



Aksay kazakh – turkish high school for boys

Introduction to Ecology. Ecological factors



Ecology

- Ecology is a branch of biology that studies the interactions of living things with each other and with the environment
- Ecology from the Greek ***oikos***, "home," and ***logos***, "to study"

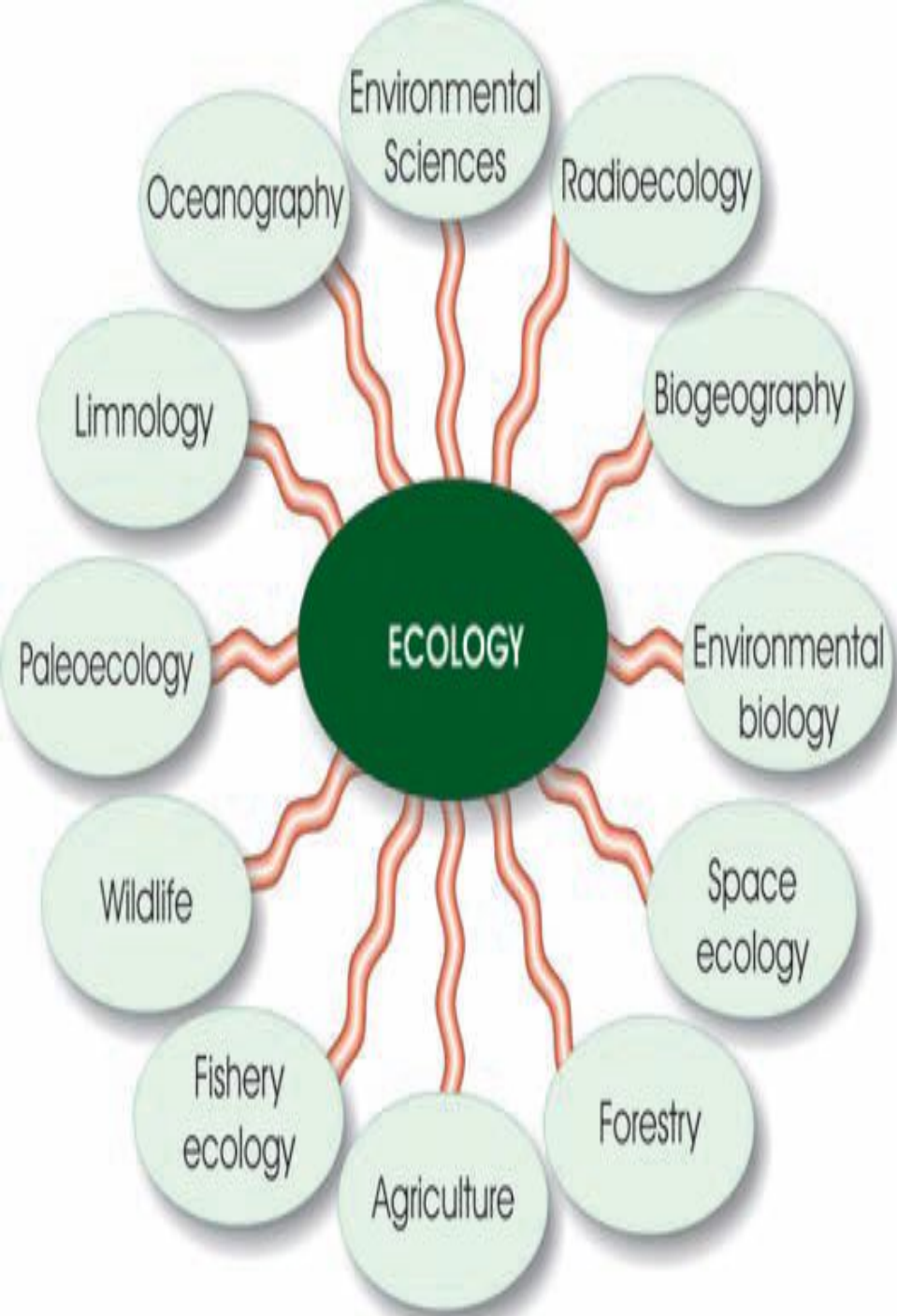


Cosmos
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Galaxy
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Solar System
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Planets
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Earth
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Ecosphere
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Ecosystem
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Communities
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Populations
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Organisms
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Organ Systems
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Organs
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Tissues
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Cells
↑
Protoplasm
↑
Molecules
↑
Atoms
↑
Subatomic Particles

Fields
of
Ecology



Sciences related to Ecology



- The science that studies the distribution of plants and animals is called ***biogeography***
- The science that studies abiotic and biotic factors of fresh water is ***limnology***
- The branch that studies the biotic and physical conditions of marine ecosystems is called ***oceanography***
- The ecology of radiation is called ***radiology***
- The ecology of space is called ***space ecology***

