2.1 Biotic and Abiotic Factors in Ecosystems

Date:

Warm up:

Study Notes/Questions

Levels of Organization

Organism - simplest level, a single living thing

- surviving in a habitat (where it lives)

Population - second level, all organisms of the same species that share a habitat

Community - all of the populations in a particular area that interact

food supply, predators

Ecosystem - the living community and the surrounding non-living environment

Biosphere - total area on earth where living things are found

including soil, atmosphere, ocean

Biotic and Abiotic Factors

Biotic Factors - living components of the ecosystem

- includes plants, fish, invertebrates, single celled organisms

Abiotic Factors – non-living (physical and chemical) components in the environment

- include temperature, wind, sunlight, and oxygen

2.1 Biotic and Abiotic Factors in Ecosystems

Study Notes/Questions

These factors influence each other in a constantly changing balance called a

dynamic equilibrum

Limiting Factor – the most critical factor in determining the type of organism that exists in an ecosystem. (e.g. Douglas Fir only grow where there is high annual rainfall)

Summary: (two to three sentences summarizing this section)

Self-Reflection Questions:	1. Describe one thing that you knew about this topic before today.	2. Describe one thing you learned about this topic today.

Activity 2.1 # 1 – 5

1. Compare the following terms. Give both similarities and differences.

(a) ecosystem and habitat

(b) organism and population

(c) biosphere and community

(d) ecosystem and community

2.2 Ecological Roles and Relationships Date:

Warm up:

Study Notes/Questions

Ecological Roles and Relationships

An ecosystem is a complex network of interactions.

All organisms must take in water, food, nutrients.

Nutrients are elements and compounds that organisms need to live and grow

Organisms can be producer, consumers, decomposers in ecosystems.

Producers

Also called autotrophs

Make their own food (usually by photosynthesis using energy from the sun)

eg: Plants, algae, phytoplankton

Consumers

Also called heterotrophs

Eat (consume) other organisms or biotic waste and break it down to get energy

Herbivores or primary consumers eat only producers

Carnivores or secondary consumers eat other consumers

Omnivores are consumers that eat both producers and consumers

Eventually nutrients cycle back into the ecosystem for the producers.

2.2 Ecological Roles and Relationships

Study Notes/Questions

Detrivores and Decomposers

Detrivores – organisms that feeds on waste material in the ecosystem including dead bodies, plant debris and animal feces (e.g. earthworm, crab)

Decomposers - organisms that break down complex molecules in waste into simpler molecules (eg. bacteria, Fungi)

Predators

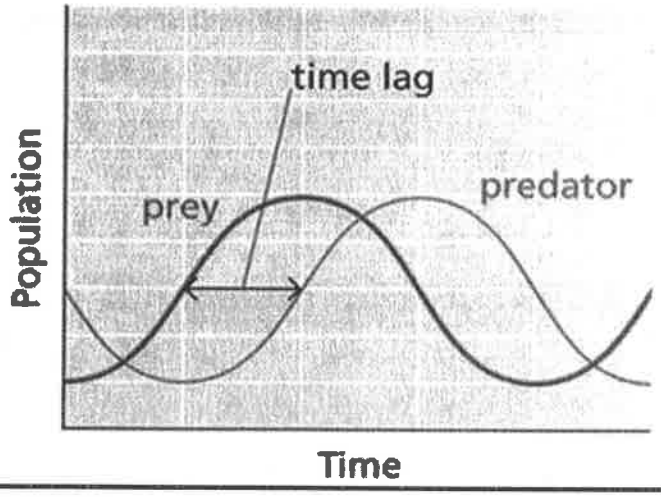
Consumers that capture and kill a prey animal

Usually think of mountain lions, tigers, etc, but also includes sea stars and centipedes

Complex cycle between populations of predator and prey

When predators reduce populations of prey, their own numbers decrease

Changes in Predator and Prey Population Size



Summary: (two to three sentences summarizing this section)

Self-Reflection Questions:	1. Describe one thing that you knew about this topic before today.	2. Describe one thing you learned about this topic today.

2.3 Symbiosis **Date:**

Warm up:

Study Notes/Questions

Symbiosis

Symbiosis refers to any close relationship between two different species.

There are three types of symbiotic relationships:

1. Mutualism is a relationship in which both species obtain some benefit from the interaction.

e.g. a lichen is a symbiotic relationship between a fungus and algae

- the fungus protects the algae
- the algae provides food for the fungus

2. Commensalism is an interaction in which one organism benefits while the other is unaffected.

e.g. barnacles living on a whale feeding on plankton in passing water

3. Parasitism occurs when one organism (the parasite) benefits by living and feeding on, or in, the body of another organism (the host).

