

Name: _____

Date: _____

■ Ecological Relationships Reading Passage

ECOLOGICAL RELATIONSHIPS

Organisms form relationships with each other in an ecosystem. Some organisms compete against other organisms for resources or space and form oppositional relationships. Other organisms depend on each other to survive and form symbiotic relationships.

Ecological relationships exist because of niches. A **niche** is an organism's role in an ecosystem. A niche includes the physical space an organism occupies, how that organism interacts with other organisms in that space and its place in the food chain. Only one species can occupy a specific niche in an ecosystem. Species interact with each other when they try to occupy the same niche or if they occupy similar or overlapping niches.

Species oppose each other when they occupy the same niche. Species that oppose each other form oppositional relationships. **Competition** is the interaction between similar species that try to occupy the same niche. It occurs because resources and space are limited in an ecosystem. Species compete with other species for the same food, water and territory. Competition occurs between individuals of the same species as well. Predation is an oppositional relationship in which one organism feeds on another organism that lives in the same space. The organism that is eaten is called **prey**. The organism that is eating is called the **predator**. The predator-prey relationship creates a cyclic but stable change in populations of the predator and prey.

Species can form a close relationship when they exist in similar or overlapping niches. In these interactions, at least one species benefits from interacting with the other. We call this a **symbiotic relationship**. **Commensalism** is a symbiotic relationship between two organisms where one organism benefits from the relationship and the other organism does not benefit from it but is not harmed by it either. Barnacles and whales have a commensalistic relationship. Barnacles become mobile by attaching to the whale. They also are protected from predators. The whale is neither helped nor harmed by the barnacles. **Mutualism** is a symbiotic relationship where both organisms benefit from the relationship. Two different organisms live together and are more successful than if they lived alone. Bees and flowers have a mutualistic relationship. Bees feed on the pollen produced by the flower. The bees pollinate the flower, helping the plant reproduce. **Parasitism** is a third symbiotic relationship. In parasitism, one organism benefits from the relationship. This organism is called the **parasite**. The other organism is harmed, but not (intentionally) killed. This organism is called the host. The parasite uses the host for nutrients. As it does so, it harms the host. The parasite can kill the host, but not intentionally. The parasite depends on the host and if it dies, the parasite can die too. Ticks, fleas and mosquitos are parasites that use humans or other animals as hosts.

Name: _____

Date: _____

■ Ecological Relationships Answer Sheet

Questions

1. What is a niche?

2. Why does competition occur?

3. Describe the predator and prey in a predator-prey relationship.

4. Compare and contrast commensalism, mutualism and parasitism.

5. Do you think oppositional or symbiotic relationships are more beneficial to an ecosystem? Justify your answer.

Name: _____

Date: _____

■ Ecological Organization Reading Passage

ECOLOGICAL ORGANIZATION

There are different ways to study the environment. Scientists divide the environment into parts. These parts are then arranged into levels of organizations. Each level is more complex than the previous because it incorporates more environmental factors. Although we divide the environment into different parts or levels, it's important to remember all living things directly or indirectly depend on each other.

Studying the environment in levels helps scientists better understand how living things interact with other organisms and with the physical environment. The physical environment includes the nonliving parts of the environment. Studying the environment in levels also helps scientists study ecology in an organized and logical way.

An **individual** is a single organism. An individual interacts with other living things and its surroundings. The surroundings in which an individual organism lives is called its **habitat**. A **population** is a group of individuals of the same species that live in the same area. Scientists study populations to learn how members of the same species interact with each other. A **community** is the assemblage of two or more different populations living in the same area. The populations usually interact with each other. Scientists study communities to learn how different species interact with each other. An **ecosystem** is a community of living things interacting with the nonliving parts of their environment. In other words, it includes living organisms together with the nonliving parts of the environment. The nonliving parts make up the physical parts of the environment.

The next ecological level is biome. A **biome** is a collection of ecosystems with the same climate and similar communities. In other words, many similar ecosystems make up a biome. All biomes on Earth make up the biosphere. The **biosphere** includes all life, land, water and air on Earth. Interactions within our biosphere produce a complex web of dependencies. Living organisms depend on each other and on the physical environment in which they live.

Name: _____

Date: _____

■ Ecological Organization Answer Sheet

Questions

1. What is ecological organization?

2. List the level of ecological organization from least to most inclusive.

3. What is the relationship between an individual, population and community?

4. What is the difference between an ecosystem and biome?

5. Do you think it's more advantageous to study more inclusive or exclusive levels of organization to better understand the relationship between different organisms? Justify your answer.