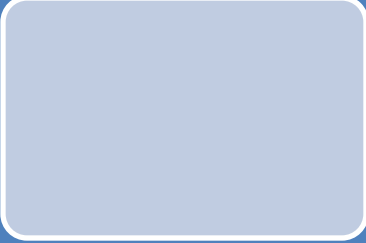
Ecological factors

- **Ecological factor** is any factor that influences living organisms, they are divided into 3 groups:



Abiotic

- The effect of nonliving chemical and physical factors



Biotic

- The effect of living things to each other

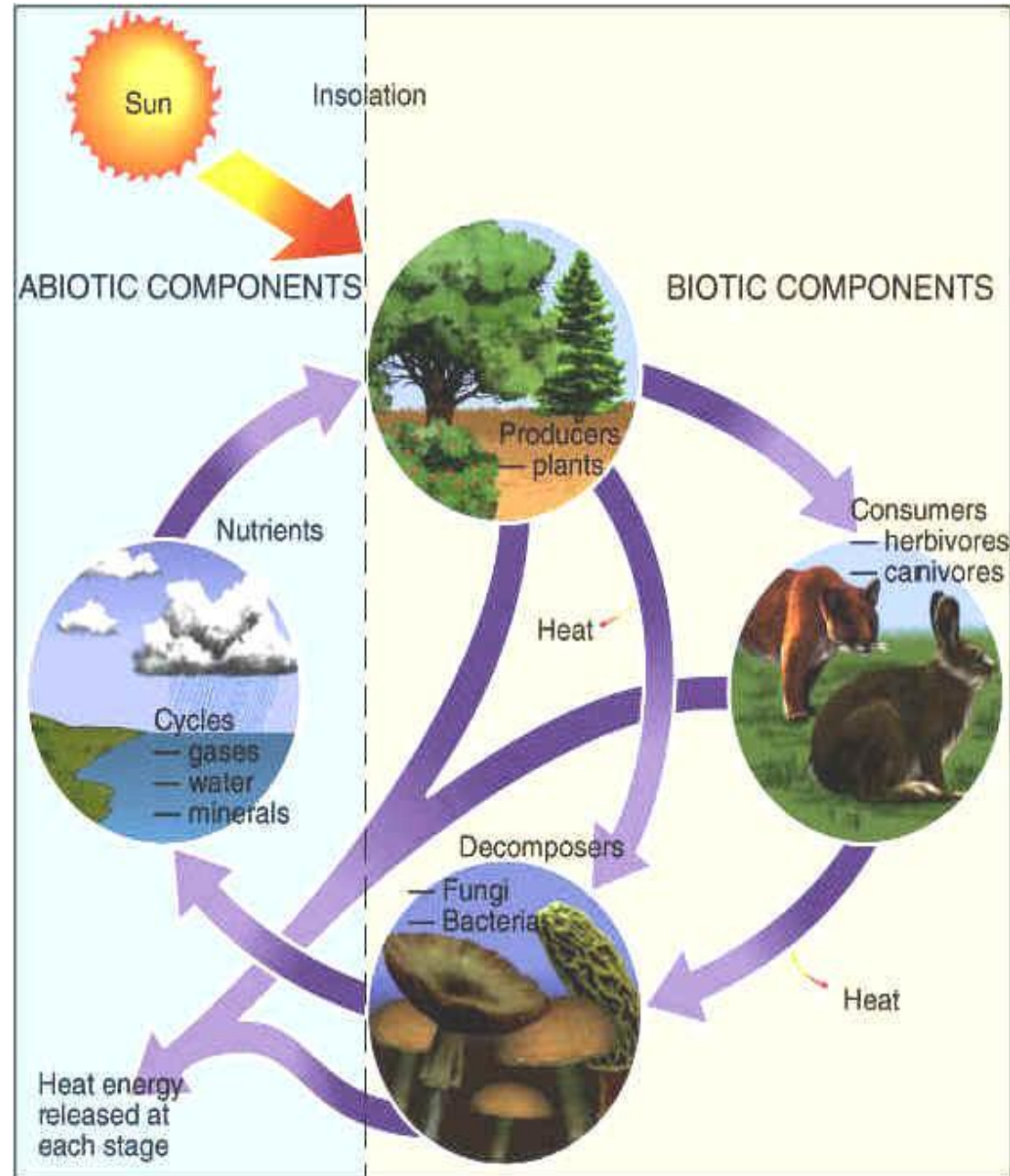


Anthropogenic

