Ecology and Adaptations Study Guide

1. What is an adaptation? An adaptation is any structure or behavior that allows an organism to survive in its environment.

2. Give five ways adaptations can help an organism survive. help find food, help attract a mate (reproduce), hide from predators (camouflage), conserve water (needles), control body temperature (fur)

3. Give three adaptations for each biome: desert, tundra, rainforest.
desert: burrowing underground, store water, nocturnal
tundra: white fur, layer of fat, hibernation
rainforest: bright colors (attract a mate), camouflage (hide from predators), poison

4. What is natural selection?
Natural selection is the process in which organisms that are better adapted to their environment are more likely to survive and reproduce.

5. How can natural selection lead to a change in a population over time?
Individuals that are better adapted to their environment will pass on their traits to offspring.

6. Describe some marine adaptations that allow fish to live in the water.
long, streamlined bodies; gills to obtain oxygen from the water, fins

7. What are predators and prey? Give examples of each.
A predator is an animal that captures its food. A prey is the animal that gets captured and eaten. Predator: tiger, shark, owl, eagle. Prey: mouse, rabbit, squirrel

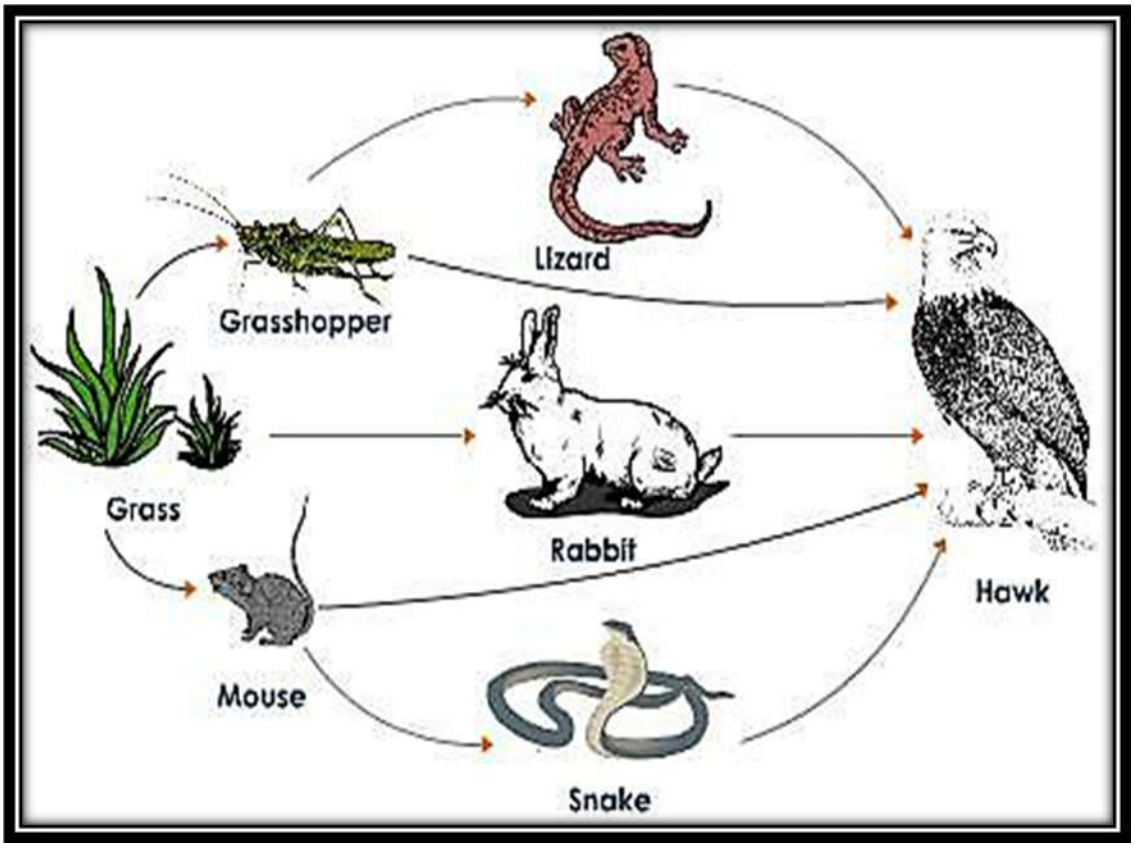
8. What is the purpose of camouflage? Camouflage allows animals to hide from predators and gives them a better chance to survive and reproduce.