- harms host, but usually slowly (since parasite might die if host dies)

e.g. tapeworm lives in digestive system of mammals

Summary: (two to three sentences summarizing this section)

2.4 Trophic Levels and Energy Flow **Date:**

Warm up:

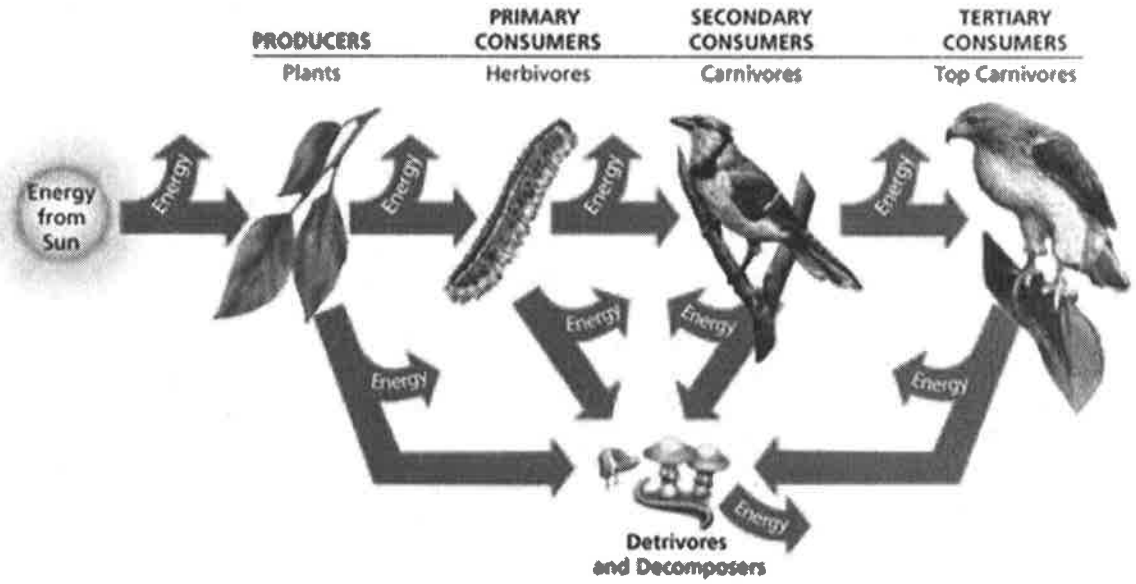
Study Notes/Questions

Trophic Levels and Energy Flow

Nutrients are recycled in the ecosystem, but energy only moves in one direction only from

producers → herbivores → carnivores

Some energy is lost to the surroundings at each level



Trophic Levels

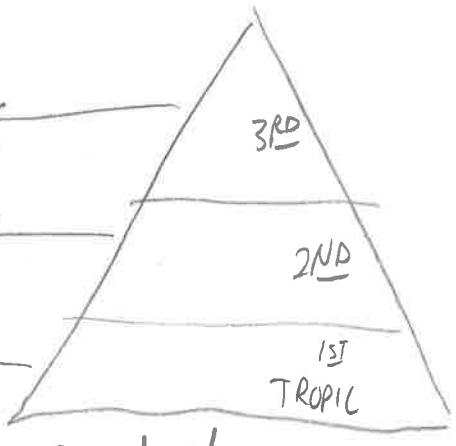
Trophic Level describes the position of the organism in relation to the nutrient and energy transfers in an ecosystem

Organisms that eat the same type of food belong to the same trophic level

carnivores - (secondary consumers)

herbivores - (primary consumers)

producers



Decomposers can be a part of every level

2.4 Trophic Levels and Energy Flow

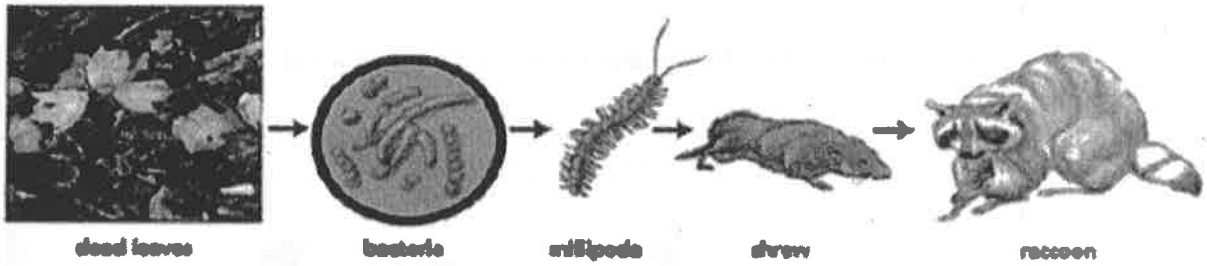
Study Notes/Questions

Food Chains and Food Webs

Food Chains - a single pathway taken by nutrients and energy through the trophic levels.

