

Middle School Science STAAR Review

Reporting Category 4: Organisms & Environment

8.11.A describe producer/consumer, predator/prey, and parasite/host relationships as they occur in food webs within marine, freshwater, and terrestrial ecosystems

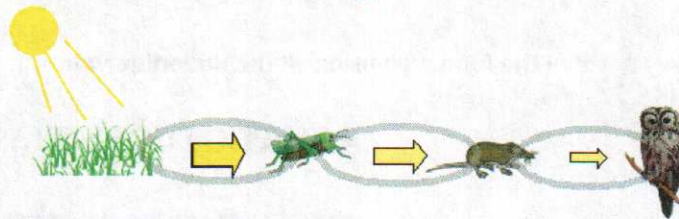
ECOSYSTEM

An **ecosystem** includes the **biotic** (living) and **abiotic** (non-living) parts of the environment.

Food Chain

The path of food energy from the sun to the producer then transferred to a series of consumers

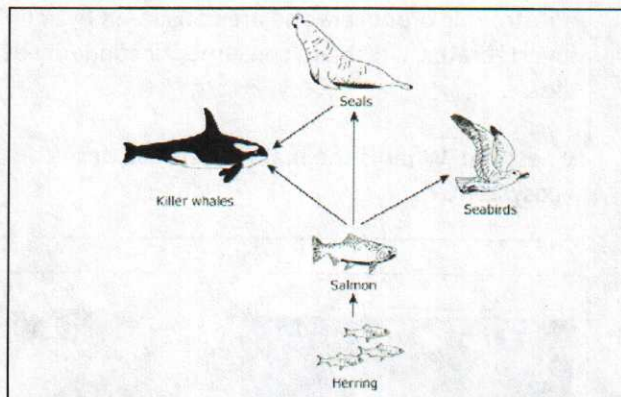
Arrows show the flow of energy.



Note: The sun provides energy to plants to produce food in the process called **Photosynthesis**.

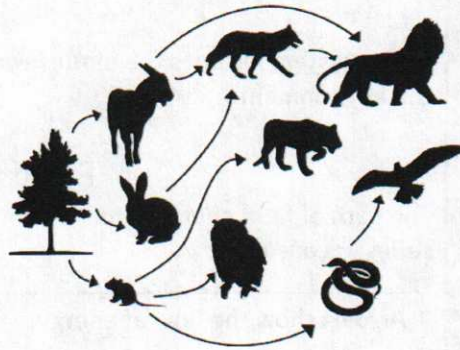
Food Web

A model that shows all the possible feeding relationships between organisms living in an ecosystem.



Energy flows through various food chains as animals eat plants and **predators** consume **prey**, creating a **food web**. The energy that flows through food chains and food webs comes from the Sun.

Trophic levels of organisms in a food web range from primary producers (autotrophs), and different levels of heterotrophs, including primary consumers (herbivores), secondary consumers (carnivores that eat herbivores), and tertiary consumers (carnivores that eat carnivores).



Label the food web using all the underline words in the paragraph above.

AQUATIC ECOSYSTEMS



Aquatic ecosystems include freshwater and marine biomes and constitute the largest part of the biosphere. In marine ecosystems, phytoplankton are autotrophic producers and are consumed by zooplankton and small invertebrates, which are consumed secondarily by fish and larger marine life.

Question: What is the main difference between freshwater and marine ecosystems?



Give an example of a producer/consumer in these ecosystems.

TERRESTRIAL ECOSYSTEMS



A **terrestrial ecosystem** is an ecosystem that is found on land.

In terrestrial ecosystems, the primary producers are plants, which are consumed by insects, arthropods, and grazing animals. Secondary consumers include spiders, frogs, and carnivorous animals.

Question:

Give an example of a predator/prey in this ecosystem. Share your answer with your partner.

DEFINITIONS you must know to answer questions.

A **producer** is an organism that is able to produce its own food, usually by using energy from sunlight to make sugars (**photosynthesis**).



Ex: plants

A **consumer** is an organism that eats other organisms for energy.










Ex: herbivores, carnivores, omnivores, and scavengers

A **decomposer** is an organism that gets energy by breaking down the remains of dead organisms or organic wastes and consuming or absorbing nutrients (recycle nutrients).