9. What are some adaptations that allow plants to survive in their environments? Many desert plants have needles for protection and can conserve water. Some plants have large leaves to collect more sunlight on the rainforest floor. Trees in the taiga do not lose their leaves. (evergreens)

10. What is the role of decomposers in an ecosystem? Decomposers break down dead organisms and return nutrients to the ecosystem.

11. Give examples of natural selection. Birds have developed beaks that allow them to eat specific types of food. Bacteria have become resistant to antibiotics.

For questions 12-15, use the following food web.



12. What would happen to the herbivore population if the number of hawks increased? The number of herbivores (mice and rabbits) would decrease.

13. If the disease mouse-scratch fever wipes out the mouse population, what would happen to the snake population? They would decrease due to a lack of food

14. Which two predators compete for grasshoppers for food? Lizards and hawks

15. Which herbivore has two different predators that prey upon it? Mouse (snake and hawk).

16. How do autotrophs obtain energy? heterotrophs? Autotrophs are organisms that are able to make their own food using energy from the Sun. Heterotrophs must consume another organism to obtain energy.

17. List the following in order from smallest to largest: population, ecosystem, biosphere, community, and organism
Organism, population, community, ecosystem, biosphere

18. What is the primary function of bacteria in the nitrogen cycle? Bacteria live on the roots on certain plants called legumes and convert nitrogen (N2) to usable nitrates & nitrite compounds for a plant to absorb through a process called nitrogen fixation

19. Why is a pyramid used to show the flow of energy in an ecosystem? less energy is available at each level of the food chain because some of the energy is lost as heat. Only 10% is passed on to the next level

20. What two life processes are used the cycle carbon throughout an ecosystem? Cellular Respiration puts Carbon into the atmosphere ($C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O$ + energy) & Photosynthesis removes carbon from the atmosphere ($C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O$ + energy)

Old material to review

1. Write the chemical equation for the process that allows organisms to release energy from food. Cellular Respiration ($C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O$ + energy)

2. Use Punnett squares to predict the traits of offspring. (see Punnett square quiz)

3. What do heterozygous (hybrid) and homozygous (pure) mean? Heterozygous means an organism has two alleles that are different (Hh). Homozygous means it has two alleles that are the same (HH,hh).

4. What kind of diseases can be treated with antibiotics? Bacterial diseases, such as strep, tetanus, and staph.

5. Describe the function of each type of cell: blood, nerve, muscle, epithelial. Blood cells carry oxygen to the body's cells. Nerve cells respond to stimuli. Muscle cells contract to allow the body to move. Epithelial cells cover and protect the body.

6. List three differences between plant and animal cells. Plant cells have a cell wall, large central vacuole, and chloroplasts

7. Why is electricity transmitted at high voltages? Electricity loses voltage as it travels over a long distance.

8. Write the equation for photosynthesis. (See number 18 for help). $6CO_2 + 6H_2O \Longrightarrow C_6H_{12}O_6 + 6O_2$

9. Give examples of Newton's three laws of motion.

1st Law- Coach Brown slams on the brakes on his bus and kids fall toward the front of the bus.
2nd Law- Jared can throw a baseball farther than he can throw a bowling ball.
3rd Law- Gases from a rocket engine push downward causing the rocket to accelerate upward.

10. What kinds of elements for ionic bonds? covalent? Ionic bonds are formed by metals and nonmetals. Covalent bonds are formed by two nonmetals. Ionic- NaCl (sodium chloride) Covalent- CO_2 (carbon dioxide)

11. Identify a balanced chemical equation.

$SnO_2 + H_2 \rightarrow Sn + H_2O$ UNBALANCED

$4NH_3 + 5O_2 \rightarrow 4NO + 6H_2O$ BALANCED

12. Calculate the speed of an object from a graph of its motion.

Speed = total distance / by total time From 7 to 10 minutes the speed is 8m / 3s = 2.7m/s