

Science Test Review

Chapter 1

1. Key Terms

Abiotic: Factor in an ecosystem created by non-living agents, for example, amount of sunlight, temperature, and strength and direction of wind.

Albedo: A measurement of the percentage of light that an object reflects; the higher the Albedo, the greater the object's ability to reflect sunlight. (Ex. Cloud-Cover, Roofs, Sand, Snow, Windows)

Artificial Ecosystem: An ecosystem that is planned and maintained by humans, for example, a park, a farm, or a garden.

Autotroph: An organism that uses energy and raw materials to make its own food, whether from photosynthesis or some other form of chemical synthesis; a producer.

Biodiversity: The number of species in an ecosystem that are similar or related to each other in that the dominant form of plant life is the same; for example, the boreal forest biome is dominated by coniferous trees.

Biomass: a pyramid-shaped measure of the mass of the dry matter contained in a group of living things, whether of a species, a class of species, or all the organisms within an ecosystem. (Weight of animal when dehydrated)

Biotic: A factor in an ecosystem created by the presence and roles of other living things.

Carnivore: An animal that feeds on other animals.

Community: The collection of all the populations of all the species in an ecosystem; all of the organisms in an ecosystem.

Consumer: A heterotroph; an organism that must eat producers or other consumers to survive.

Decomposer: An organism that feeds on detritus, in the process releasing nutrients to the soil and water, where other organisms can use them.

Detritus: Waste from plants and animals, including their dead remains.

Ecological Niche: The place or role of a species within an ecosystem; everything an organism does to survive and reproduce, including its place in the food web, its habitat, its breeding area, and the time of day that it is most active.

Ecology: The study of the interaction of living things with each other and with the Abiotic (non-living) factors in their environment.

Ecosystem: In an area defined by an ecologist, the set of relationships between populations of species and between those populations and the Abiotic (non-living) factors in their environment. Can be divided into aquatic and terrestrial)

Ecotone: A transition area between two ecosystems that includes members of the community of both ecosystems.

Endangered: A species that is close to extinction.

Extinct: A species that no longer exists anywhere on Earth.

Extirpated: A species that no longer exists in one part of its range.

Food Chain: A step-by-step sequence linking organisms that feed on each other, starting with a food source, such as a producer or detritus, and continuing with a sequence of consumers.

Food Web: A pictorial representation of the feeding relationships among organisms in an ecosystem.

Habitat: An environmental space where species can live; the conditions required for the survival of a species.

Herbivore: An animal that eats plants.

Heterotroph: An organism that is incapable of making its own food, and so must feed on other organisms to gain energy.

Natural Ecosystem: An ecosystem that is neither planned nor maintained by humans; an ecosystem in which organisms are free to interact and change their interactions without human interference.

Omnivore: An animal that eats both plants and animals.

Parasite: an organism that lives on or in an organism of another species, known as the host, from the body of which it obtains nutriment.

Pest: An organism that people consider harmful or inconvenient in a particular situation, such as weeds and some insects, fungi, and rodents.

Photosynthesis: The process by which green plants and some other organisms use sunlight energy, carbon dioxide, and water to produce carbohydrates (sugars) and oxygen.

Population: All of the members of a species living in the same ecosystem or habitat.

Primary Consumer: In a food chain or food web, an organism that relies on autotrophs directly for its source of energy, organisms at the second trophic level.

Producer: An autotroph; an organism that uses photosynthesis or another form of chemical synthesis to make food.

Scavenger: an animal or other organism that feeds on dead organic matter.

Secondary Consumer: In a food chain or food web, an organism that relies on primary consumers for its principal source of energy; organisms at the third trophic level.

Thermodynamics: The scientific study of energy transformations, described by laws.

- **First Law:** States that although energy can be transformed from one form to another, it cannot be created or destroyed.
- **Second Law:** States that during any energy transformation, some of the energy is converted into a form, mostly heat, which cannot be used (i.e., each time energy is transformed in a system, some of that energy is lost from the system). Including those in living organisms, commonly being 10-20%.