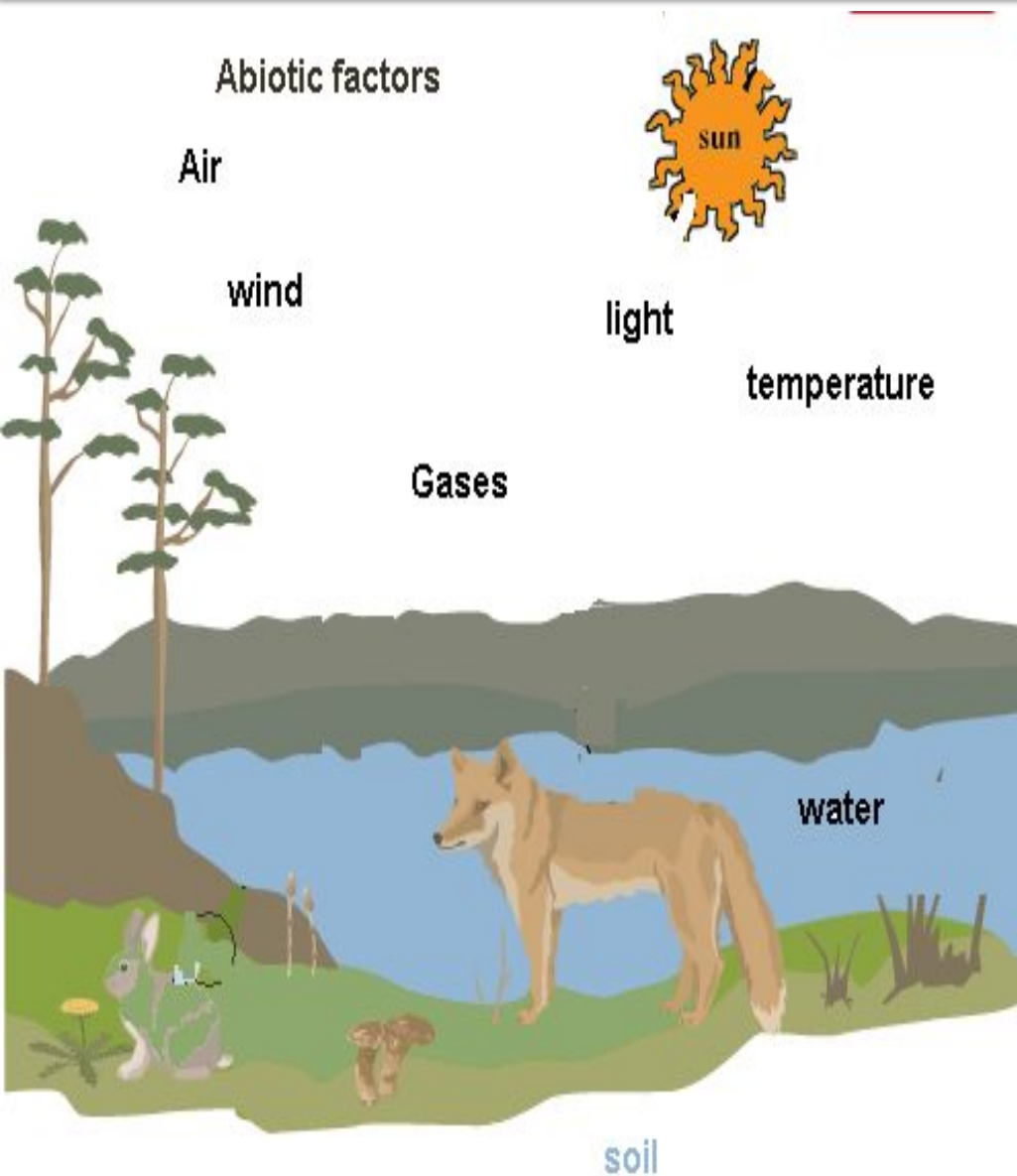
- The effect of humans to environment

Factors affecting the distribution of living things

- The environment includes ***abiotic components*** (nonliving chemical and physical factors) such as temperature, light, water, and nutrients
- ***Biotic components*** (living) such as plants, animals, fungi-all the other organisms



