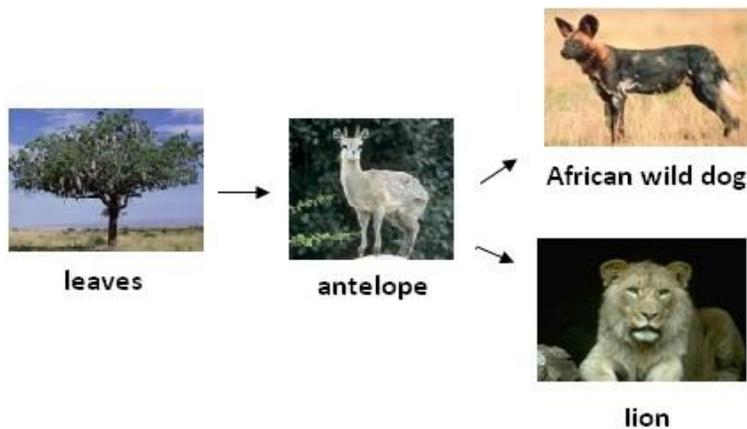


Name _____ Class period _____

ECOLOGY-----CDL 8

Population Dynamics

Populations in an ecosystem affect one another. A change in the number of one type of organism will cause a change in the number of other types of organisms. These changes can be studied by looking at the population dynamics of an ecosystem.



The food web above represents four populations within a savanna ecosystem. Antelopes depend on leaves from trees as their major food source. African wild dogs and lions compete with each other for antelopes as a food source.

The number of organisms within these populations will always be changing as some organisms are born and other organisms die. The population size of one species will also change if the population size of another species changes.

For example, if a drought in the ecosystem caused many of the trees to die, there would not be enough food for all of the antelope to survive. The antelope population would decrease. If the antelope population decreased, the number of African wild dogs and lions would also likely decrease because they would be losing a major food source.

Another example would be if humans hunted and killed many of the African wild dogs and lions. This would cause an increase in the antelope population because they would not have as many predators. More antelope means they would eat more leaves from trees. This would decrease the amount of leaves available, which is a resource that antelopes depend on for survival. If the antelope population became too large, it might outgrow its food supply and eventually start to decrease.

All populations within an ecosystem are related in some way. This means that a change in even one population in an ecosystem can have drastic effects on the ecosystem as a whole.

Changes in Ecosystems

Change often occurs in ecosystems over time. These changes may occur over short periods of time, or they may occur over long periods of time. Changes in ecosystems impact the organisms that live there.

Short-Term Changes

Short-term changes occur over small periods of time (i.e., a few hours, days, or months).

A flash flood is an example of a short-term change. Flash floods result when there is a lot of rainfall within a short period of time. This can be damaging to the habitats of many organisms and can even temporarily reduce the size of certain populations. Other populations may flourish during this type of change. After a few hours or days, however, the water recedes, and the ecosystem is restored to its normal state. Though the ecosystem is back to normal fairly quickly, it can take much longer for the populations that live in the ecosystem to stabilize.

Flash floods can cause areas that are normally dry to become submerged in water.

Seasonal changes are also an example of short-term changes. Seasonal short-term changes include cooler temperatures in the winter and warmer temperatures in the summer, as well as differences in the amount of sunlight received during different seasons. Responses of organisms to these seasonal changes include trees shedding their leaves in the fall and growing new leaves in the spring, as well as animals hibernating when an ecosystem becomes extremely cold in the winter.



Some trees shed their leaves in the fall and grow new leaves in the spring to conserve energy.

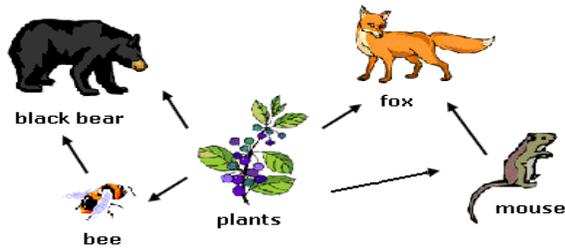
Long-Term Changes

Long-term changes occur over long periods of time (i.e., years, centuries). Because of this, long-term changes can have major impacts on the populations living in an ecosystem.