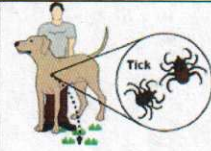


Ex: fungi and bacteria

	<p>A herbivore is an organism that consumes only plants</p>	 <p>Ex: Giraffe, rabbits, cows</p>
	<p>A carnivore is an organism that consumes other animals</p>	 <p>Ex: hawks, tigers</p>
	<p>An omnivore is an organism that consumes both plants and animals</p>	 <p>Ex. Humans, bears</p>
	<p>A parasite is an organism that survives on a host organism and causes harm to the host.</p>	 <p>Ex. Insects that eat tomatoes</p>
	<p>A host is an organism that is used by another for nutrients, shelter, or transport; it is harmed by the relationship</p>	 <p>Ex. Humans are host for mosquitoes</p>
	<p>A prey is an organism that is hunted by other organisms for food</p>	 <p>Prey</p>
	<p>A predator is an organism that hunts for its food</p>	 <p>Predator</p>

Symbiosis

Parasitism is an interaction between two organisms, in one organism benefits (the parasite) and the other organism is harmed (host).



Mutualism is an interaction between two organisms, in which there is benefit to both.



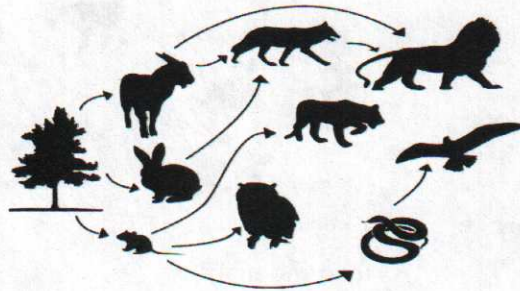
Commensalism is an interaction between two organisms, in which one benefits and the other is not affected.



QUESTIONS:

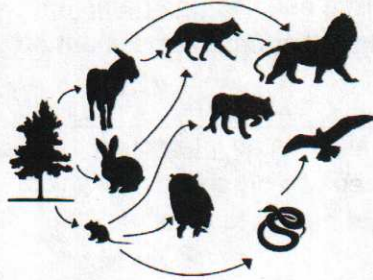
Refer to the diagram below to answer the question.

1. The primary consumers found within the food web are the –



- A. plants
- B. wolf, snake, and hawk
- C. frog, dragonfly, and bird
- D. mouse, grasshopper, butterfly

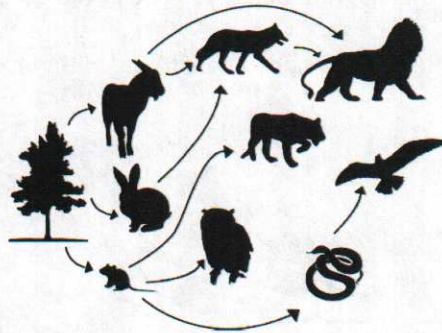
2. If the wolf population decreased within the food web below, the result would be



- A. the mouse population decreasing
- B. the hawk population decreasing
- C. the snake population decreasing
- D. the producer population decreasing

Explain your answer:

3. An example of a predator-prey relationship existing between two of the organisms in the food web below are between the –

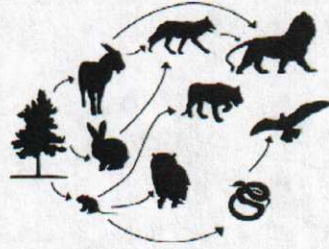


- A. toad and snake
- B. wolf and hawk
- C. plant and butterfly
- D. grasshopper and fly

Explain your answer:

4. The mouse is an example of a(n) –

Refer to the diagram below to answer the question.



- A. Autotroph
- B. Consumer
- C. Predator
- D. Producer

5. A clown fish's home is in a sea anemone. Clown fish scare away other fish that eat the sea anemone. The clown fish and sea anemone exhibit which type of relationship?



