

AP Environmental Study Guide

Different Forms of Energy:

1. **Kinetic** - The energy of moving objects
2. **Potential** - Energy that is stored
3. **Gravitational** - Associated with gravity or gravitational force and is the energy held by an object because of its high position compared to a lower one
4. **Thermal or Heat** - Is created from the vibration of molecules and atoms within substances. The faster they move, the more energy they produce + the hotter they become
5. **Electrical** - Generated by moving electric charges called electrons. Lighting and electric cells are an example of electrical energy
6. **Radiant or Light** - A form of electromagnetic radiation and is the only type of energy humans can see
7. **Nuclear** - The energy that holds together the nucleus of atoms. It is released during nuclear fusion.
8. **Mechanical** - Associated with the position and motion of an object

Conservation of Energy - Energy can never be created nor destroyed, but it can be transformed from one type to another

Building Blocks of Life:

Carbon:

- Has four electrons in its outer shell
 - Can form a variety of simple and complex molecules
 - Can form straight carbon chains, branched carbon chain, carbon ring, single, double, or triple bond
- Referred to as carbon-based life forms is because of all of our biological molecules, their backbone is that of carbon because carbon has four valence electrons and can form a wide variety of bonds and shapes.

Macromolecules = Large molecules formed by joining smaller organic molecules together

Monomers = Small compounds and are also linked together to form polymers (building blocks)

Polymers = Molecules made from repeating units of identical or nearly identical compounds (monomers) linked together by a series of covalent bonds

Four Major Categories of Biological Macromolecules:

1. Carbohydrates
2. Lipids
3. Proteins
4. Nucleic Acids

The Carbon Cycle:

- Based on CO₂
- Producers remove CO₂ from the atmosphere (Any type of green plant or tree is a producer)
- Consumers use CO₂ (Mainly animals are consumers)
- Some carbon takes a long time to recycle
- Humans altering carbon cycle by burning fossil fuels
- Carbon Sink = An area where large amounts of carbon can be stored for a long time

Example of carbon sink = The ocean, the atmosphere, and old forests

The Nitrogen Cycle:

- Nitrogen is a crucial component of proteins, many vitamins, and nucleic acids such as DNA. However, N₂ cannot be absorbed by multicellular plants or animals
- Fortunately, there are two natural processes that help convert N₂ into compounds plants and animals can use as nutrients.
 - Lightning (taking place in the atmosphere)
 - Nitrogen fixing bacteria (takes place in aquatic systems, in soil, and in the roots of some plants where specialized bacteria completes this conversion)
- Nitrogen fixation - converting usable nitrogen gas into usable nitrate by bacteria in soil
- Ammonification turns dead plants and animals into ammonium
- Nitrification turns ammonium into nitrates
- Denitrification takes extra nitrogen from the soil and puts it back into the air
- Fixation turns nitrogen into ammonium
- Assimilation occurs when plants absorb nitrogen from nitrates in the soil
- Remember that nitrogen makes up 78% of earth's atmosphere

In what way is nitrogen important to life on earth?

- Used in making DNA
- Used to make chlorophyll in plants
- Used in amino acids and proteins

Evolution Vocabulary:

1. **Evolution** - The development of life on Earth and is the change in heritable characteristics within a population
2. **Species** - A community of animals capable of interbreeding with each other and having offspring that can also reproduce
3. **Gene** - Made up of DNA and determines the characteristics + traits living creatures have
4. **Limiting Factor** - Anything that constrains a population from growing or slows it down
5. **Genotype** - Collection of genes responsible for the various genetic traits of a given organism.
6. **Phenotype** - Set of observable characteristics of an individual resulting from the interaction of its genotype with the outside.
7. **Genetic Mutation** - Random changes in DNA triggered by toxins, chemical substances, or radiation.

8. **Speciation** - The formation of new and distinct species in the course of evolution.

Causes of mutations = Toxins, Chemical substances, Radiation, and Alcohol