

## TOPIC SEVEN: Ecology

*This is the most important part of the test!!!*

- A. Understand how organisms interact with their environment (food webs, nutrient cycles).
- B. Energy is needed to keep an ecosystem going. The energy comes from the sun and is made usable by **producers** (plants and other **autotrophs**).
- C. Energy is passed on to other organisms in the form of food. Since all organisms must use energy for their own needs, most energy is lost before it can be passed to the next step in the food chain. As a result, organisms high on the food chain have less energy available to them and must have smaller populations (see **energy pyramid**).
- D. Environmental factors (air, water, light, temperature, pH, food, predators, etc.) determine which organisms can live in an ecosystem and how large the population can get. The maximum size of a population is called the **carrying capacity**.
- E. There are many roles in an ecosystem (**niche**), but **competition** between species usually results in only one species occupying a niche at any one time. Often, organisms with similar needs will divide resources to reduce competition (ex: birds eat insects during the day; bats eat them at night).
- F. Know the basic processes of **ecological succession**.
- G. Know the following terms: **producer, consumer, omnivore, herbivore, carnivore, predator, parasite, habitat, niche, population, community, ecosystem, biosphere, pollution, renewable resource**.
- H. Human action (development, industrialization, pollution, farming, overhunting, overgrazing, clear cutting, introduction of foreign species, soil erosion) often has negative consequences for the ecosystem (and humans too).
- I. The negative effects humans have had on the environment are mostly attributed to the increasing human population.
- J. **Biodiversity** refers to the variety of life on earth. As habitats are lost and species become extinct, biodiversity is reduced. This is considered bad because:
  - 1. Ecosystems with low diversity are less stable than ecosystems with more diversity.
  - 2. Ecosystems with low diversity take longer to recover from environmental changes.
  - 3. We use organisms for many things such as food and medicine; by reducing biodiversity we are losing potentially valuable resources.

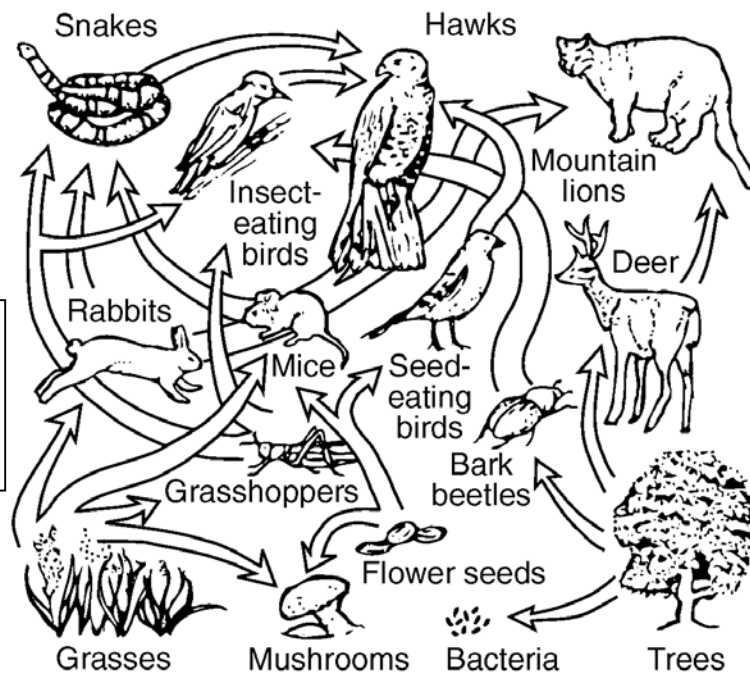
**K. Actions being taken by humans to reduce or repair damage to the environment include:**

1. Recycling wastes
2. Conserving available resources
3. Using cleaner resources (ex: solar over fossil fuels)
4. Protection of habitats and endangered species
5. Use of biological controls instead of pesticides and herbicides
6. Farming native plants (ex: cocoa in the rainforest)
7. Planting trees to replace those cut down
8. Rotating crops or planting cover crops to reduce soil loss
9. Passing laws to control pollution, land management, hunting, fishing, etc.

