Ecology

Background Information

- **Environment** is the physical, chemical and biological factors surrounding of an organism at any given time.
- **Ecology** the total relationships between the organisms and the environment.
- **Ecosystem** is a community made up of living organisms and nonliving components such as air, water, and mineral soil.

Environment can be divided into two groups:

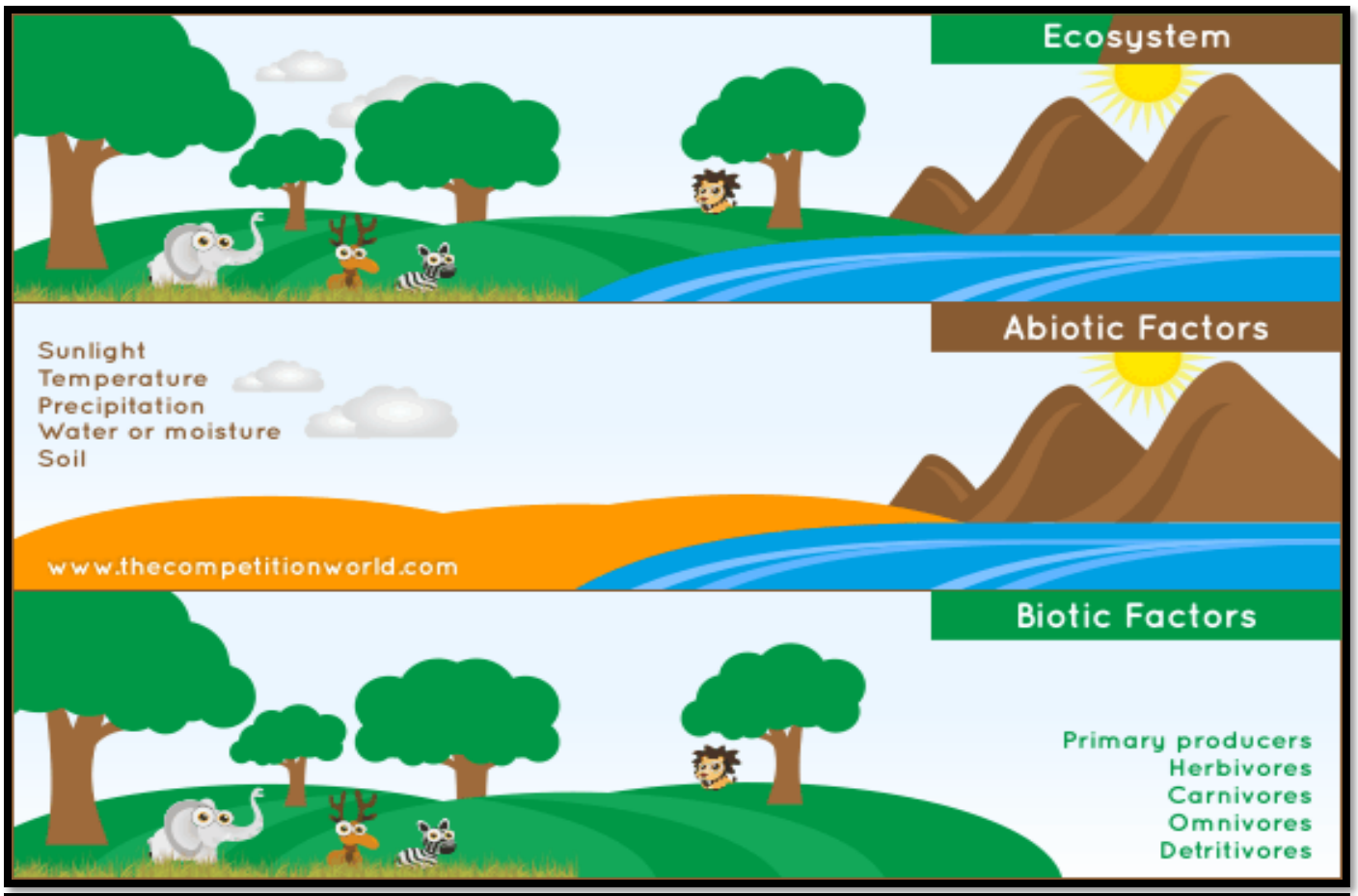
1- **Biotic** can be described as any living component that affects another organism, or shapes the ecosystem.

a) **Producers**, otherwise known as autotrophs, convert energy (through the process of photosynthesis) into food.

b) **Consumers**, otherwise known as heterotrophs, depend upon producers (and occasionally other consumers) for food.

c) **Decomposers**, otherwise known as detritivores, break down chemicals from producers and consumers (usually antibiotic) into simpler form which can be reused.