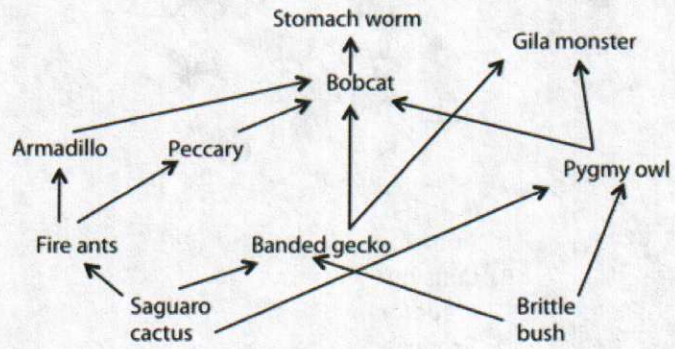
- A. Commensalism
- B. Mutualism
- C. Parasitism
- D. Predator-Prey

Explain your answer:

6. A student goes home one day to find his dad chopping down a tree in their backyard. The pine beetle had attacked the tree for some time, feeding on the tree's bark to the point of killing the tree. The pine beetle is a –

- A. Herbivore
- B. Host
- C. Parasite
- D. Producer

7. In the diagram below, a desert food web is shown. Write an essay identifying and describing one producer-consumer relationship, one predator-prey relationship, and one parasite-host relationship within the desert food web.



ESSAY:

8.11.B investigate how organisms and populations in an ecosystem depend on and may compete for biotic and abiotic factors such as quantity of light, water, range of temperatures, or soil composition

Biotic & Abiotic



Term	Definition	Examples
Biotic factors	are the living parts of an ecosystem	Animals (ex. Horses, dogs) Plants (ex. Trees, grass) Fungi (ex. mushroom) Microorganism (ex. bacteria)
Abiotic Factors	are the non living parts of an ecosystem	Sunlight Air Temperature Water Soil Wind Clouds

Competition for Biotic & Abiotic

Biotic Competition	Abiotic Competition
Competing for food	Competing for sunlight

Resources for an organism's habitat, including space, food, shelter, and water, may be limited or depleted by competition. Two species cannot operate in the same niche in the same environment.

DEFINITIONS you must know to answer questions.

A **population** is a group of living organisms of the same kind living in the same place.

Ex. Group of polar bears



A **niche** is an organism's "job" or role in an ecosystem.



Examples:

A ladybug eating aphids

A **community** is ALL species or populations living in the same area.



Competition occurs when more than one individual, or populations in an ecosystem relies upon the same limited resources.

Examples of **limited resources**:
food, water, territory

Two types of competition:

a. **Intraspecies competition**: occurs when members of the same species compete for same resources in an ecosystem



b. **Interspecies competition**: occurs when individuals of two separate species share a limiting resource in same area.



Invasive species vs. native species



An "**invasive species**" is defined as a species that is non-native (or alien) to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm or harm to human health.

QUESTIONS:

1. Describe an owl's niche in the ecosystem. On what abiotic and biotic factors do individual owls and owl populations depend?

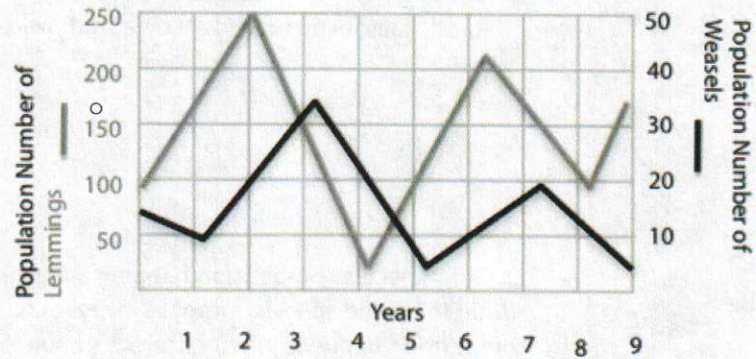


2. Intraspecies competition happens when individual organisms within the same species compete for resources. Interspecies competition happens when different populations of species compete for resources. Describe the similarities and differences between these two types of competition. Use specific examples to support your answer.

3. Competition for resources within an elk herd living in a national park can become severe. What conditions can increase resource competition between individuals within a population?

