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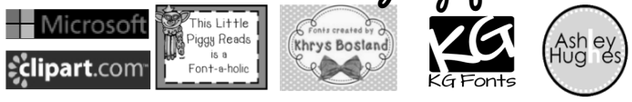

Ecology: Interactions Within the Environment

Name: _____

How do things "work" together to survive in their environments? **Ecology** is the study of the interactions among organisms and their environments. There are several things that make up an ecosystem. An **ecosystem** is all of the living and non-living features of an environment**. Abiotic factors** are those things that are non-living in an environment like air, water, soil and sunlight, and **biotic factors** are all of the living components such as trees, plants, animals, insects, bacteria, and us! We have many different ecosystems on our planet, too! Large geographic areas with similar climates and ecosystems are called **biomes**, and they can include such environments like the snowy tundra, the desert, or the very diverse tropical rainforest. Most organisms live in a specific area suited for their needs.

An **organism** is any single living thing living within an ecosystem, and the place where it obtains the types of food, shelter, moisture and temperature that it needs is called its **habitat**. Its **niche** is the unique way that the organism survives within its environment, or its "job" within the environment. Organisms live in groups called **populations** within their ecosystem and certain features of that ecosystem can affect how that population lives and thrives. Anything that can limit the size of a population, including living and nonliving features of an ecosystem, is called a **limiting factor**. An example of a factor that could limit the size of a population might be a hunter or a drought. An ecosystem can only support a certain number of individuals before that system begins to run out of resources. The largest number of individuals of a particular species that an ecosystem can support over time is called its **carrying capacity**.

All organisms rely on other organisms for energy. The transfer of energy from one organism to another is called the **energy flow** through the ecosystem. We can trace the path of energy through an ecosystem with an **Energy Pyramid**. An energy pyramid shows the direction that energy flows and each level on the pyramid is called a **trophic level**. At the bottom are **producers**, organisms that can make their own food. Next are **consumers**, who need to consume food from another source, such as a producer or another consumer. **Decomposers** return nutrients to the soil by consuming wastes and dead organisms.
We can see how organisms rely on each other for energy in food chains and webs. A **food chain** shows how food energy passes from one organism to the next. **Food webs** are more complex and show the network of many interconnected food chains. Organisms have special types of interactions with one another. If an animal hunts and kills another animal for food, it is called a **predator** and is a consumer. The animal that is hunted and caught for food is the **prey** and is also a consumer; it may be an herbivore, omnivore, or carnivore. A **carnivore** is a meat eater and can eat herbivores, omnivores, or other carnivores. **Herbivores** eat producers or plants only, and an **omnivore** eats both producers (plants) and consumers (other animals).

Some organisms have very close relationships with one another. **Symbiosis** is any close relationship between different species, and including mutualism, commensalism, and parasitism. **Mutualism** is when both species benefit from the relationship, like bees pollinating flowers. **Commensalism** is when one species benefits and the other organism doesn't really get anything out of it. The shark and the remora is an example of this. The remora just hangs around the shark waiting for it to drop food, but the shark doesn't get anything from the remora. **Parasitism** is when one organism gets helped in the relationship and the other organism is harmed, like fleas on a dog.

Relationships exist among all living things. When one thing is out of balance, it can affect the entire environment. For example, when we spray pesticides on our crops, those chemicals can upset the delicate ecosystem that exists there, causing some populations to soar while others may die out. So the next time you think about throwing trash on the ground or pouring chemicals down your drain, think about who or what you might be affecting!

Ecology: Interactions Within the Environment

Name: _____

Use the reading to match the vocabulary term with the appropriate definition.

1. _____ **-** study of the interactions that take place among organisms and their environment
2. _____ - living things within an ecosystem
3. _____ - one of any living thing
4. _____ - place where an organism lives and that provides the types of food, shelter, moisture, and temperature needed for survival
5. _____- chain showing how energy passes from one organism to the next
6. _____ **-** eat producers
7. _____- any close relationship between species, including mutualism, commensalism, and parasitism.
8. _____ - animal that hunts and kills other animals for food. It is a consumer [carnivore or omnivore]
9. _____ - largest number of individuals of a particular species that an ecosystem can support over time
10. _____ - non-living parts of ecosystem-air/water/soil/sun
11. _____ - all the living organisms that live in an area and the nonliving features of their environment
12. _____ **-** large geographic areas with similar climates and ecosystems. Includes: Tundra, Desert, Tropical Rainforest, Temperate Rainforest, Grassland, Arctic Tundra, Temperate Deciduous Forest
13. _____ **-** in an ecosystem, refers to the unique ways an organism survives, obtains food and shelter, and avoids danger
14. _____- anything that can limit the size of a population, including living and nonliving features of an ecosystem, such as predators or drought
15. _____ - show the direction in which energy flows. As the amount of available energy decreases, the pyramid gets smaller. Each layer on a pyramid is called a _____level.
16. _____**through an ecosystem** – The transfer of energy from one organism to another through food webs.
17. _____ - organism that makes its own food, autotroph.
18. _____ - organism that cannot make own food, a heterotroph
19. _____ **-** consume wastes and dead organisms
20. _____ - complex network of many interconnected food chains and feeding relationships
21. _____ - an animal that is hunted and caught for food. It is a consumer; it may be a herbivore, omnivore, or carnivore.
22. _____ - eat herbivores, omnivores, or other carnivores
23. _____ - eat producers and consumers

