

Chapter 1 Vocabulary

1.1 Sustainability

Ecosystems

- **Ecosystem** – An area, and all of the living things in it
- **Sustainable ecosystem** – An ecosystem that can maintain itself
- **Biotic** – Living (or dead) parts of an ecosystem example: bird, dead plants
- **Abiotic** – Non-living parts of an ecosystem example: rock, temperature

Earth's spheres

- **Lithosphere** – the Earth's surface
- **Hydrosphere** – the watery parts of Earth (lakes, rivers, ocean)
- **Atmosphere** – the gas that surrounds the Earth

Lithosphere + hydrosphere + atmosphere = Biosphere (parts of Earth that contain life)

Water cycle

- **Evaporation** – $\text{H}_2\text{O (l)} \rightarrow \text{H}_2\text{O (g)}$
- **Condensation** – $\text{H}_2\text{O (g)} \rightarrow \text{H}_2\text{O (l)}$
- **Precipitation** – Rain or snow
- **Run-off** – water from the land, that flows into the ocean

Carbon cycle

- **Photosynthesis** – the chemical reaction that plants use to store the Sun's energy in sugar
- **Cellular respiration** – the chemical reaction that all living things use to release the energy found in sugar

Nitrogen cycle

- **Nitrogen fixation**, also called **Nitrification** - Chemical reactions that convert N_2 gas into other compounds (such as nitrates, nitrites, and ammonia)
- **Denitrification** – Chemical reactions that convert compounds back into N_2 gas.

Phosphorus cycle

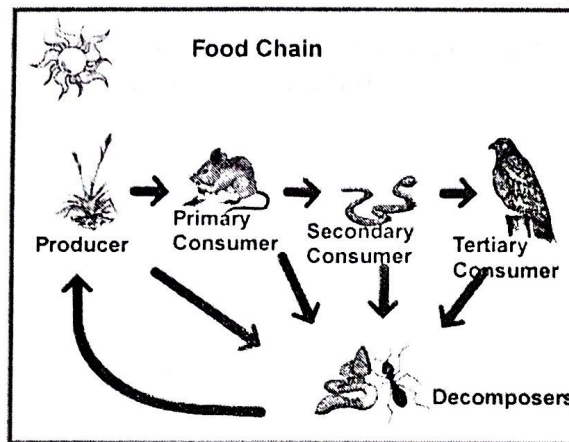
- **Erosion** – The breakdown of rocks, when water runs over them. This releases phosphorus into the water.
- **Eutrophication** – A negative effect of phosphorus buildup. The "death" of a lake or pond, that happens when phosphorus is added to the lake. Plants grow, and cover the surface. The life underneath dies.

1.2 The Biosphere and Energy

- **Chlorophyll** – A green compound found in plants. It absorbs light, so that plants can photosynthesize.

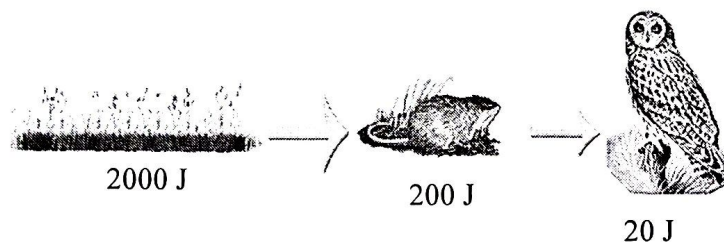
Trophic Levels

- **Food chain** – shows the feeding relationships, and transfer of energy, in an ecosystem
- **Trophic level** (also called "**Feeding Level**") – a category that is defined by how an organism gets energy
 - **Producer** – Makes its own food. These are always plants.
 - **Consumer** – Eats to get its energy.
 - **Primary (1°)** = first; **secondary (2°)** = second; **tertiary (3°)** = third
 - **Herbivore** – a consumer that only eats plants
 - **Carnivore** – a consumer that only eats other animals
 - **Omnivore** – eats both plants and animals
 - **Decomposer** – Breaks down dead matter to get energy.



Trophic efficiency

- **Biomass** – Mass made up of living matter (e.g., bones + flesh + fat)
- **Trophic efficiency** – The amount of energy transferred from one trophic level to the next (10% average)



Pollution

- **Bioaccumulation** – Occurs when toxins build up in the body of an organism.
- **Biomagnification** – Occurs when toxins move up the food chain, and become more concentrated in the top consumers.

1.3 Extracting Energy from Biomass

- **Fossil fuel** – Energy-rich chemical compounds. Form over millions of years, after dead plants and animals get buried. E.g., coal, oil, gas
- **Aerobic** – needs oxygen
- **Anaerobic** – does not need oxygen
- **Fermentation** – an anaerobic reaction, that releases the energy stored in glucose
- **Greenhouse gases** – Gases in the atmosphere that trap heat. E.g., H₂O (g), CO₂, methane (CH₄)
- **Greenhouse effect** – The warming of the Earth. Happens because the greenhouse gases trap heat.
 - Natural greenhouse effect vs. Enhanced greenhouse effect (extra, due to human actions)
- **Global warming** – The observation that the Earth's temperature has risen, due to the enhanced greenhouse effect.
- **Acid precipitation** – Rain or snow that contains too much acid. Produced when SO₂, NO₂, and NO dissolve in the clouds.
- **Kyoto Protocol** – international agreement. The goal was to reduce the amount of greenhouse gases produced all over the world.