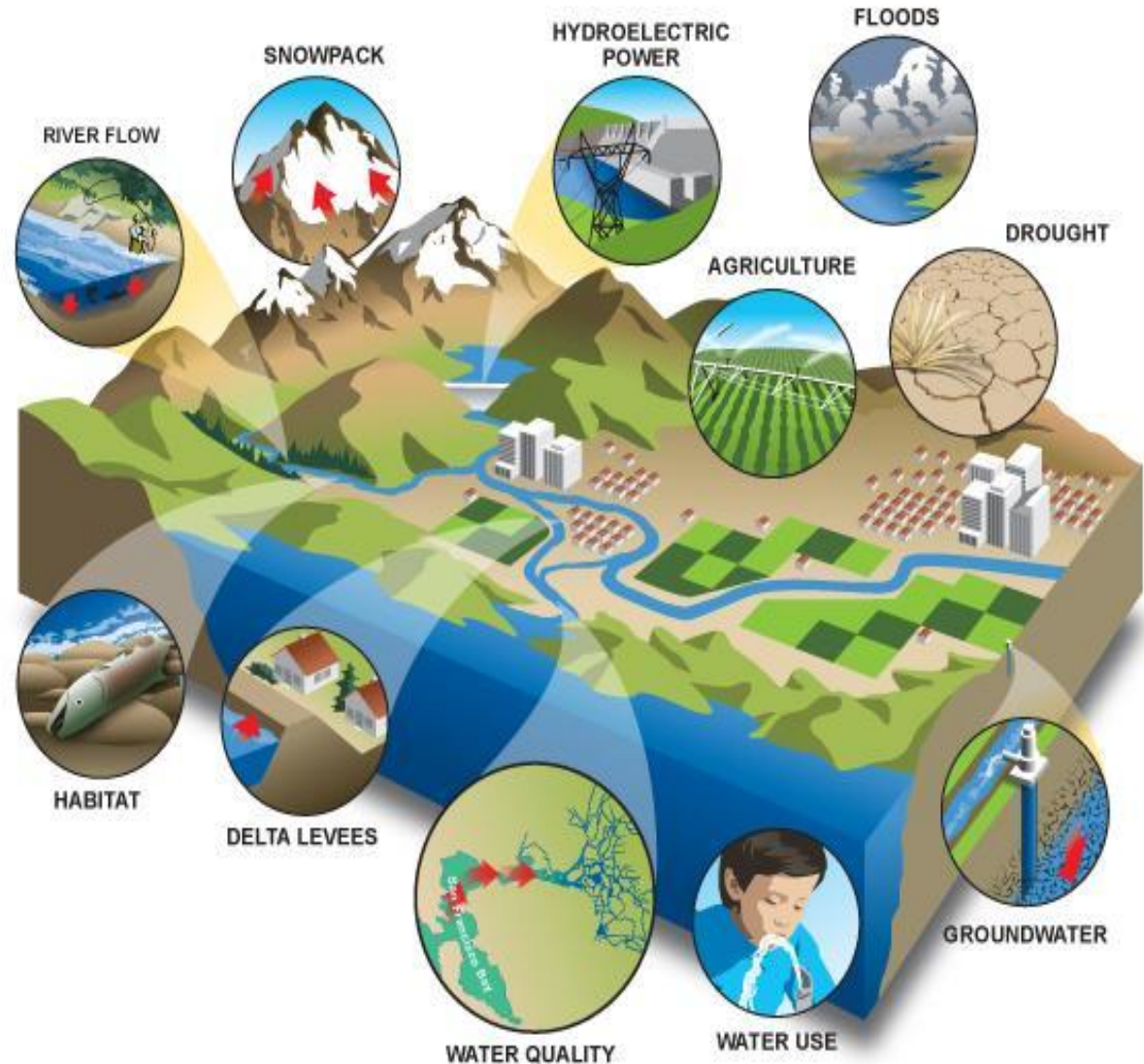
Abiotic factors



- Abiotic factors are important determinants of the distribution of organisms in the biosphere
- ***Climatic Factors:***
 - Light
 - Temperature
 - Water
- ***Soil Factors:***
 - Structure of soil
 - Minerals and salts