Free Response:

24. What are the three types of symbiosis? Using the symbols (+) for positive, (-) for negative, and (0) for neutral, describe what each organism gets out of the relationship for each type of symbiosis.
    a.
    b.
    c.
25. List some limiting factors that might limit the size of a population within its environment?
i.e. increased hunting by man and drought

Ecology: Interactions Within the Environment

Name: _____

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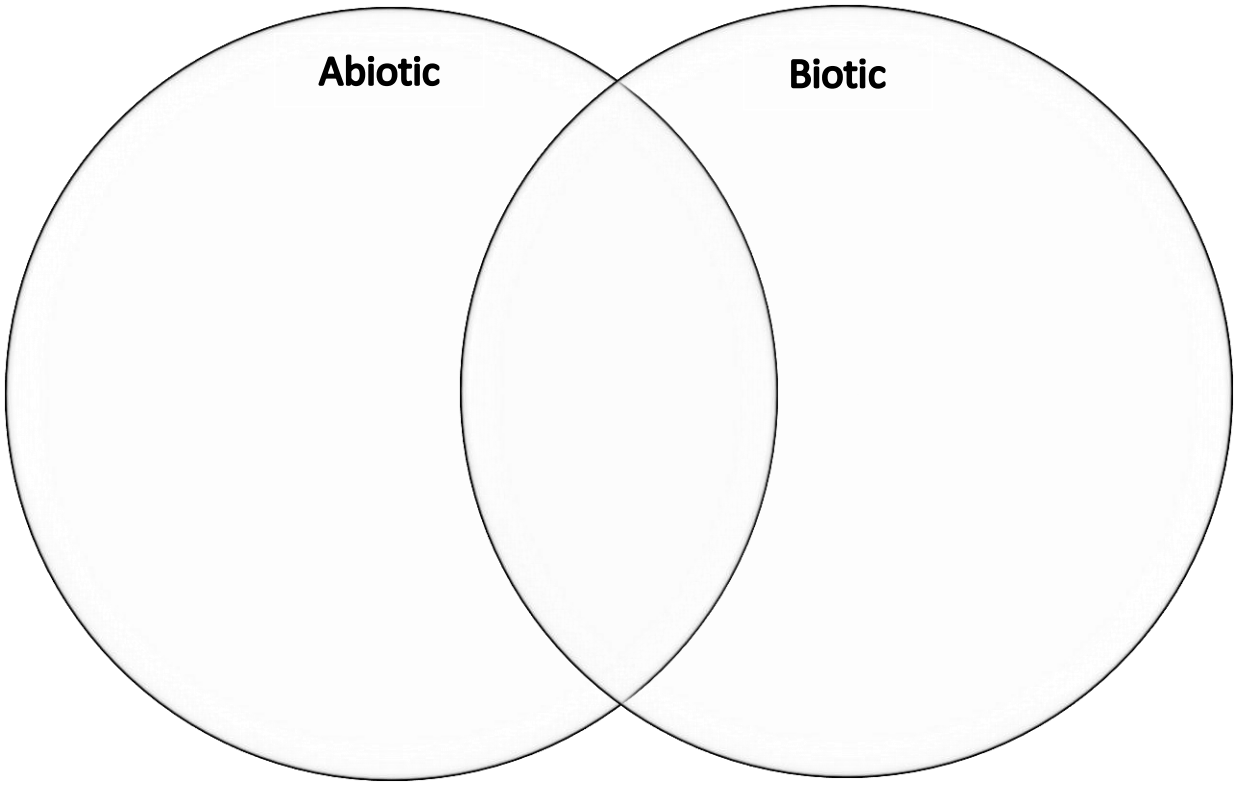
Ecology:
Interactions Within the Environment

Name: _____

Answer the questions below using the reading

1. Based on the definition of Ecology, what do you think the word parts “eco” and “ology” mean?

2. Compare and contrast abiotic and biotic factors using the diagram below.



3. Provide three examples of each:
    a. Abiotic Factor-
    b. Biotic Factor-

4. Write a paragraph explaining how energy flows through an ecosystem using the following terms: Energy Pyramid, Trophic Level, Producer, Primary Consumer, Decomposer, Sun, Secondary Consumer, Tertiary Consumer

Ecology: Interactions Within the Environment

Name: _____

5. Food webs and food chains both show how energy transfers in an ecosystem. Explain how they differ from one another.

6. Using the reading, define and give an example of each type of consumer.

Type of consumer	Definition	Example

7. Identify the three types of symbiosis. Then, using the symbols (+) for positive, (-) for negative, and (0) for neutral, describe what each organism gets out of each relationship. Provide an example of each type.

