

## yi56The Cycling of Materials Chapter 5, Section 2

## The Cycling of Materials

- Materials in ecosystems are constantly being reused through 3 cycles:
  - Carbon Cycle
  - Nitrogen Cycle
  - Phosphorus Cycle

## Carbon

- Carbon
  - is an essential component of proteins, fats, and carbohydrates which make up all organisms.
  - exists in air, water, and living organisms.
- How many things with carbon in their name, or uses of Carbon can you name?

## The Carbon Cycle

- The Carbon Cycle - the movement of carbon from the nonliving into living things and back
- Producers convert CO<sub>2</sub> in the atmosphere into carbohydrates during photosynthesis
- Consumers obtain carbon from the carbohydrates in the producers they eat and release it back into the atmosphere as CO<sub>2</sub>

## Long Term Carbon Cycle

- Carbon sink -carbon storage place (ex. oceans, trees, rocks)
- Carbon is converted in carbonates that make up bones and shells.
- Carbonate deposits produce limestone rocks.
- Carbon in carbohydrates, fats or oils are released into the soil after an organism dies.
  - This can form deposits of coal, oil or natural gas also known as: Fossil Fuels
- Fossil fuels are stored carbon left over from bodies of plants and animals that died millions of years ago!
- How do humans affect the carbon cycle???

## Nitrogen

- Nitrogen makes up 78% of atmospheric gases.
- Organisms use nitrogen to build proteins which are used to build new cells.
- Atmospheric nitrogen needs to be fixed to be used by organisms.
- This alteration or fixing is done by nitrogen-fixing bacteria.
- Nitrogen-fixing bacteria are found in legumes and in soil.

## The Nitrogen Cycle

- The Nitrogen Cycle - when nitrogen moves between the atmosphere and living things.
- Nitrogen is converted to nitrates by bacteria in plants and soil.
- Herbivores get the nitrogen they need by eating plants
- Carnivores get the nitrogen they need by eating plants or other animals.
- Decomposers return nitrogen to the atmosphere by breaking down wastes.

## Phosphorous

- Phosphorous is an element that is part of many molecules that make up cells.
- Phosphorous is an essential material in bones and teeth.
- Plants get phosphorous from soil and water.
- Animals get phosphorous by eating plants or other animals.

## The Phosphorous Cycle

- The Phosphorous Cycle - the movement of phosphorous from the environment to organisms and back.
- Phosphorous does not occur as a gas, so the cycle is slow and does not occur in the atmosphere.
- Phosphorous enters soil and water through
  - Rock erosion
  - Waste from organisms
  - Land runoff (fertilizers)
- Excess nitrogen and phosphorous in the environment can cause algal blooms or acid rain.