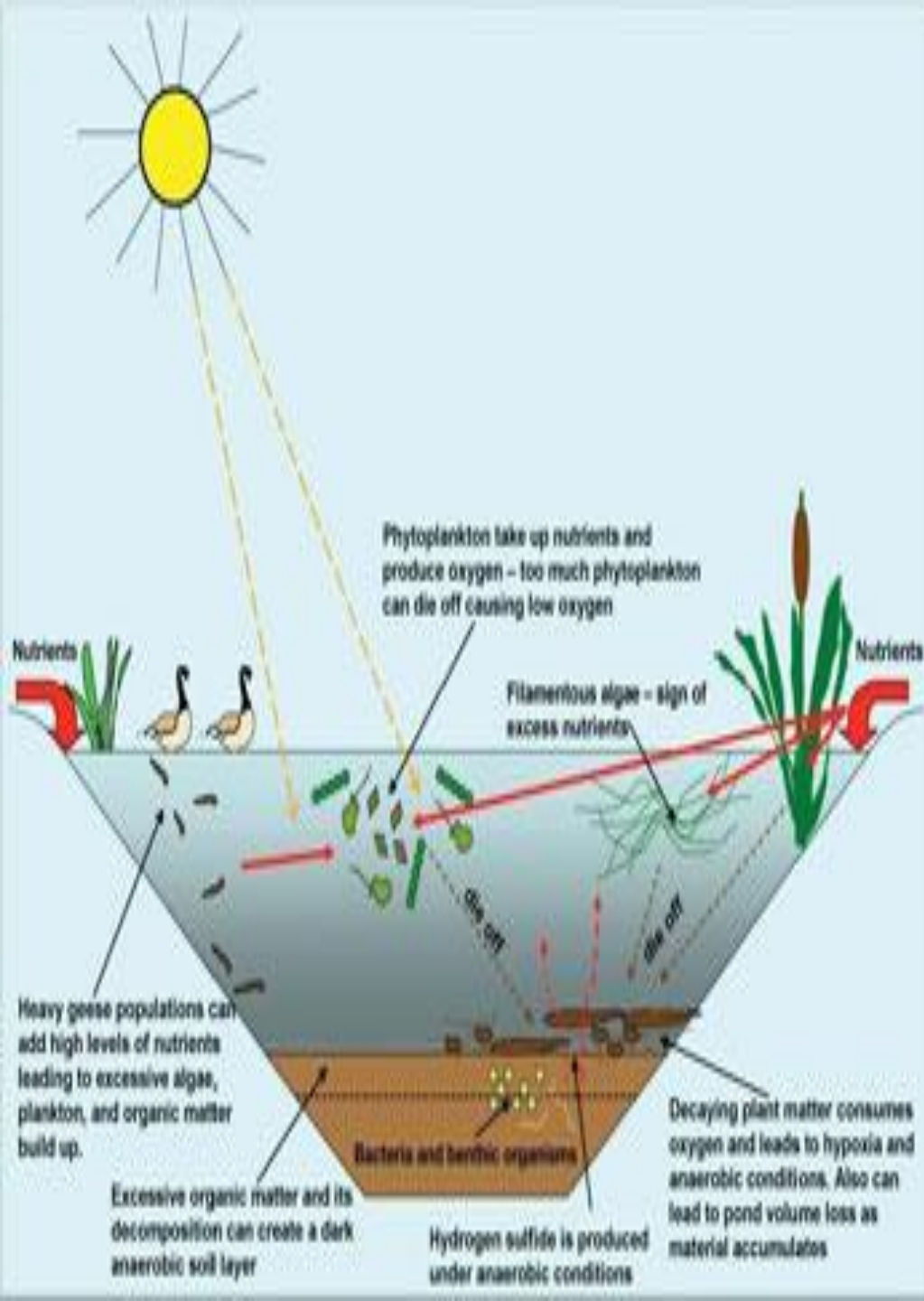
Climatic Factors

- The variety of living things on earth is affected and determined by sunlight, temperature, pressure, moisture, and air movements, which are all together called *climatic factors*



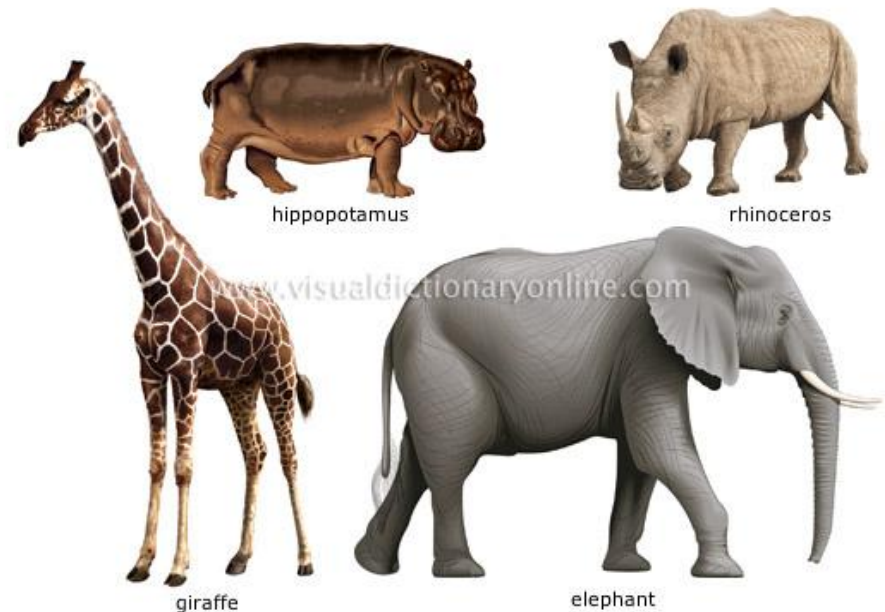
LIGHT

- The energy source for all organisms in nature is light
- The reproduction, migration, and pigmentation of various organisms are all affected by light
- Light is essential for photosynthesis, thus it affects plants