Arrows show that the first organism is food for the next (and so on)

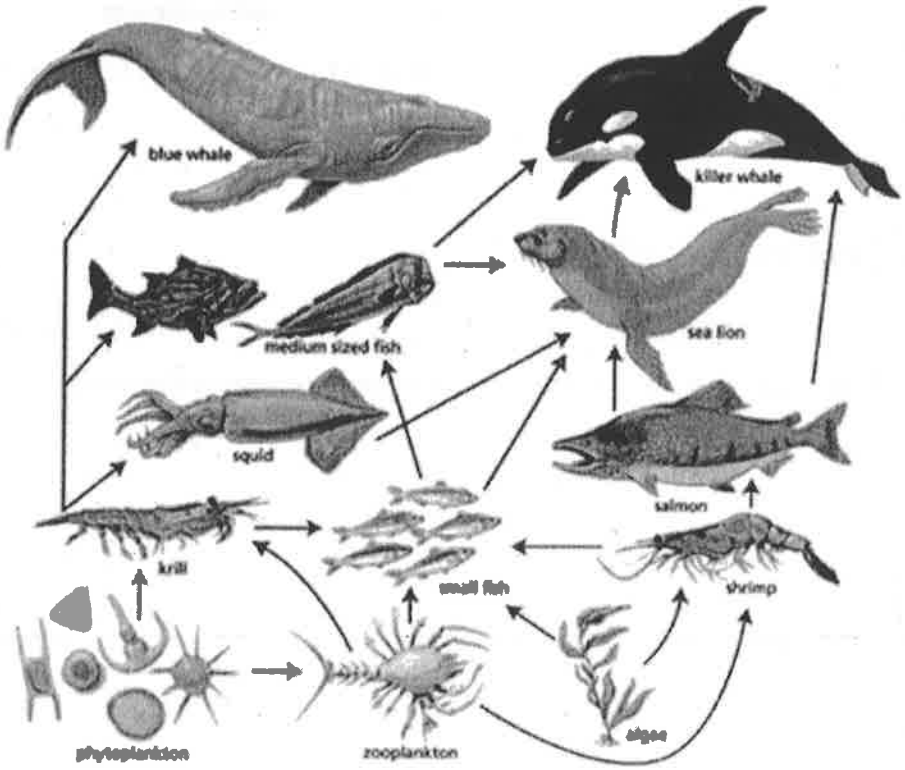
Change in population at one level affects other levels.



Some sources show decomposers at the end of most food chains, but we will consider their interactions separately.

In reality, ecosystems have more complex food web, showing the different cross-linked food chains.

A single organism may eat different foods, and be prey for more than one predator



2.5 Ecological Pyramids

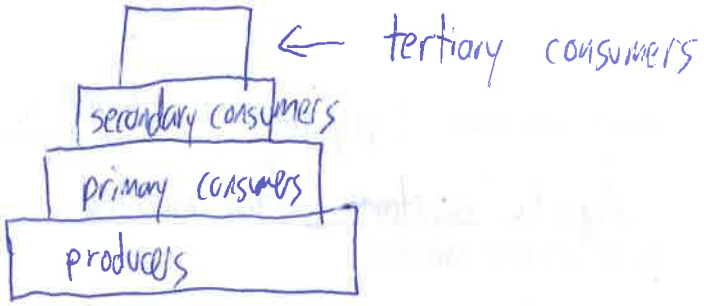
Date:

Warm up:

Study Notes/Questions

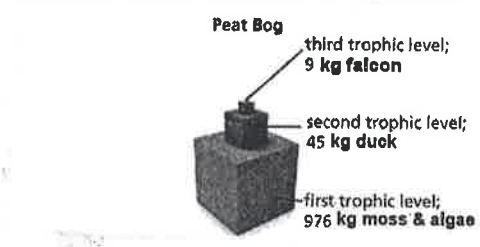
Ecologists use three different types of ecological pyramids to illustrate ecosystems:

Pyramid of Energy: represents how much energy is available in each trophic level



- usually only about 10% of energy is passed on to next level. (limits the number of trophic levels – energy runs out)
- rest is used by organisms for movement, reproduction or lost as heat

Pyramid of numbers: represents the actual number of organisms present in each trophic level

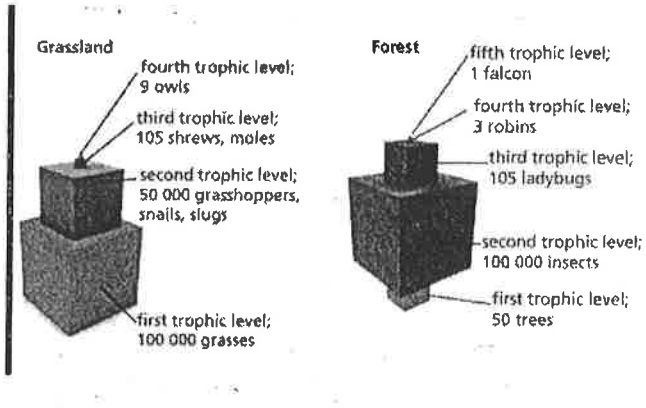


- shape depends on physical size of producers

2.5 Ecological Pyramids

Study Notes/Questions

Pyramid of Biomass: represents the total mass of living things in each trophic level



- usually standard pyramid shape

- Aquatic systems often inverted (small mass of producers, but they reproduce very rapidly)

Summary: (two to three sentences summarizing this section)

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