Type of Symbiotic Relationship	Definition	Use (+) (-) and (0) to show what each organism gets out of the relationship	Provide an example of each type of symbiosis

8. List some limiting factors that might limit the size of a population within its environment? (for example: increased hunting by man and drought)

9. What are some ways that humans negatively affect the environment?

Ecology Teacher key

Use the reading to match the vocabulary term with the appropriate definition.

1. **Ecology -** study of the interactions that take place among organisms and their environment
2. **Biotic Factors** - living things within an ecosystem
3. **Organism** - one of any living thing
4. **Habitat** - place where an organism lives and that provides the types of food, shelter, moisture, and temperature needed for survival
5. **Food Chain-** chain showing how energy passes from one organism to the next
6. **Herbivore -** eat producers
7. **Symbiosis-** any close relationship between species, including mutualism, commensalism, and parasitism.
8. **Predator** - animal that hunts and kills other animals for food. It is a type of consumer [carnivore or omnivore]
9. **Carrying Capacity** - largest number of individuals of a particular species that an ecosystem can support over time
10. **Abiotic** - non-living parts of ecosystem-air/water/soil/sun
11. **Ecosystem** - all the living organisms that live in an area and the nonliving features of their environment
12. **Biomes -** large geographic areas with similar climates and ecosystems. Includes: Tundra, Desert, Tropical Rainforest, Temperate Rainforest, Grassland, Arctic Tundra, Temperate Deciduous Forest
13. **Niche -** in an ecosystem, refers to the unique ways an organism survives, obtains food and shelter, and avoids danger
14. **Limiting Factor-** anything that can limit the size of a population, including living and nonliving features of an ecosystem, such as predators or drought
15. **Energy Pyramid** - show the direction in which energy flows. As the amount of available energy decreases, the pyramid gets smaller. Each layer on a pyramid is called a **trophic** level.
16. **Energy through an ecosystem** – The transfer of energy from one organism to another through food webs.
17. **Producer** - organism that makes its own food, autotroph.
18. **Consumer** - organism that cannot make own food, a heterotroph
19. **Decomposer -** consume wastes and dead organisms
20. **Food Web** - complex network of many interconnected food chains and feeding relationships
21. **Prey** - an animal that is hunted and caught for food. It is a consumer; it may be a herbivore, omnivore, or carnivore.
22. **Carnivores** - eat herbivores, omnivores, or other carnivores
23. **Omnivores** - eat producers and consumers

Free Response:

24. What are the three types of symbiosis? Using the symbols (+) for positive, (-) for negative, and (0) for neutral, describe what each organism gets out of the relationship for each type of symbiosis.
    a. Mutualism (+,+) both organisms benefit
    b. Commensalism (+,0) one organism benefits and the other is neither helped nor harmed
    c. Parasitism (+, -) one organism benefits and the other is harmed
25. List some limiting factors that might limit the size of a population within its environment?
i.e. increased hunting by man and drought
    Examples may include: Natural disasters, accidents (hit by car, caught in fences), limited resources (food, water, shelter), weather changes, global warming, etc.