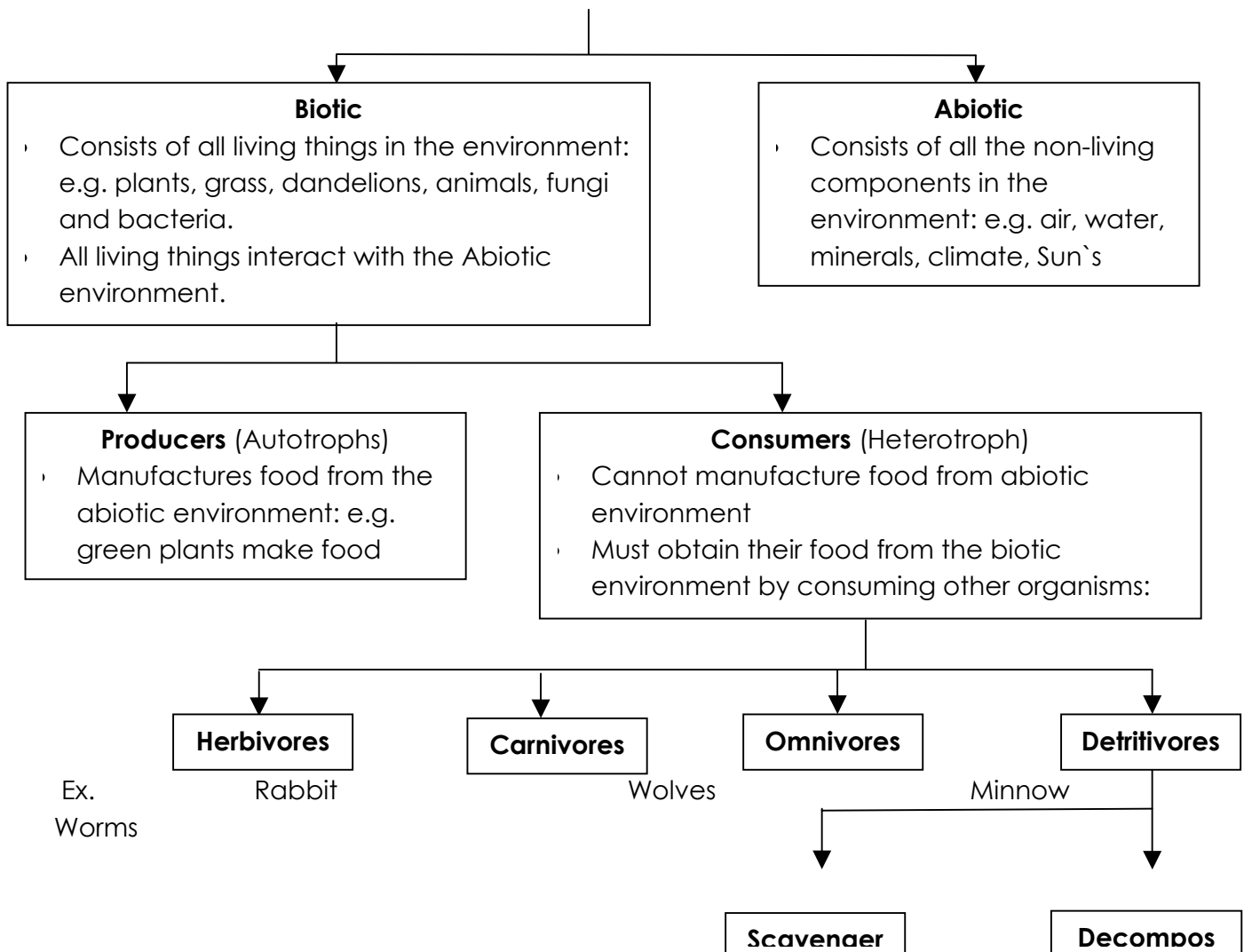
Threatened: A species that is likely to become endangered if factors that make it vulnerable are not reversed.

Trophic Level: A way of categorizing living things according to how they gain their energy; the first trophic level contains autotrophs, and each higher level contains heterotrophs.

Vulnerable: A species that is not in imminent danger of extinction, but that is at risk because of low or declining numbers at the fringe of its range, or in some restricted area.

