Notes will vary based upon individual class concept attainment. These notes will be modified with examples and more in depth information at the teacher’s discretion.

**Cycles of Matter**  
**Section 3-3**

**Recycling in the Biosphere**
Unlike the one-way flow of energy, matter is recycled within and between ecosystems.

Elements, chemical compounds, and other forms of matter are passed from one organism to another and from one part of the biosphere to another through **Biogeochemical Cycles**.  
**Biogeochemical Cycles** connect 3 aspects of the biosphere, which are:
- Biological
- Geological
- Chemical

**Water Cycle**
**Evaporation** is the process by which water changes from liquid form to an atmospheric gas.
Water can also enter the atmospheric by **Evaporating** from the leaves of plants in the process of **Transpiration**.

**Nutrient Cycles**
**Nutrients** are the chemical substances that an organism needs to sustain life.

Every living organism needs **Nutrients to build tissues and carry out essential life functions**. Like water, **Nutrients are passed between organisms and the environment through Biogeochemical Cycles**.

**Nitrogen Fixation** is a process where bacteria, which live in the soil and on the roots of plants called legumes, convert nitrogen gas into ammonia.

**Denitrification** is a process where bacteria convert nitrates into nitrogen gas.

**Nutrient Limitation**
**Primary Productivity** is the rate at which organic matter is created by producers in and ecosystem.

A **Limiting Nutrient** is a single substance in an ecosystem that is scarce or cycles very slowly.

An **Algal Bloom**, results from a large input of a **Limiting Nutrient** into an aquatic ecosystem.
- ex. runoff from heavily fertilized fields