- A. Large habitat
- B. High population density
- C. Elevated rate of disease
- D. Increased predation

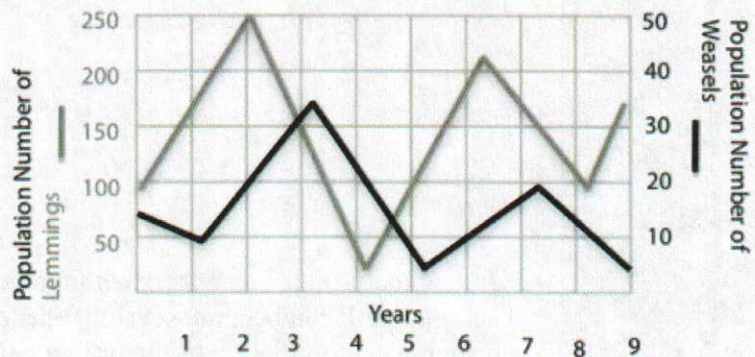
4. Use the graph below to answer the question below.
How many more lemmings are there than weasels during the peak of the lemmings population? Record answer on a griddable.



Griddable:

0	0	0	0		0	0	
1	1	1	1		1	1	
2	2	2	2		2	2	
3	3	3	3		3	3	
4	4	4	4		4	4	
5	5	5	5		5	5	
6	6	6	6		6	6	
7	7	7	7		7	7	
8	8	8	8		8	8	
9	9	9	9		9	9	

5. Use the graph below to answer the question below.
In the study area, weasels prey primarily on lemmings. Using this information and the graphed data, what can you infer?



- A. Weasels compete with lemmings for resources.
- B. Weasel population numbers remain constant over time.
- C. Weasels are an invasive species.
- D. The weasel population declines when individuals compete for reduced food sources

6. What often happens when two species operate in the same niche with limited resources?



- A. They will share resources without affecting either population.
- B. They will contribute to an increase in resources over time.
- C. Both populations will grow without limit.
- D. They will compete for available resources, causing a decline in one population and in the shared resource.

7. In a forest, two trees are growing next to each other. One is growing strong and tall. The other appears weak and small. Which of the following describes natural resources that both trees compete for here?

- A. Quantity of light and nutrients
- B. Root length and strength
- C. Genetic diversity
- D. Presence of bird nests and roosting areas

8. How do invasive species compete with native species?



- A. Invasive species often occupy the same niche as native species and invasive species may be more successful at obtaining resources.
- B. Invasive species are always larger than native species.
- C. The population number of invasive species is always lower than native species.
- D. Invasive species have different resource requirements from the native species.

9. Organisms and populations compete for abiotic and biotic resources. How does competition affect these resources? Explain your choice.

- A. Competition can limit or deplete resources.
- B. Competition can increase biotic resources.
- C. Competition can provide abiotic resources for other organisms.
- D. Competition only affects biotic resources.

10. How could a scientist demonstrate competition between organisms in a Petri dish? Explain your choice.



- A. The scientist could give the organisms a limited amount of food every day.
- B. The scientist could give the organisms a limited amount of food every day.
- C. The scientist could move some of the organisms out of the Petri dish when it gets crowded.
- D. The scientist could feed one of the organisms, but not the others.

8.11.C explore how short-and long-term environmental changes affect organisms and traits in subsequent populations

Short-Term and Long-Term Environmental Change Effects

Adaptations are traits that make an animal suited to its environment.

Two Types:

Structural Adaptations are inherited physical features of an organism. (Ex. White fur on a polar bear)

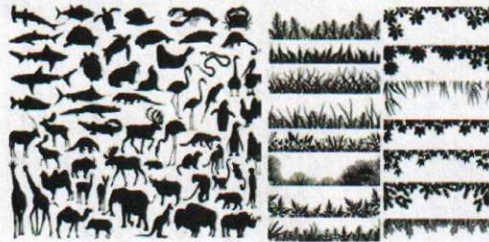


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Behavioral Adaptations are things organisms do to survive. (Ex. Migration & hibernation)



Biodiversity-The number of different species of plants and animals in an area



Short-Term and Long-Term Environmental Changes

Short-Term	Long-Term
<ul style="list-style-type: none"> - Drought - Smog - Flooding - Volcanic Eruption - Blizzard - Pollution 	<ul style="list-style-type: none"> - Ice Age - Deforestation - Urbanization - Global Warming - Extinction of Species - Radioactive Waste/Pollution

Changes in environmental conditions can affect the survival of individual organisms and entire species.

Long-term environmental changes, like climate change, can permanently alter an ecosystem, but over time the change may cause some genetic variations to become more favorable or less favorable in the new environment. If adaptations to the new environment are not present or do not develop, populations can become **extinct**.

Short-term environmental changes, like "floods, don't give populations time to adapt to change and force them to move or become **extinct**.