2. Abiotic and Biotic Factors

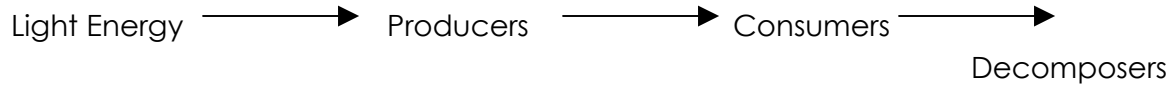
The Earth's environment is divided into two categories:



Bacteria

Seagull

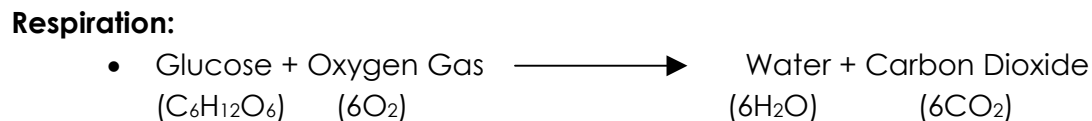
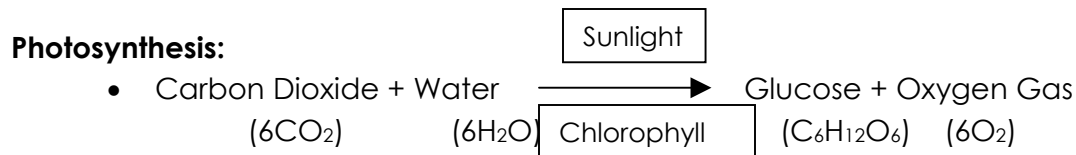
Cycle of Life



3. Role of Sunlight

- No ecosystem can exist without a source of energy.
- The biosphere depends on a continuous supply of energy from the Sun.
- The energy needed to support life on Earth come from the Sun. Sunlight provides the energy required for the evaporation of the H₂O cycle.
- Nuclear fusion in the Sun radiates energy out into space, only – 10⁻⁹ energy of the Sun reaches the Earth.
- Harmful high energy like Cosmic Rays, X-Rays, UV Radiation are all filtered out before reaching the Earth, as these are either reflected or absorbed by chemicals in the atmosphere.
- Only a very small portion, 0.023% is used by plants for photosynthesis, because 44% heats the earth's surface, 30% is reflected back into outer space from clouds or Earth's surface, 25% evaporates water, and 1% generates winds and waves.
- Energy from the sun allows green plants to make their own energy through photosynthesis.

4. Photosynthesis and Respiration

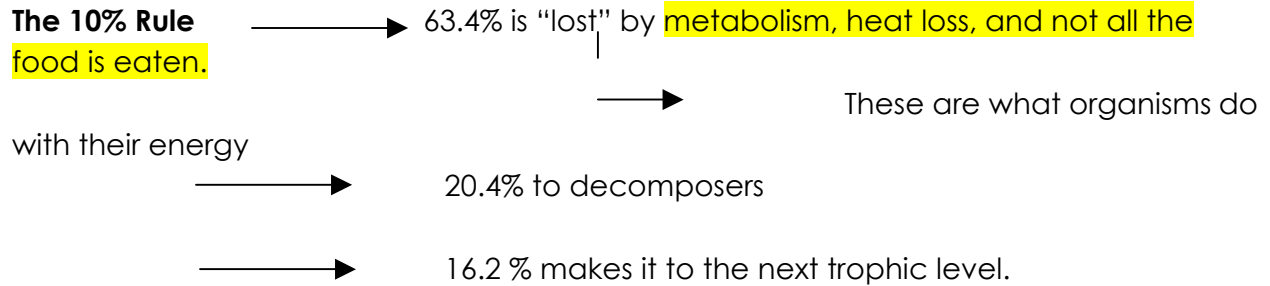


5. Law of Thermodynamics

Thermodynamics: The scientific study of energy transformations, described by laws.

- **First Law:** States that although energy can be transformed from one form to another, it cannot be created or destroyed.