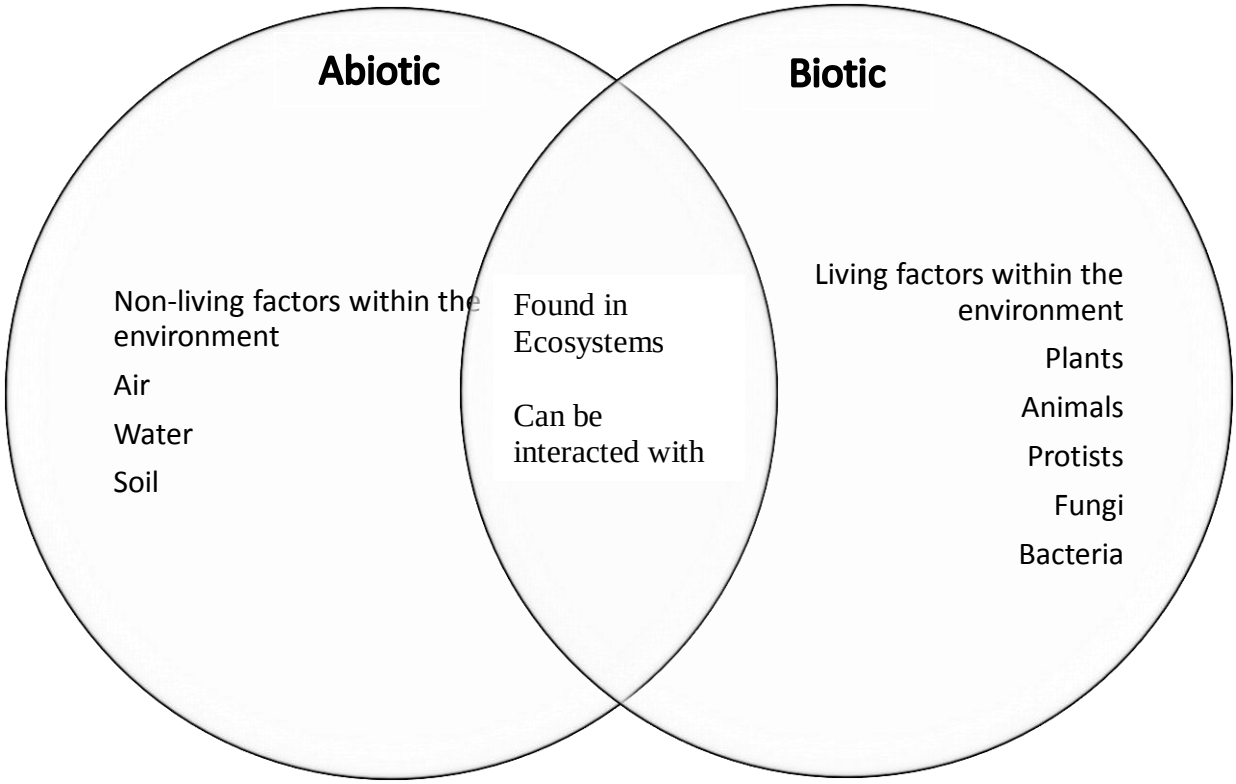
Ecology:

Teacher Key

Answer the questions below using the reading

1. Based on the definition of Ecology, what do you think the word parts "eco" and "ology" mean?
   Eco means environmental; Ology means the study of
   Ecology is the study of living things within their environment.

2. Compare and contrast abiotic and biotic factors using the diagram below.



3. Provide three examples of each:
   a. Abiotic Factor- sun, rain, clouds, rocks, water (river, lake, ocean)
   b. Biotic Factor- flowers, trees, insects, fish, mammals, birds, mushrooms

4. Write a paragraph explaining how energy flows through an ecosystem using the following terms: Energy Pyramid, Trophic Level, Producer, Primary Consumer, Decomposer, Sun, Secondary Consumer, Tertiary Consumer

Ex; An energy pyramid shows how energy moves through an ecosystem. The sun is the source of all energy on earth. The sun provides energy needed for the bottom of the energy pyramid: producers. Producers or autotrophs are plants which harness only 10% of the sun's energy to make their own food As we move up the energy pyramid much of the sun's energy is lost and only 10% of energy is transferred to each trophic level. The primary consumer is an herbivore or omnivore that eats the producers. Next is the secondary consumer- carnivore or omnivores that eat the primary consumers. Lastly is the tertiary consumer or top predator.

Ecology:

Teacher Key

5. Food webs and food chains both show how energy transfers in an ecosystem. Explain how they differ from one another. A food chain shows energy transfer through an ecosystem. Arrows always point from the thing being eaten to that which eats it. A food chain is just ONE example of plant and animal interactions within an ecosystem. A food web is many food chains linked together, showing all of the various predator/prey relationships within an ecosystem.
6. Using the reading, define and give an example of each type of consumer.

Type of consumer	Definition	Example
Herbivore	Eats plant material	Deer
Carnivore	Eats animal material/meat	Wolf
Omnivore	Eats both plant and animal material	Bear

7. Identify the three types of symbiosis. Then, using the symbols (+) for positive, (-) for negative, and (0) for neutral, describe what each organism gets out of each relationship. Provide an example of each type.

Type of Symbiotic Relationship	Definition	Use (+) (-) and (0) to show what each organism gets out of the relationship	Provide an example of each type of symbiosis
Mutualism	Both organisms benefit from their relationship	+, +	Bees pollinating flowers
Commensalism	One organism benefits while the other is neither helped nor harmed	+, 0	Shark and Remora
Parasitism	One organism benefits while the other is harmed	+, -	Dogs and Fleas

8. List some limiting factors that might limit the size of a population within its environment? (for example: increased hunting by man and drought)

   See # 25

9. What are some ways that humans negatively affect the environment?

   Examples may include:
   Solid waste
   Pollution
   Excessive energy usage