Human activity affects natural systems through agriculture, resource consumption, and pollution from waste disposal and energy production.



QUESTIONS:

1. How are populations affected by long-term environmental change?
 - A. They may adapt to the new environment, or they can become extinct
 - B. They are not affected by long-term changes.
 - C. They always become extinct or move from the area.
 - D. They can only change their niche.

2. How can a researcher determine if a population has adapted to a long-term environmental change?
 - A. The population has a lower number of breeding individuals.
 - B. The population immediately behaved differently to obtain resources after the change.
 - C. The population has migrated to a new location and occupies similar niche.
 - D. The population has changed behaviorally to become successful in the new environment over several generations.

EXPLAIN YOUR CHOICE for #2 BELOW:

3. How are populations affected by short-term environmental changes?
 - A. They increase in number and diversity.
 - B. They do not have time to adapt and are forced to move or become extinct.
 - C. Over generations they develop new behaviors which help them live in the changed environment.
 - D. The changes will only affect individuals and not populations.

4. What type of data could be used to determine if an environmental change was a short-term change?

- A. Genetic adaptations in populations to the changed environment
- B. Temperature changes in the area collected over five years
- C. Organisms and population numbers before and right after the event which caused the changes
- D. Organism niche use 10 years after the event

EXPLAIN YOUR CHOICE for #4 BELOW:

5. How will clear-cut logging, a short-term environmental change, affect organisms living in the area?



ANSWER: _____

6. Farming by humans negatively affects a natural environment the LEAST when –



- A. high concentrations of nitrogen-rich fertilizer are used
 - B. toxic pesticides are applied annually
 - C. practices adhere to organic standards and long-term sustainability of the soil composition
 - D. a large proportion of water flow from local streams is drawn out and used for irrigation
7. How do human activities most directly affect natural systems?
- A. Through agriculture, resource consumption, and pollution from waste disposal and energy production
 - B. By domesticating animals
 - C. By causing only short-term environmental changes
 - D. Through the production of literature and art

8. A researcher notices a decline in organism and population numbers over several years in a stream environment. What human activity may have affected organisms and populations in this way?

ANSWER: _____

9. A scientist must assess an environment to determine the affect of changes in environmental conditions on living species. What type of data will the scientist collect, and how will this measure the impact of the environmental change? (Hint: use words like diversity, abundance, species, etc. in your explanation)

8.11.D recognize human dependence on ocean systems and explain how human activities such as runoff, artificial reefs, or use of resources have modified these systems

Dependence on Ocean Systems

Humans depend on the ocean for:

Weather, Food, Transportation and Recreation

Humans modify by:

Overfishing

personal sport, commercial harvesting



Artificial Reefs

man made underwater structure to promote marine life such as a sunken ship



Run Off

chemicals and trash flow to the ocean from rivers and streams



Human activity such as runoff pollution can originate from small or large sources on land and water, including motorized vehicles, oil spills, agricultural chemicals, and recreation. Runoff pollution negatively affects beaches and ocean habitats.

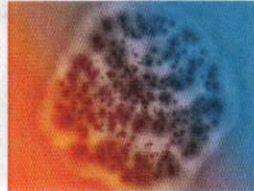
Overharvesting food from the ocean creates an imbalance in existing ocean food webs. **(What does overharvesting mean and how would this cause an imbalance?)**

Other examples of the effects of human activity on oceans include climate change, spread of disease, and introduction of exotic species.

Climate Change



Disease



Exotic species/Invasive



QUESTIONS:

1. Fish farming in large netted cages in the ocean have become big business. What affect do these human activities have on ocean systems?



- A. Siltation
- B. Coral bleaching
- C. Islands of garbage
- D. Increase in disease

2. What ocean feature regulates Earth's climate and weather?



- A. Ocean acidity
- B. Marine biodiversity
- C. Ocean temperature
- D. Wind patterns

3. Introduction of exotic species can –



- A. increase atmospheric carbon dioxide
- B. outcompete native species, thereby reducing marine biodiversity
- C. help prevent collapsed fisheries and increase fish catch
- D. affect oxygen production

4. What measurement in a lab experiment would indicate photosynthesis activity in marine algae?

- A. Changes in water level over time
- B. Volume of water compared to the mass of the algae
- C. Oxygen concentration in the water
- D. Changes in water temperature over time