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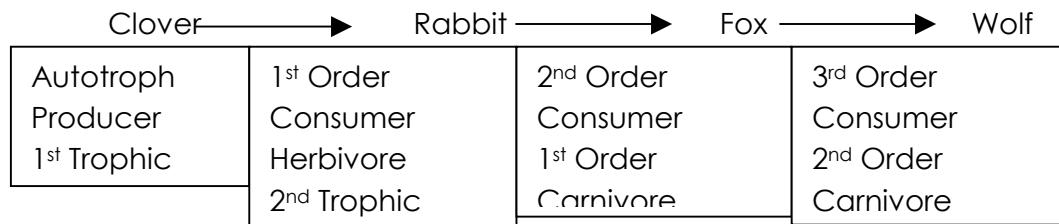


Rule of Thumb: 10% of energy in a lower trophic level is available to the next trophic level.

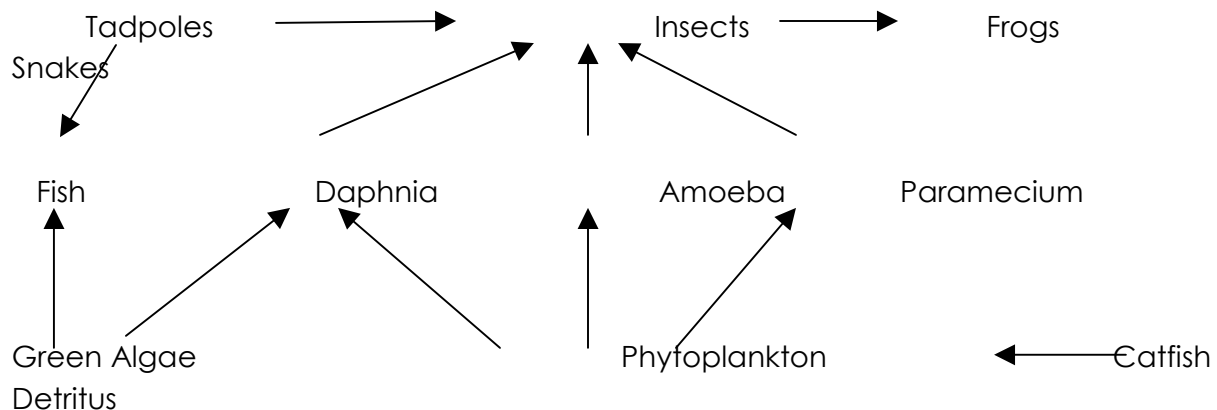
1000 kJ → 100 kJ → 10 kJ

6. Models for Energy Flow

Food Chain: A step-by-step sequence linking organisms that feed on each other, starting with a food source, such as a producer or detritus, and continuing with a sequence of consumers.

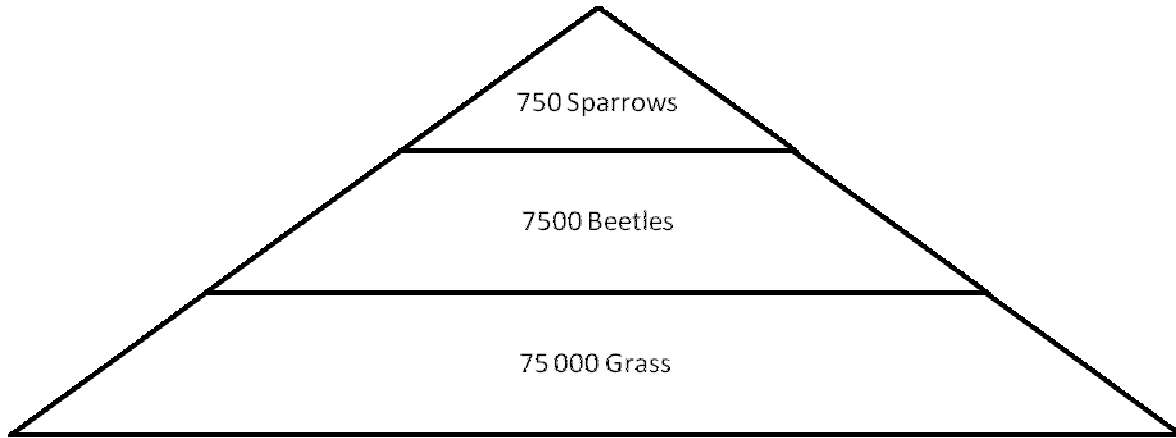


Food Web: A pictorial representation of the feeding relationships among organisms in an ecosystem, consisting of many food chains.