2- Abiotic are non-living chemical and physical parts of the environment that affect living organisms and the functioning of ecosystems. abiotic factors can include **water**, **light**, **radiation**, **temperature**, **humidity**, **atmosphere**, and **soil**.


Ecosystem
Abiotic Factors
Sunlight
Temperature
Precipitation
Water or moisture
Soil
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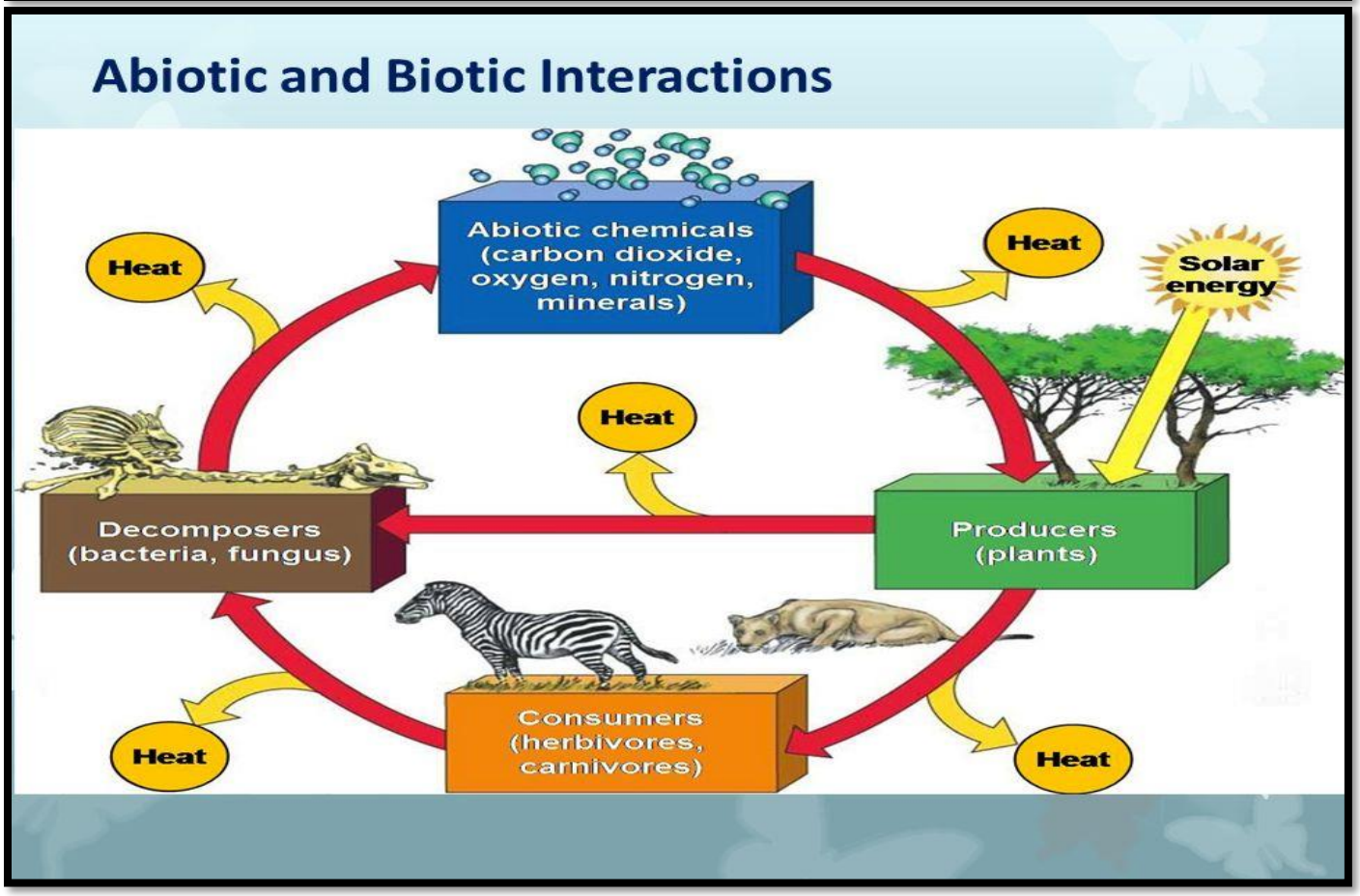
Biotic Factors
Primary producers
Herbivores
Carnivores
Omnivores
Detritivores


Abiotic and Biotic Interactions
Abiotic chemicals (carbon dioxide, oxygen, nitrogen, minerals)
Heat
Heat
Solar energy
Heat
Decomposers (bacteria, fungus)
Producers (plants)
Consumers (herbivores, carnivores)
Heat
Heat

Environmental factor

Environmental factor or **ecological factor** or **eco factor** is any factor, **abiotic** or **biotic**, that influences living organisms.