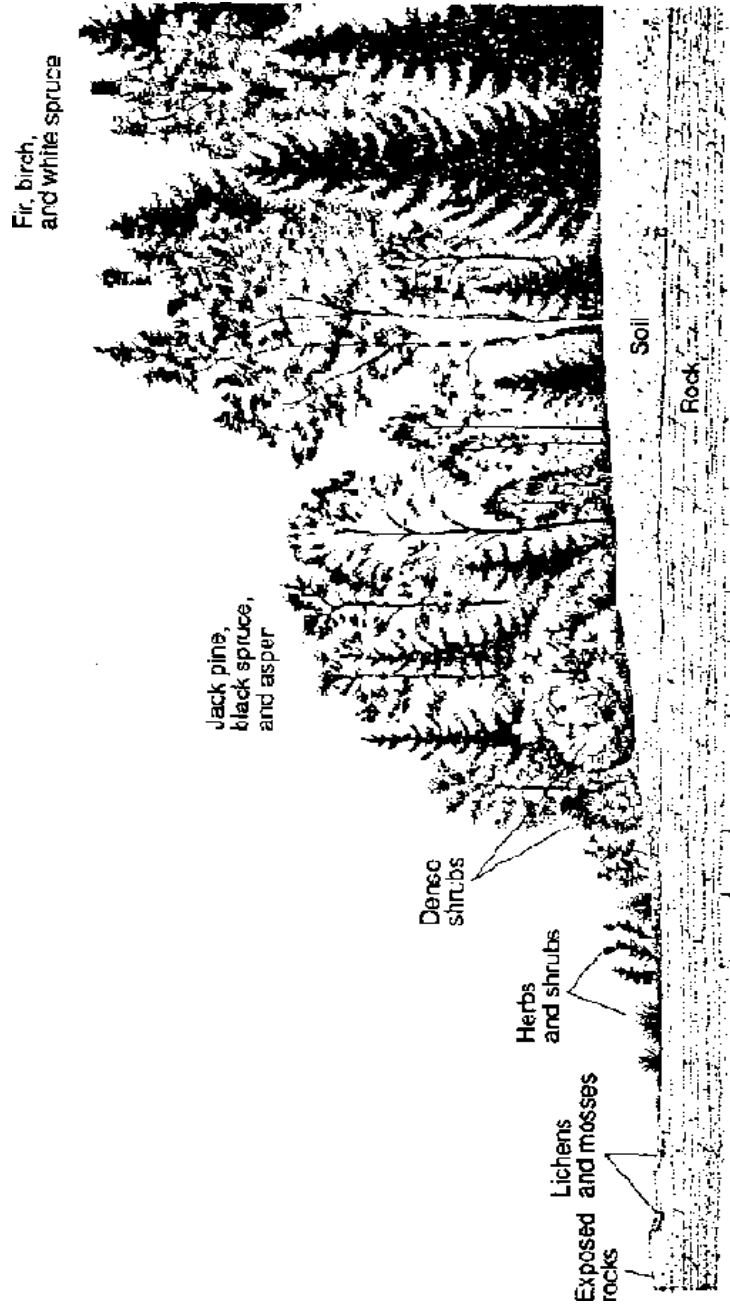
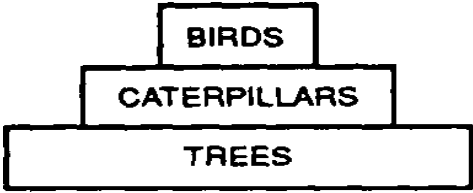
**L. For each of the following ecological problems, you should be able to identify the *specific* cause, their negative effects on the environment, and a way that people are trying to fix the problem:**

1. acid rain
2. loss of habitat (ex: deforestation)
3. loss of diversity
4. global warming
5. loss of ozone layer
6. introduced species
7. industrialization

**A Complex Food Web**  
 Note: the direction of the arrows indicates who is consuming whom.



An **energy pyramid** shows how energy is used up with each step in a food chain.



Adapted from *What You Absolutely Must Know to Pass the NYS Living Environment/Biology Regents*  
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