Pyramid of Numbers: Shows how many organisms are eaten at each trophic level.

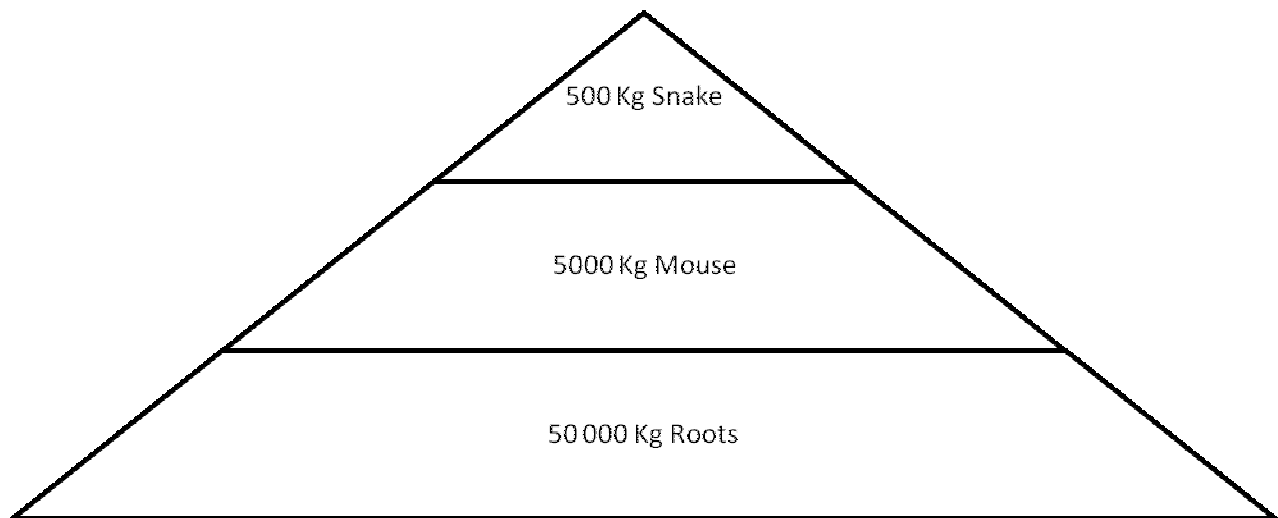
- Pyramid of Numbers is the easiest to construct and it assumes that each organism has the same amount of energy as the next.



For every pyramid show classification of organisms on the side of each level.

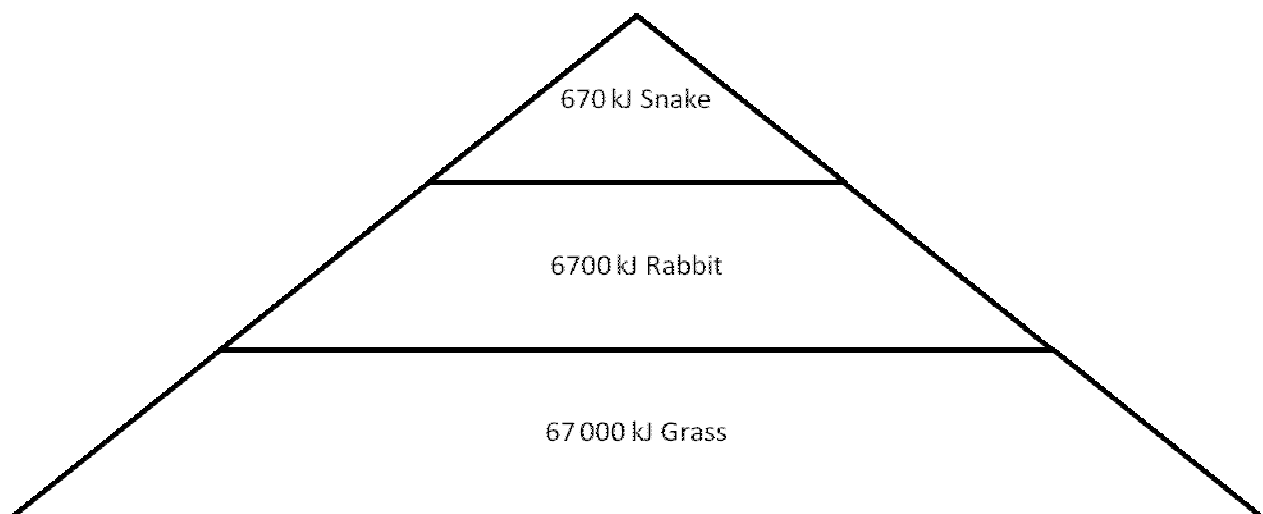
Pyramid of Biomass: Shows the amount of dry mass that is eaten at each trophic level.