5. What are some examples of ocean pollution from runoff?

- A. Smog and particulates
- B. Reforestation of disturbed areas
- C. Extracting and burning fossil fuels
- D. Chemicals used in agriculture and oil leaking from motorized vehicles

6. How can commercial fishing modify ocean systems?
- A. Fish can be overharvested, creating an imbalance in ocean food webs.
 - B. Fishing can affect ocean currents and shipping routes.
 - C. Ocean pH can become acidic, causing coral bleaching
 - D. Commercially harvested fish can dramatically increase in numbers and diversity.
7. What factors could be included in a model showing the affect of climate change on ocean systems?
- A. Areas where overfishing has depleted fisheries
 - B. Temperature and pH of the water
 - C. Amounts of nitrogen and phosphorus
 - D. Numbers of introduced exotic species
8. Sewer drains along city streets are a common sight. Especially when it rains, the flow of water to the drains carry trash and toxins with it. What does this demonstrate about how human activities can affect ocean systems?



- A. Excess atmospheric carbon dioxide can lead to ocean acidification.
 - B. Organic farms help curb agricultural runoff.
 - C. Urban runoff can damage beaches and ocean habitats.
 - D. Introduced species cause a decline in ocean biodiversity.
9. Which part of an ocean system would a researcher study to learn about oxygen production and carbon dioxide consumption?
- A. Marine algae
 - B. Ocean currents and circulation of energy
 - C. Seasonal climate variations
 - D. Tide

10. Satellite images are common on the news to help forecast storms and sunny days. How do these images also show one way that humans are dependent on ocean systems?



- A. They show marine biodiversity.
- B. They show cycling of matter by algae.
- C. They show storage of gases.
- D. They show how weather patterns are regulated by ocean temperatures.

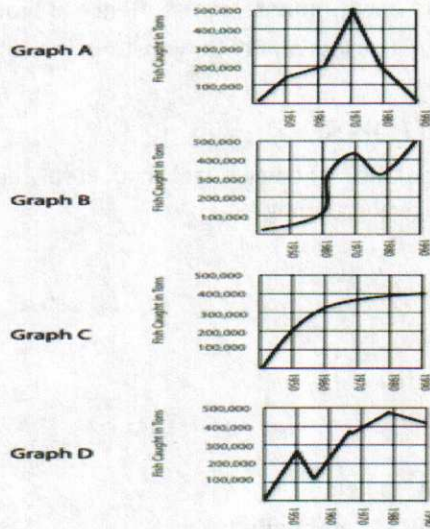
11. A student has been collecting nitrogen level data in a marine bay every week. If conditions remain the same and this trend continues, what will be the nitrogen concentration on the eighth week of study? Record answer as number of grams of nitrogen per cubic meter in griddable .

Griddable:

Week	Nitrogen grams per cubic meter
1	.01
2	.04
3	.07
4	.1
5	.13

				.		
0	0	0	0		0	0
1	1	1	1		1	1
2	2	2	2		2	2
3	3	3	3		3	3
4	4	4	4		4	4
5	5	5	5		5	5
6	6	6	6		6	6
7	7	7	7		7	7
8	8	8	8		8	8
9	9	9	9		9	9

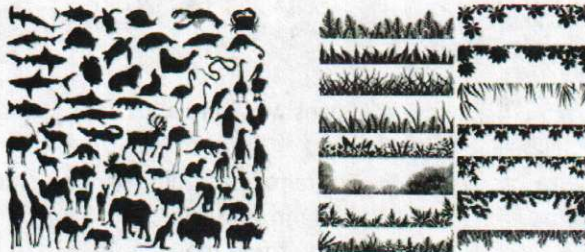
12. Which graph below best demonstrates the effects of overfishing?



- A. Graph A
- B. Graph B
- C. Graph C
- D. Graph D

7.10.B describe how biodiversity contributes to the sustainability of an ecosystem

BIODIVERSITY



The number of different species of plants and animals in an area



Biodiversity, or biological diversity, is the variety of life and the intricate interactions that support and link organisms together in a geographical region.

Biodiversity includes a variety of genes, species, and ecosystems. The **higher** the biodiversity of an ecosystem, the **better** that ecosystem can withstand environmental stress. Hence, if biodiversity is lost, that ecosystem has less ability to withstand the same environmental stress.

