Ecology Notes

2.1 Organisms and their Relationships

- Ecology –

- The word ecology was first introduced in 1866 by a German biologist named _____.

Biotic and Abiotic Factors

- Biotic factors –
    - Examples –
- Abiotic factors –
    - Examples –

Levels of Organization

- Biosphere –
- Ecologists look at smaller portions of the biosphere when studying ecological relationships. Look at page 37 in your textbook.

Ecosystem Interactions

- Habitat –

- Niche –
    - An organism's niche describes how it meets its needs for…

      _____

Community Interactions

- Competition –

    - Resources are necessary for life and might include…

      _____

- Predation –

- Mutualism –

- Commensalism –

- Parasitism –

2.2 Flow of Energy in an Ecosystem

- Organisms differ in how they obtain energy. Everything that organisms do in ecosystems requires energy.
- Where do organisms get their energy? _____
- Autotroph –

    - Autotrophs are also called _____.
    - Autotrophs capture energy from the Sun, making it available for all members of an ecosystem.
- Heterotroph –

    - Heterotrophs are also called _____.
    - _____ eat only plants
    - _____ prey on other heterotrophs for food
    - _____ eat both plants and animals
    - _____ eat dead, decaying material
    - _____ break down dead material by releasing digestive enzymes

Models of Energy Flow

- Ecologists use _____ to model the energy flow through an ecosystem.
- Food chain –

- Food web –

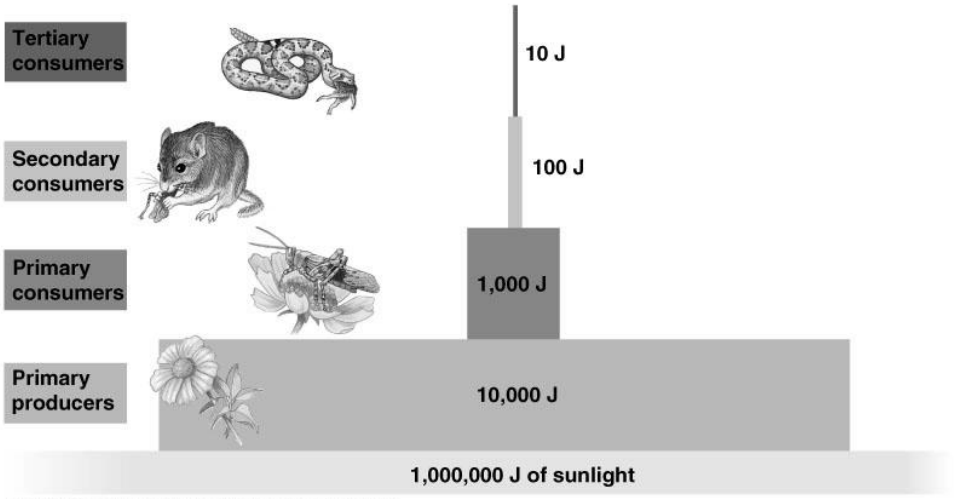
- Each step in a food chain or food web is called a _____.
- Autotrophs make up the first trophic level.
- Heterotrophs make up the remaining levels.

Loss of Energy in a Food Chain

- When an organism eats, _____ of the energy in the food is lost to the environment as _____.
- The amount of useful energy available to do work decreases as energy passes through the ecosystem.
- Rule of 10
  - Only _____ of energy is used by an organism when it eats.
  - The other _____ is lost to the environment.

Energy Pyramids

- An energy pyramid is a diagram that shows _____.
- The size of each block is determined by the amount of energy available.



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2.3 Cycling Materials

- There are 4 different cycles that we find in the environment…

  _____

- Cycle –

The Water Cycle is VERY Important to Living Things

- Freshwater constitutes only about _____ of all water on Earth.
- Water available for living organisms is about _____ of all freshwater.
- _____ of all freshwater is found in ice caps and glaciers.
- Even ocean-dwelling organisms rely on freshwater flowing to oceans to prevent high salt concentrations inside their body.

The Water Cycle (Look at page 46 in your textbook)

1. _____ from bodies of water and/or transpiration from plants.
2. _____ in the form of clouds.
3. _____ that falls as snow, rain, sleet, hail, etc.
4. Some precipitation is absorbed by the soil and stored as _____.
5. Diagram below:

<u>The Carbon Cycle</u> (Look at page 47 in your textbook)

Carbon dioxide is _____ to make their own food and produce oxygen.

