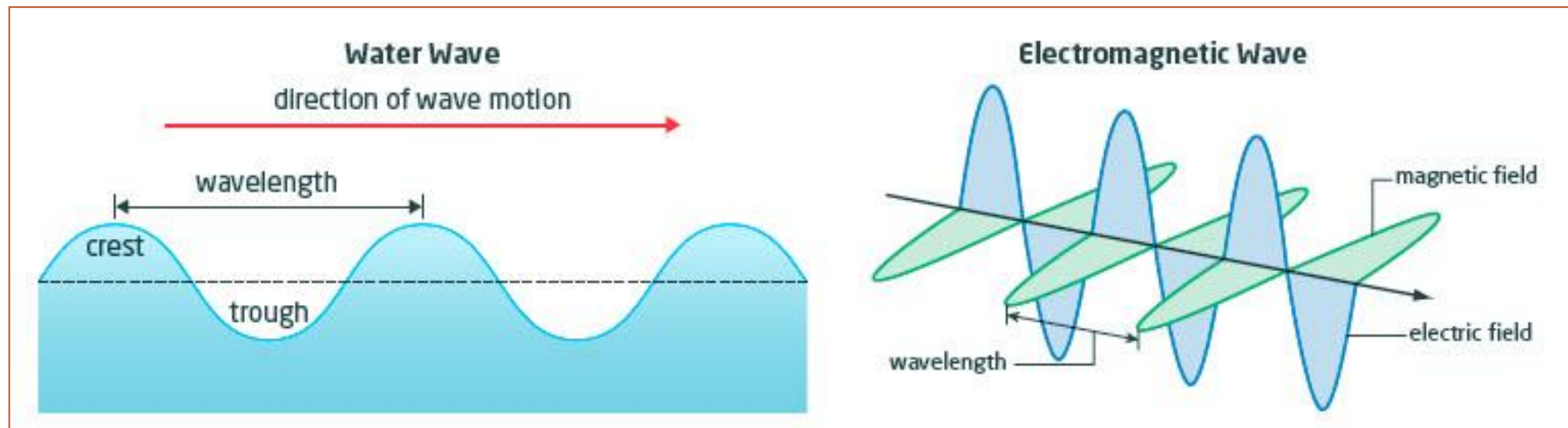
Bioluminescence involves light that is produced in chemical reaction within living organisms.



When oxygen reacts with calcium the reaction emits a bioluminescent light in fireflies.

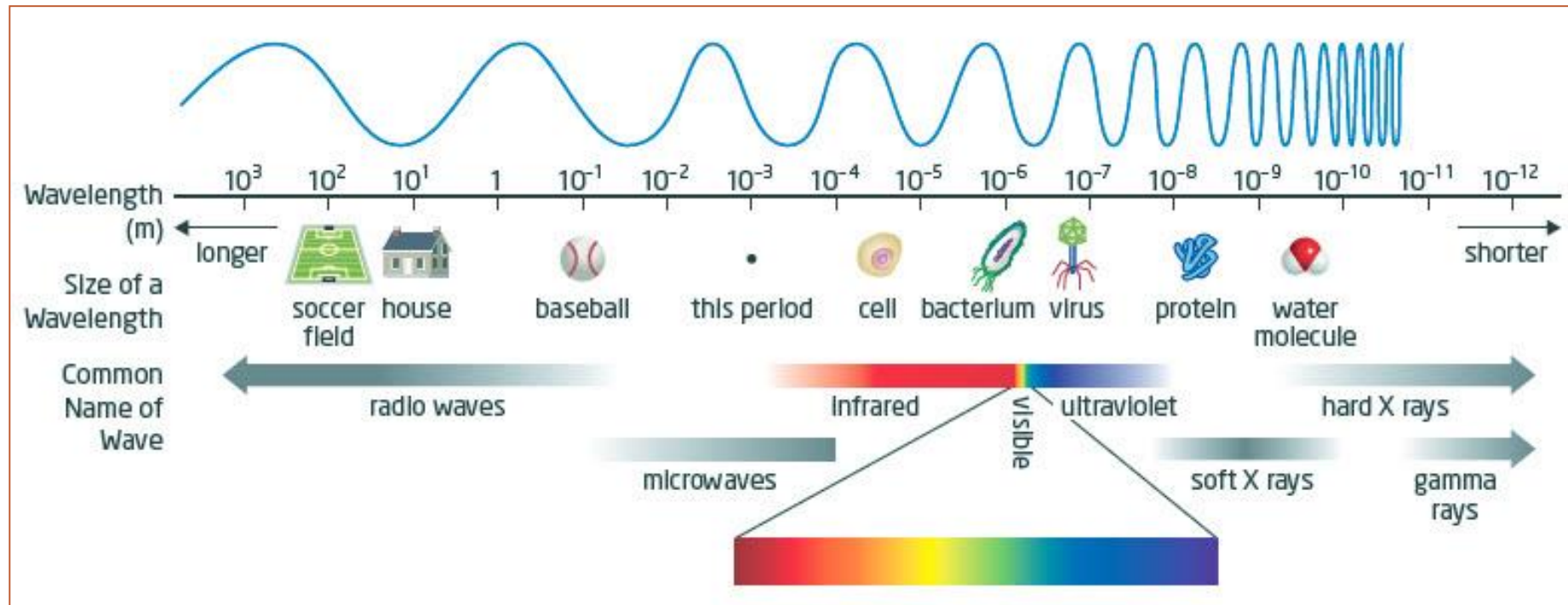
Electromagnetic Waves

Electromagnetic waves are invisible and involve the movement of energy from one point to another. The energy is able to move in a wave like motion due to magnetic and electric fields.



Electromagnetic Spectrum

The **Electromagnetic Spectrum** displays the range of electromagnetic waves that exist in order of their frequency.



Homework

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