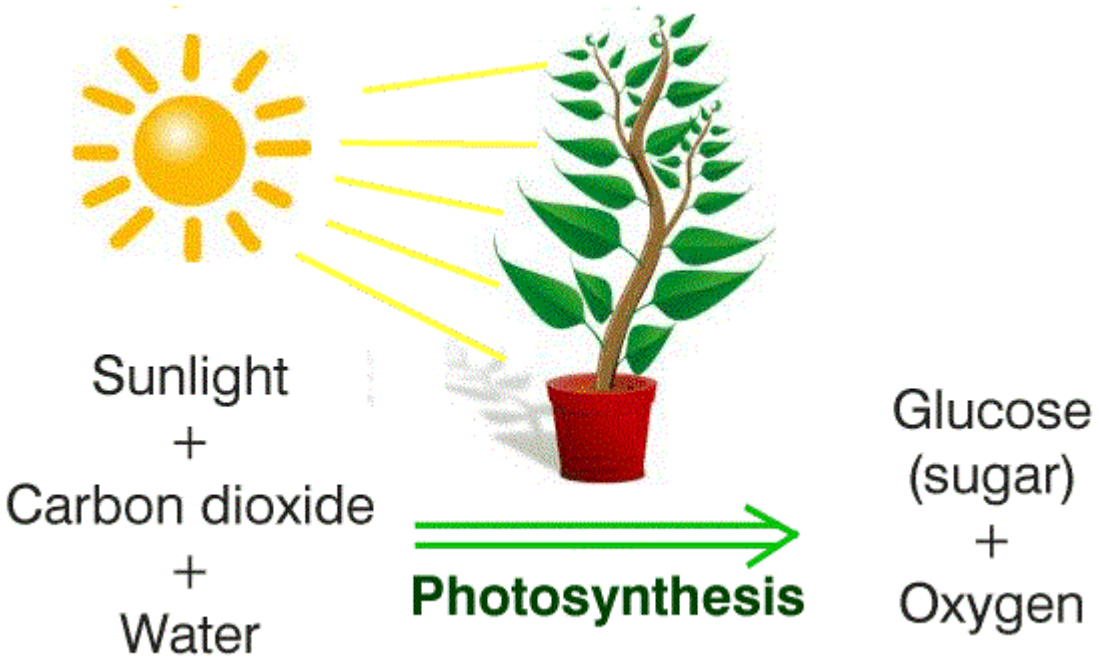
1- Abiotic Factors include:

a. **Physical factors**:(light, Temperature, humidity, rainfall, Dew, Evaporation, Water flow, wind and atmospheric pressure).