Temperature

- All life on earth needs heat to survive
- The source of this heat is sunlight
- Animals are placed into two groups according to the relationship between their body temperature and the air temperature:
 - - **poikilothermal animals** (without constant body temperature)
 - - **homoiothermal animals** (with constant body temperature)



Temperature

- Invertebrates, fish, frogs and reptiles are poikilothermal animals – their body temperature depends on environment
- Homoiothermal animals are birds and mammals



Water

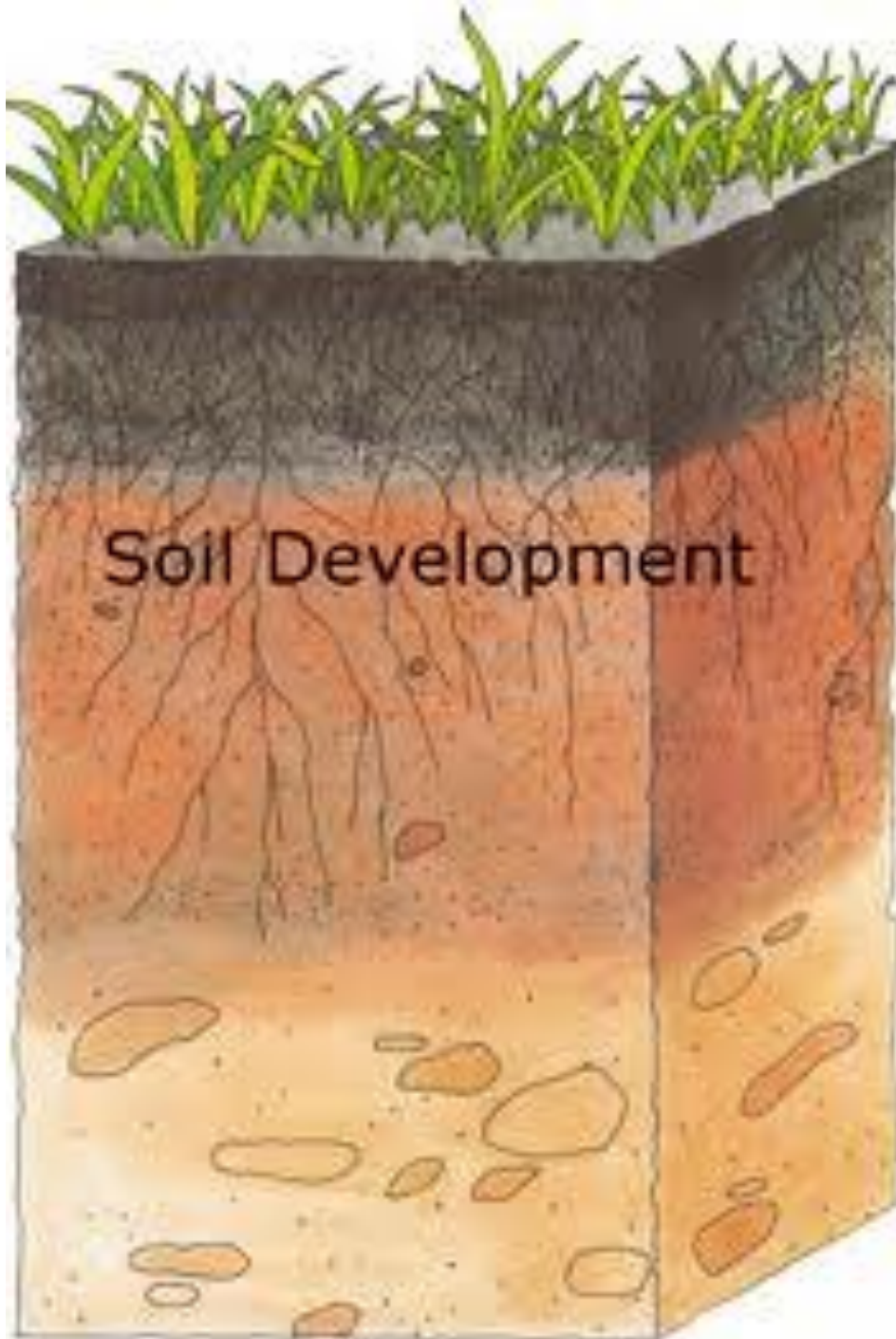


- Plants are placed in three groups according to their water needs:
- ***Hydrophytes*** - grow where water is always available, ex: water lily and elodea
- ***Mesophytes*** – grow where water availability is intermittent, ex: clover,
- ***Xerophytes*** - grow where water is scarce most of the time, ex: cactus