Long-term changes are often caused by catastrophes, such as fires, droughts, or earthquakes. For example, when a lack of rainfall induces a drought, plants can't get enough water to survive. Then, when the plants die, herbivores (plant-eaters) won't have enough to eat, and they, too, will die. Finally, when the herbivores die, carnivores (meat-eaters) won't have enough to eat, and they will die out as well. Even when rain finally falls again, it takes time for plants to regrow, and it will take time for all of the organisms to return to their normal population sizes. A drought occurs when rain does not fall for a long period of time. Recovering from a drought may take even longer.

Long-term changes may also be caused by human events, such as pollution and deforestation. For example, the addition of excess nutrients to a system can cause algal blooms, or the overgrowth of algae in an aquatic ecosystem. When the algae dies, there is an overabundance

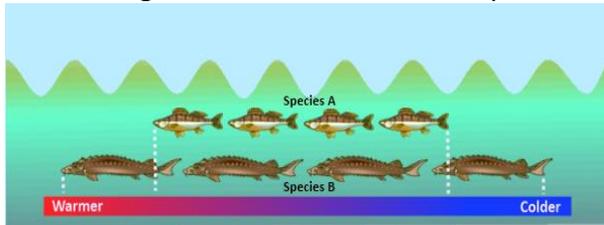
of dead matter in the water, and the decomposition process removes oxygen from the ecosystem. Without oxygen, fish and other organisms that live in the water will also die.



1. What would most likely happen in the ecosystem shown in the above food web if the fox population significantly increased?

- A. The population of mice would decrease.
- B. The population of mice would increase.
- C. The population of bees would increase.
- D. The population of black bears would increase.

2. The diagram below shows the temperature range of two fish species in Lake Superior.



What will happen to the species in this ecosystem if the water temperature increases close to the warmest temperature shown on the diagram?

- A. Species A will survive and species B will die out.
- B. Both species will survive.
- C. Species B will survive and species A will die out.
- D. Neither species will survive.

3. A population of sagebrush lives in a grassland ecosystem. Over several years, erosion causes the soil of the grassland to have an increasing amount of sand in it. The data below was collected by scientists studying the ecosystem.

Year	Percentage Sand in Soil	Average Height of Sagebrush (meters)	Number of Sagebrush Plants
1	38	1.15	120
2	42	1.16	129
3	45	1.14	137
4	51	1.15	145

If the soil is 53% sand next year, which of the following statements is the most likely prediction?

- A. The size of the sagebrush population will decline.
- B. The average height of the sagebrush will increase.
- C. The size of the sagebrush population will increase.

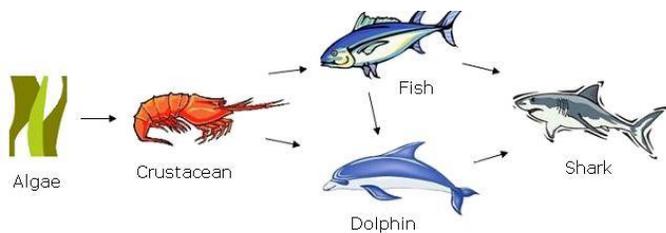
4. A variety of small animals and insects can live in a mountain tundra ecosystem. The ground in such places is often rocky with very little soil. The plants that grow there are fragile and grow slowly.

What would most likely happen in the ecosystem if many people carelessly trampled the tundra and killed off the plants?

- A. The amount of soil in the tundra would increase.
- B. The new plants would grow more quickly.
- C. The populations of many animal species would decrease.

5. A large population of deer lives in the forest. Wolves kill and eat the deer as a primary food source. Which of the following would most likely cause an immediate decrease in the population of deer in the forest?

- A. The wolf population greatly increases.
- B. The wolf population completely disappears.
- C. The wolf population slightly decreases.



6.

A food web is shown above. What would most likely happen in this ecosystem if the shark population significantly increased?

- A. The population of crustaceans would decrease.
- B. The population of fish would decrease.
- C. The population of algae would increase.

7. One year, heavy rain makes Lake Raymond very deep. The next year, however, rain is very light, and not much water is left in Lake Raymond.

How will this most likely affect animal life in Lake Raymond?

- A. There will be less animal life the second year.
- B. There will be more animal life the second year.
- C. There will be several new species of fish the second year.
- D. There will be an increase in bacterial life the second year.