- Pyramid of Biomass is most difficult to use in the field, it also assumes that 1 g of a species has the same energy as 1 g of another; it does not consider the energy contribution of each organism.



Pyramid of Energy: Shows the amount of energy that is passed on at each trophic level.

- Pyramid of Energy is very difficult to use in the field because it involves calculations including numbers, masses and energy content of each type of organism.

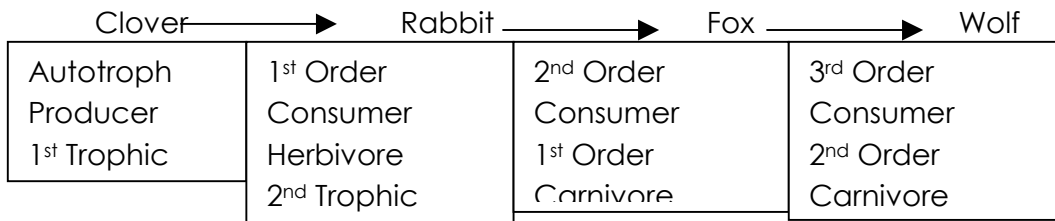


7. Classification of Organisms

When making a food chain or pyramid you must include:

- Trophic Level: 1st, 2nd, 3rd
- Whether it is a producer or consumer or a detritivore
- Whether it is a herbivore or carnivore

- What order Consumer: 1st Order Consumer
- What order the Carnivore: 1st Order Carnivore
- What is the Top Carnivore



8. Indicator Species

Indicator Species (bioindicator): A plant or animal species that is used to gather information about an environment or area. The presence of an indicator species can be a signal, as can the absence of such a species, and in cases where indicator species are present, their relative abundance and health can also be used as an indicator.

Why are amphibians good indicators?

- A study of amphibians is a good bioindicator of the health of the planet because they occupy both freshwater and forest ecosystems, any decline in frog population can be used to foretell ecological problems in both of these ecosystems.
- Frogs are more sensitive than most species, including humans to environmental changes since they breathe partially through their skin and are directly exposed to the external environment.

Why are frogs disappearing?

- Habitat destruction
- Chemical Pollution
- Increased UV radiation
- Increased fungi, parasites and predation
- Climate Changes: Global Warming

9. Levels of Endangerment

Vulnerable: A species that is not in imminent danger of extinction, but that is at risk because of low or declining numbers at the fringe of its range, or in some restricted area. (Grey Fox)



Threatened: A species that is likely to become endangered if factors that make it vulnerable are not reversed. (Wood Bison)



Extirpated: A species that no longer exists in one part of its range. (Grizzly Bear)



Endangered: A species that is close to extinction. (Eastern Cougar)



Extinct: A species that no longer exists anywhere on Earth. (Blue Walleye)

10. Exotic Species

Exotic Species: A species that has been introduced from another geographic region to an area outside its natural range, due to human activity, whether accidental or deliberately. (Zebra Mussels)

Exotic species cause the original species to either adapt or die.

- They eat all the food and cause competitions for species.
- They cause pollution.
- Throw off the ecosystem.
- Zebra Mussels attach themselves to hard objects.