Name: _____

Date: _____

● Impact of Environmental Change Reading Passage

IMPACT OF ENVIRONMENTAL CHANGE

All organisms require resources to survive. Plants need air, water, sunlight, space and nutrients in soil. Animals need air, water, food, space and shelter. If the availability of resources in an ecosystem changes, the organisms that live there will be affected as well.

Some species can adapt or adjust to changes in the environment. For example, if an animal's food supply decreases, the animal finds a different food source to eat. If the amount of sunlight decreases for a plant, it bends itself towards available sunlight or grows new leaves to capture sunlight in different areas. If the temperature decreases, an animal grows thicker fur or develops a thicker layer of fat under its skin to keep it warm. If a species cannot adapt to the changes, it may move to a new environment. In the new environment, the species may have more food, water or space. It may have better environmental conditions that are more suitable for the organism.

If a species cannot adapt or cannot find a new place to live, it may die out. The death of a species in an ecosystem can further disrupt the ecosystem, especially if it is a producer and the base of a food chain, a decomposer or an essential source of food for animals high in a food chain. If an entire species dies out on Earth, the species becomes extinct.

Extinction occurs at the moment that the last organism of a species dies.

Environmental changes can make an ecosystem more suitable for different, non-native species to live in. Usually, new species move into the environment as old species move out. For example, if the water supply in an ecosystem decreases, species may move to new environments to find water. Species that can live in areas where there is little water may move in and replace the species that moved out.

Questions

1. What does it mean when a species can adapt to changes in the environment?
2. What happens when a species becomes extinct?
3. What can happen if a species cannot adapt to changes in the environment?
4. Are all environmental changes harmful to species? Explain.
5. How do you think diversity in a species affects the way it is impacted by environmental changes? Justify your answer.

Name: _____

Date: _____

● Impact of Environmental Change Answer Sheet

Questions

1. What does it mean when a species can adapt to changes in the environment?

2. What happens when a species becomes extinct?

3. What can happen if a species cannot adapt to changes in the environment?

4. Are all environmental changes harmful to species? Explain.

5. How do you think diversity in a species affects the way it is impacted by environmental changes? Justify your answer.

Name: _____

Date: _____

■ Carrying Capacity Reading Passage

CARRYING CAPACITY

Limiting factors are biotic and abiotic factors that regulate how many organisms live in an ecosystem. They restrict the growth of populations. Availability of freshwater and food, space and environmental conditions such as temperature and precipitation are the most significant limiting factors in an ecosystem.

An ecosystem can support only so large of a population. The maximum population size that an ecosystem can support is called **carrying capacity**. Limiting factors determine carrying capacity. The availability of abiotic factors such as water and space and biotic factors such as food dictates how many organisms can live in an ecosystem. In an ecosystem, the population of a species will increase until it reaches the carrying capacity. Then the population size remains relatively the same.

If limiting factors change, such as the availability of food or water, the carrying capacity changes as well. For example, if more food is available, then carrying capacity will increase. On the other hand, if less water is available, then carrying capacity will decrease. Changes in limiting factors can be due to natural reasons, such as natural disasters. Humans can also alter carrying capacity. We alter carrying capacity when we manipulate resources in a natural environment.

Natural disasters can destroy resources in an ecosystem. If resources are destroyed, the carrying capacity will most likely decrease. Furthermore, disease can kill individuals of a population - such as those that are a source of food - which affects the carrying capacity of other organisms. If a food source is decreased due to disease, then carrying capacity of the organisms that depend on them will decrease. For example, If a disease breaks out and kills off grasses in an ecosystem, animals that depend on the grasses for food will have a smaller food supply. Therefore, their carrying capacity will decrease.

If a population exceeds carrying capacity, the ecosystem may become unsuitable for the species to survive. If the population exceeds carrying capacity for a long period of time, resources may be completely depleted. Populations may die off if all the resources are exhausted.

Name: _____

Date: _____

■ Carrying Capacity Answer Sheet

Questions

1. What is a limiting factor? Give examples.

2. What is carrying capacity?

3. Compare and contrast how changes to food and water availability in an ecosystem can affect carrying capacity.

4. What happens to a population if it exceeds its carrying capacity?

5. How could humans manipulate limiting factors so to increase or decrease the carrying capacity of populations in an ecosystem?
