ECOLOGY

I. ECOSYSTEMS

1. ECOSYSTEM - all the living & nonliving things in an environment
   a. BIOTIC FACTORS - living things
   b. ABIOTIC FACTORS - nonliving things
   c. Example: POND ECOSYSTEM
      - Biotic: fish, frogs, ameba, paramecium, bacteria, plants
      - Abiotic: water, rocks, dirt, sunlight, temperature
2. **COMMUNITY** - all of the different LIVING things in an ecosystem  
a. Example: **POND ECOSYSTEM**  
   - Community = fish, frogs, ameba, paramecium, bacteria, plants

3. **POPULATION** - organisms of the same SPECIES living in a community  
a. Example: **POND ECOSYSTEM**  
   - All of the frogs in the pond
4. **NICHE**
   a. the role an organism plays
   b. what it needs, what it eats, where it lives, how it behaves

5. **HABITAT** - where an organism lives
II. LIVING THINGS IN AN ECOSYSTEM

1. PRODUCERS
   a. autotrophs
   b. Plants that carry out photosynthesis (make own food)
   c. get energy from the SUN
   d. CONTAIN THE GREATEST AMOUNT OF ENERGY IN THE ECOSYSTEM

2. CONSUMERS - heterotrophs
   a. HERBIVORES - eat producers (plants)
   b. CARNIVORES - eat other animals
   c. OMNIVORES - eat both plants and animals
   d. SCAVENGERS - eat dead organisms
3. **DECOMPOSERS**
   a. break down dead organisms into small materials & place them back into the environment to be used again
   b. **BACTERIA, MUSHROOMS**

4. **PREDATOR** - living thing that hunts and kills other living things as food

5. **PREY** - organisms killed by predators
III. **FOOD CHAIN** - shows how much ENERGY is transferred

1. **PRODUCER** → **PRIMARY CONSUMER** → **SECONDARY CONSUMER**
   (herbivore or omnivore)         (carnivore or omnivore)

2. **EXAMPLES:**

   ![Food Chain Diagram]

   a. PRODUCER (most energy)
   b. PRIMARY CONSUMER (herbivore)
   c. SECONDARY CONSUMER (carnivore)
   d. CARNIVORE
   e. CARNIVORE (carnivore)
IV. FOOD WEB

...overlapping food chains

**EXAMPLE:**

a. **Producers:** grasses & bean plants

b. **Herbivores** *(primary consum)*
   caterpillars, rabbits,

c. **Carnivores:**
   frogs, snakes, hawks, trout, f

d. **Decomposers:** bacteria
   bacteria
V. ENERGY PYRAMID

Diagram showing the energy pyramid with levels:

- Producer
- Herbivore
- Carnivore

With the greatest energy at the bottom and less energy at the top.
2. Use the energy pyramid at the right to answer the questions below.

a. Which level contains the greatest amount of energy? **GREEN PLANTS**

b. What happens to the amount of energy as it moves up the pyramid? **DECREASES**

c. Which organism is an herbivore? **MICE**
VIII. ECOLOGICAL SUCCESSION

1. When one community replaces another until a stable community exists
2. CLIMAX COMMUNITY - stable community, end of succession
VI. SYMBIOSIS

1. Relationship between 2 organisms where one lives on, in, or near the other

2. 3 types:
   a. **COMMENSALISM** = 1 benefits, other not harmed/unaffected (+, -) **Example**: -mites on eyebrows
   b. **MUTUALISM** = both benefit (+, +) - **Example**: bacteria in our intestines
   c. **PARASITISM** = PARASITE benefits, HOST is harmed (+, -) - **Example**: -fleas on dog
1. In order to survive, all organisms must have
   (1) chlorophyll   (3) energy
   (2) carbon dioxide (4) blood

2. Different species of carnivorous animals that share the same habitat in an ecosystem may
   (1) become decomposers
   (2) produce their own food
   (3) compete for food
   (4) mate with each other

3. The diagram below shows a rabbit population at two different times.
   (1) decrease in resources   (3) increase in disease
   (2) decrease in predators  (4) increase in pollution
5. Grasses, shrubs, and trees are called producers because they make
(1) water  (2) carbon dioxide  (3) minerals  (4) food

6. In the past, Native American Indians buried dead fish along with corn seeds. This technique was used because the decomposing dead fish would
   (1) provide nutrients for the growing corn plant
   (2) eliminate the need for weeding around the corn plant
   (3) release oxygen for use by the corn plant
   (4) supply all the water needed by the corn plant

7. Competition is most likely to occur between which two organisms?
   (1) deer & butterflies  (3) goldfish & rabbits
   (2) owls & bacteria  (4) grass & strawberry plants

8. How do decomposers obtain their food?
   (1) hunting and killing prey for food
   (2) changing carbon dioxide and water into food
   (3) absorbing food from dead organisms
   (4) producing food from oxygen and sunlight
9. Living things are classified as producers or consumers according to
   (1) their speed       (3) how they reproduce
   (2) how they get food (4) the size of their communities

10. Some microorganisms cause human disease. Other microorganisms are used in making cheese, yogurt, and bread. Based on this information, the relationship between humans and microorganisms can be
    (1) beneficial, only
    (2) harmful, only
    (3) beneficial or harmful

11. What is the nutrient source for some fungi?
    (1) sunlight       (3) carbon dioxide
    (2) oxygen         (4) dead organisms

12. Which event is the best example of competition between species in a pond environment?
    (1) dragonflies landing on lily pads
    (2) frogs and toads eating flies
    (3) lizards and snakes lying in the sun
    (4) hawks eating mice
1. Identify the producer in this food web.
2. Explain why mice are classified as omnivores in this food web.
   - Letters A, B, C, and D represent different energy levels in the energy pyramid below.
3. Identify one organism labeled in the food that could be placed on the energy pyramid level B.
21 The diagram below shows a food chain.

Sun

Green plants → Caterpillars → Birds → Snakes

(Not drawn to scale)

Which organisms in this food chain are herbivores?

(1) green plants
(2) caterpillars
(3) birds
(4) snakes
The diagram below shows several different organisms found in an area.

Bird
Worm
Grass
Bacteria and fungi
(Not drawn to scale)

The worms in the diagram represent

(1) a community  (3) a habitat
(2) an ecosystem   (4) a population
The diagram below shows how a plant community changed over 300 years.

300 years ago

Which process caused the gradual changes shown in this plant community?

(1) urban growth
(2) global warming
(3) environmental pollution
(4) ecological succession
Base your answers to questions 53 and 54 on the food web below and on your knowledge of science.

53 Which organism labeled in this food web provides energy, either directly or indirectly, to all of the other organisms? [1]
The diagram below shows a food chain.

(Not drawn to scale)

What do the arrows in the diagram represent?

(1) flow of energy  (3) one community replacing another
(2) life cycle stages  (4) renewable resource depletion
3. Identify the producer in this food web.
4. Explain why mice are classified as omnivores in this food web.