Soil Factors

- Soil is very suitable to life for bacteria, fungi, viruses, algae, and protozoans
- Microorganisms are especially abundant in soil rich in organic wastes
- The dominance of a microorganism in a certain area is determined by environmental conditions



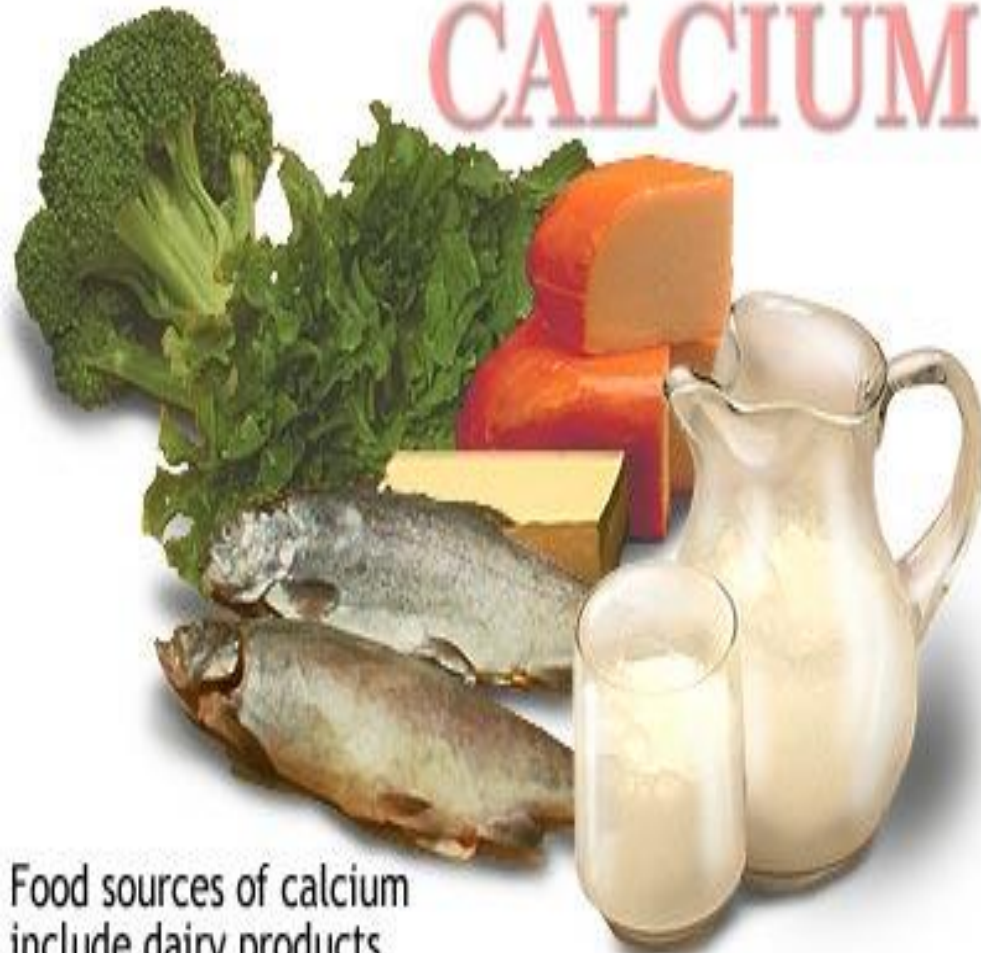


Soil factors

- Soil, water, air, organic and inorganic molecules are very important for plant growth
- The ratios of these 4 groups in the soil are as follows:
 - - Minerals (Ca, Mg, P, N): 45%
 - - Organic molecules (plant and animal residues): 5%
 - - Air: 25%
 - - Water (soil water with dissolved salts): 25%

Minerals and Salts

minerals
CALCIUM



Food sources of calcium include dairy products, green leafy vegetables, and salmon, and sardines

- Organisms contain very important and vital minerals
- The most important ones are N, P, K, Ca, S, Fe and Mg
- Deficiency of these causes serious problems in living things
- For example, Ca is an element used by all organisms
- Calcium is a component of animal endo- and exoskeletons, and is necessary for muscle contraction and blood clotting

Biotic factors

- A **biotic factor** is any living component that affects another organism
- Each biotic factor needs energy to do work and food for proper growth

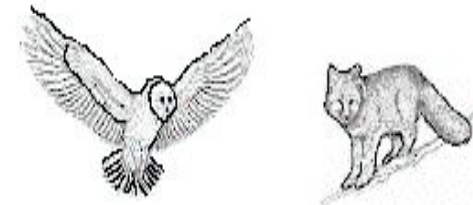


Biotic factors

- Biotic components usually include:
- **Producers** - plants
- **Consumers** - animals, they depend upon producers for food.
- **Decomposers** - fungi and bacteria, they break down chemicals from producers and consumers (usually dead) into simpler form which can be reused