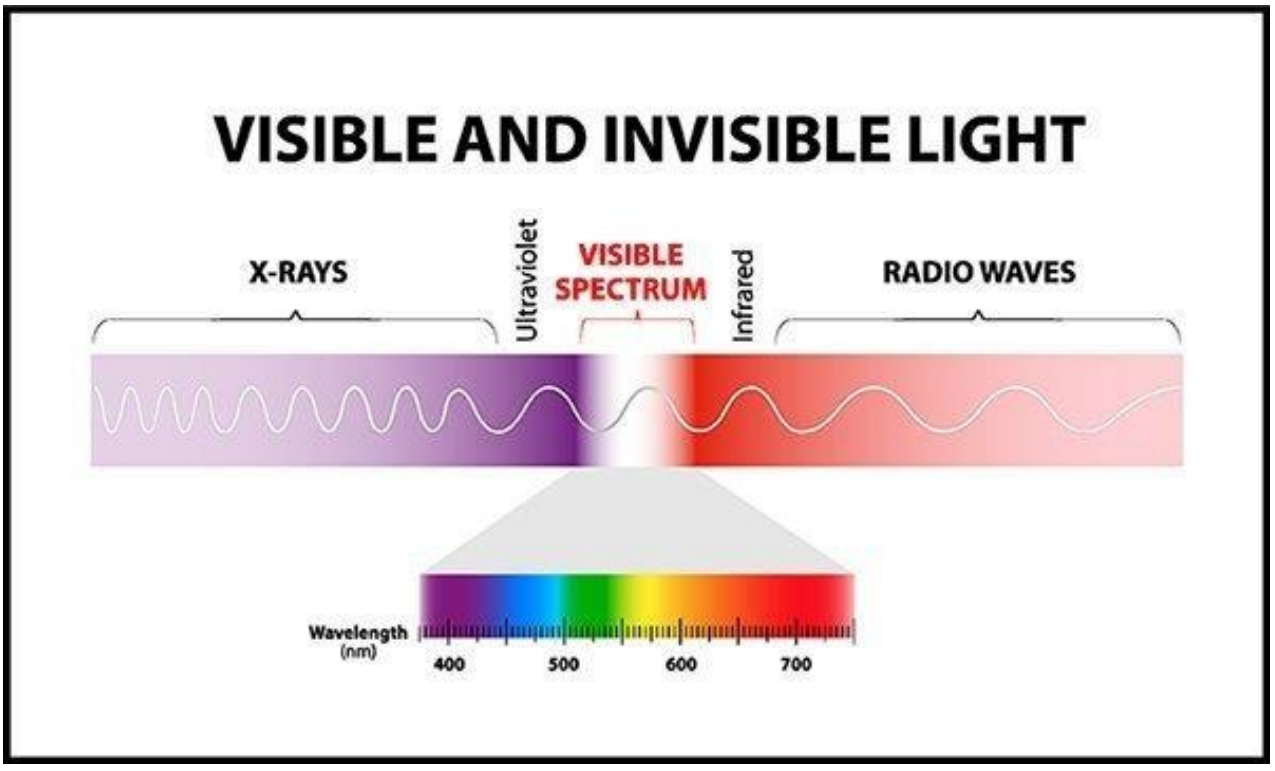
b. **Chemical factors**:(pH, Electrical conductivity, Salinity, Radioactive element, availability of nutrients and heavy metals).

Light (Solar Radiation)

Light is electromagnetic radiation come mainly from the sun, Sunlight provides the energy that green plants use to create sugars mostly in the form of starches, which release energy into the living things that digest them. This process of photosynthesis provides virtually all the energy used by living things. Light include:



1. **Visible light** is the portion of the electromagnetic spectrum that is visible to the human eye. Electromagnetic radiation in this range of wavelengths is called visible light or simply light. A typical human eye will respond to wavelengths from about 390 to 700 nanometers.
2. **Infrared radiation (IR)** is electromagnetic radiation (EMR) with longer wavelengths than those of visible light, and is therefore generally invisible to the human eye
3. **Ultraviolet (UV)** is electromagnetic radiation with a wavelength from 10 nm to 400 nm, shorter than that of visible light but longer than X-rays.
4. **Various Rays** (X-Rays, Gamma rays, Micro wave and Radio waves)



NOTE: The greater the energy, the larger the frequency and the shorter the wavelength.

The importance of light

1- Source of energy for Photosynthesis.

2- Important in the process of transpiration, flowering, germinations and hormones formation.

3- Important factor in animal migration and animal reproduction.

4- Essential for eye sight and maintain body temperature for many animals.

5- Interferes with other factors such as heat and humidity which will effect structure of organisms.

Types of light measurement devices:

- **Solarimeter** a type of measuring device used to measure combined direct and diffuse solar radiation. An integrating solarimeter measures energy developed from solar radiation based on the absorption of heat by a black body.

- **Radiometer** is a device for measuring the power of electromagnetic radiation. Generally, a radiometer is an infrared radiation detector or an ultraviolet detector

  The vanes rotate when exposed to light, with faster rotation for more intense light, providing a quantitative measurement of electromagnetic radiation intensity.

- **Photometer** is an instrument that measures light intensity or the optical properties of solutions or surfaces. Photometers measure:(Illuminance, Irradiance, Light absorption, Scattering of light, Reflection of light and Fluorescence)

- **Secchi disc** is a plain white, circular disk 30 cm (12 in) in diameter used to measure water transparency or turbidity in bodies of water. The disc is mounted on a pole or line, and lowered slowly down in the water. The depth at which the disk is no longer visible is taken as a measure of the transparency of the water. This measure is known as the Secchi depth and is related to water turbidity. Since its invention, the disk has also been used in a modified, smaller 20 cm (8 in) diameter, black and white design to measure freshwater transparency.