Carbon dioxide is released into the atmosphere in two ways:

- What is a fossil fuel?
- List several types of fossil fuels

<u>The Nitrogen Cycle</u>

Nitrogen gas makes up _____ of Earth's atmosphere.

Why can't plants and animals use nitrogen directly from the atmosphere?

Nitrogen gas is captured from the air by species of _____ that live in _____, the _____, or grow on the _____ of some plants.

Nitrogen fixation -

3.1 Community Ecology

- Community –

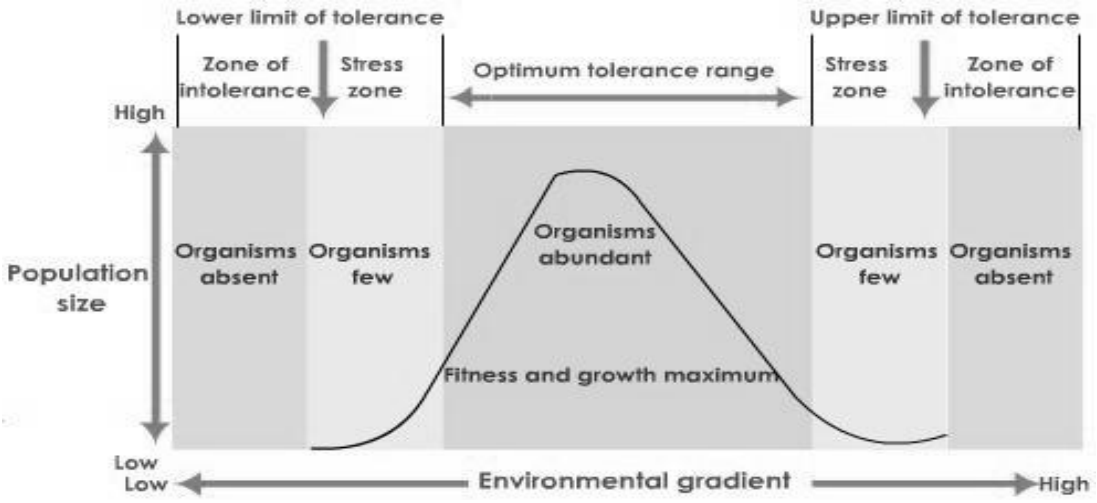
- Limiting factor –

  - Examples include:

- If the environment of the community changes, plants and animals have to:
  -
  -

Tolerance

For any environmental factor, there is an _____ that define the conditions in which _____.



Tolerance -

Succession

- Ecosystems are _____.
- Ecological succession –

  - Primary succession
    -

    - Examples:
    - Pioneer species –

  - Secondary succession
    -

    - Examples:

	Primary Succession	Secondary Succession
Pioneer species?		
Soil absent or present?		
Which is more common?		

3.2 Terrestrial Biomes

Biome –

Climate –

_____ and _____ (elevation) impact the climate of an area.

- Latitude –

- Altitude –

Classify biomes based on latitude:

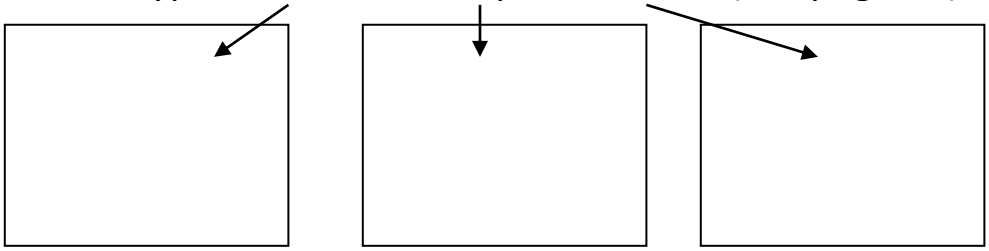
Type of Biome	Examples
Polar Biomes	
Temperate Biomes	
Tropical Biomes	
Other	

4.1 Population Dynamics

- All species occur in groups called _____.
- Populations are characterized by:
    - Population density –

    - Spatial distribution –

Three types: uniform, clumped, random (see page 93)



    - Population ranges

Factors that Limit Populations

- Density-independent factors –

    - Examples:

- Density-dependent factors –

    - Examples:

Population Growth Rate

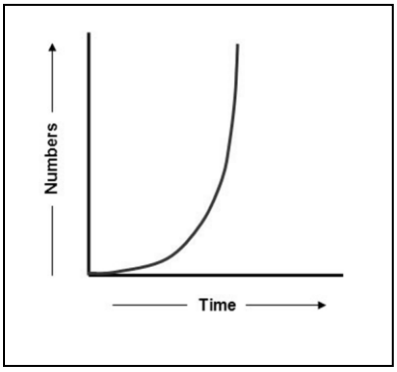
- PGR –

    - Dependent on birth rate and death rate
        - If a population has more births then deaths, the population is _____.
        - If a population experiences more deaths then births, the population is _____.
        - If a population has an equal number of births to deaths, the population is _____.
    - Also dependent on emigration and immigration
        - Emigration –
        - Immigration –

Population Growth Curves

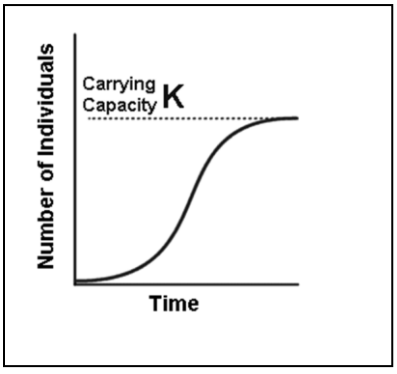
- _____ (j-curve)

    - All populations grow exponentially until some limiting factor slows the population's growth.



- _____ (s-curve)

    - Occurs when the population's growth slows or stops following exponential growth when the population reaches the carrying capacity.
    - Carrying capacity –



4.2 Human Population

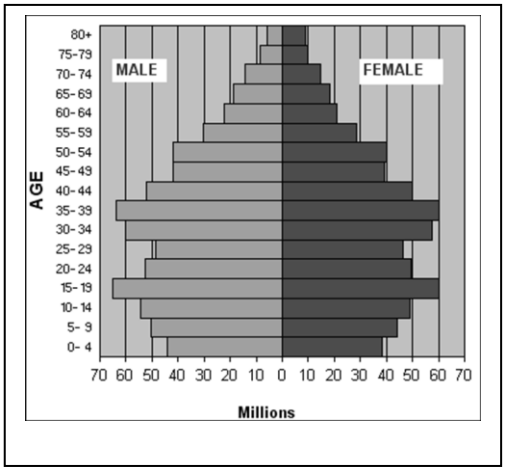
- Demography –

Why are People Living Longer?

- _____ has improved, allowing more people to be fed by large crops (corn, soybeans, wheat, etc).
- The breeding of animals (cows, pigs, chickens, etc) has increased food supplies.
- _____ has given people more information at their fingertips.
- _____ have increased a person's chance for survival by reducing the number of deaths from parasites and disease.
- _____ have helped people survive major weather disasters.

Population Pyramids

- Population pyramids show _____.
- The age structure is the number of males and females in each of three categories:
    - Pre-reproductive:
    - Reproductive:
    - Post-reproductive:



Human Carrying Capacity

If human population continues to grow:

5.1 Biodiversity

- Biodiversity –

- The importance of biodiversity:
    - _____ - Humans depend on plants and animals for food, clothing, energy, and shelter.
    - _____ - Medicines are derived from plants and animals.
    - _____

5.2 Threats to Biodiversity

- Scientists believe we are witnessing a period of mass extinction.
- What is mass extinction?

Overexploitation –

Habitat Loss –

Pollution –

Introduced Species –

Acid Precipitation –

Eutrophication –

Protecting the Ozone Layer

- Ozone is a compound made up of _____ molecules.
- The ozone layer is important because _____.
- The ozone concentration is much lower over _____.
- What destroys ozone?
    - CFCs =
    - VOCs =

Controlling Greenhouse Gases

- Human activity causes gases to be released into the atmosphere. These gases _____ and help to _____ the Earth just like a greenhouse _____.
- Greenhouse gases include _____.
- Because humans still burn _____, carbon dioxide levels get higher and higher.
- All of this trapped heat energy causes changes to weather patterns, making storms more severe across the globe.
- Some of this trapped heat also causes the ice to melt (glaciers, ice sheets) at the north and south poles.

Protecting Fresh Water

- Freshwater is in short supply because humans constantly pollute it.
- By 2025, 1.8 million people will be living in countries or regions with absolute water scarcity. 2/3 of the world population could be under stress conditions.

5.3 Conserving Biodiversity

- As population increases, the need for natural resources also increases, but usually at the expense of _____.
- _____ resources are found in _____ and must be used carefully.
    - Examples:
- _____ resources have an _____.
    - Examples:
- More people need to live sustainably
    -
    -
    -

Restoring Ecosystems

Biological communities can recover from natural and human-made disasters but the recovery is dependent on two things:

-
-

Bioremediation –