A Food Web in the Tundra Biome

Small Predators



Snowy Owl

Arctic Fox

Primary Consumers



Musk Oxen



Insects



Lemmings

Primary Producers

Tiny Flowering Plants
Grasses
Sedges
Willows
Lichens

4 inches
or less
in
height



Nematodes

Water-Saturated Ground -- Small Shallow Lakes

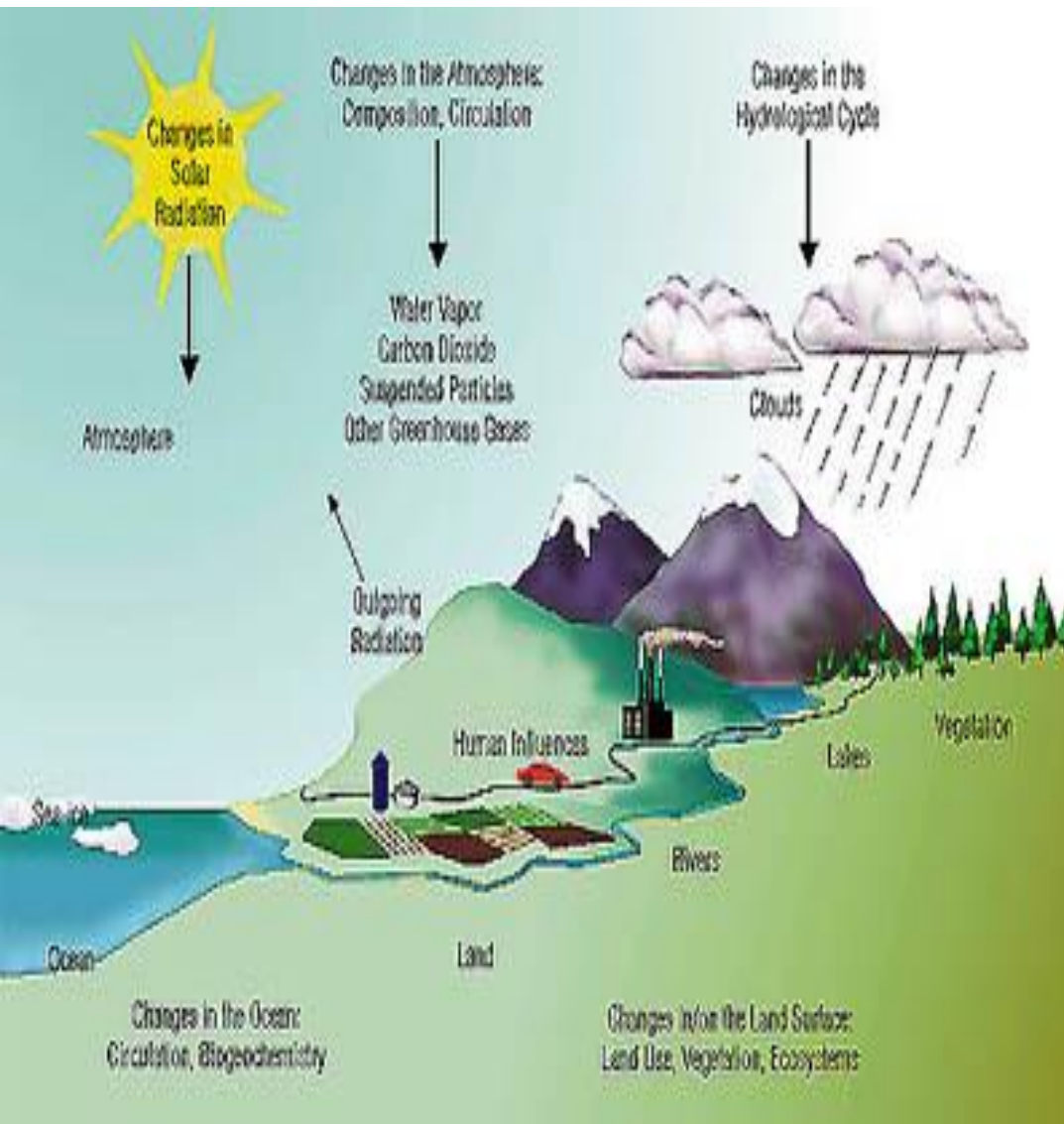
Bacteria

Permafrost

Ground is permanently frozen

life forms (if any)
probably dormant

Anthropogenic factors



- Changes which influence the organic world and are introduced into nature by human activity
- Example, the changes in structure of the earth's surface, soils, and vegetation