QUESTIONS:

1. A population of daisies lives in an area. They are part of what larger ecological grouping?



- A. A field
 - B. A community
 - C. A floodplain
 - D. A state
2. A fox species living in an area eats mostly mice. What would you predict would happen if the mouse population died from a quick-spreading virus?



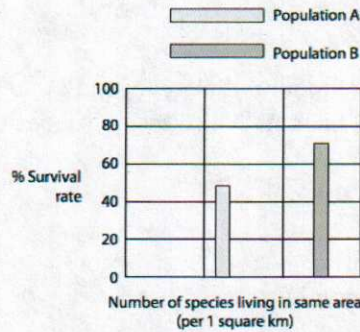
- A. Foxes would turn to eating grass species to survive.
 - B. Some foxes would roam outside of their usual home range to find more mice.
 - C. Some foxes may starve
 - D. Both B and C
3. An ecosystem, like the one below, depends on which of the following in order to be healthy?



- A. Yearly check-ups
- B. A balanced water table
- C. Interdependent relationships between a variety of organisms
- D. Annual pruning of shrubs and trees by human caretakers

4. Which of the following is the most vulnerable to disease and demonstrates the lowest biodiversity?
- A. A cultivated rice field
 - B. A managed tree farm
 - C. A natural short-grass prairie
 - D. Both A and C
5. Temperature, water amounts, soil type, and other organisms control the biodiversity of a habitat. Which term includes the items that control biodiversity?
- A. Limiting factors
 - B. Niches
 - C. Disturbances
 - D. Environmental stresses
6. A bluegill perch is a sunfish that has a blue tab on its gill cover. They have a yellow abdomen with dark blue vertical stripes on the sides of their bodies. They live in freshwater and spawn between May – August. Their diet consists of insect larva, protists, small crustaceans, and small fish. Based upon the description of bluegill perch, what is a limiting factor for the perch?
- A. The blue tab on its gill cover
 - B. Its yellow abdomen
 - C. The vertical stripes on its body
 - D. The salinity (saltiness) of the water
7. A forest is composed of Douglas Fir trees, Noble Fir trees, Red Cedar Trees, White Pine trees, Big Leaf Maple trees, Hemlock trees and Vine Maple trees. If a disease attacks the Douglas Fir trees, what happens to the forest?
- A. All the trees will die and the forest will be destroyed
 - B. Only the Douglas Fir trees may be destroyed, but the rest of the trees will be maintained in the forest
 - C. All the trees will survive, but the shrubbery on the forest floor will die
 - D. The animals in the forest will get sick from the disease and they will pass it to the people who walk through the forest

8. Two populations of chimpanzees live in two different areas of a jungle region. The jungle area that Population B is located within has higher biodiversity than the jungle area that Population A is located. Referring to the graph below, what can you infer?



- A. Chimpanzees in Population A have a lower survival rate because the biodiversity is less.
 B. Chimpanzee survival is not dependent on tree diversity in any part of the jungle.
 C. Chimpanzee in Population B live in a jungle area that have higher biodiversity and have a higher survival rate.
 D. Both A and C
9. Researchers are studying a bird species that feeds solely on flying insects. Their study area is home to three different species of flying insects. One insect species mysteriously disappears suddenly, yet the bird population barely drops. What is an explanation for this?

7.10.C observe, record, and describe the role of ecological succession such as in a microhabitat of a garden with weeds

Ecological Succession

The gradual replacement of one plant community by another through natural processes over time

Primary – Begins in a place without soil (Side of a Volcano)

Starts with **Pioneer Species** (like Lichen that doesn't need soil). They die /decompose and leave behind organic matter on bare rock to make soil.




Then simple plants, grass, shrubs, trees grow and die to provides home to insects, birds and small mammals.

Secondary - Begins in a place that already has soil and was once the home of living organisms. Example..... After forest fires.



Following a major disturbance, such as natural disaster, a progression of re-building occurs. Weeds, small insects, and other pioneers will move into the disturbed area first. This literally lays the foundation for other species to move into the area, and the progress continues. This is referred to as ecological succession.

Vocabulary you need to know:

<p>Habitat</p>	<p>A place where an organism naturally lives and grows</p> 
<p>Microhabitat</p>	<p>A very small specialized habitat, such as the space under a rock</p>  <p>...small pond or in a schoolyard tree.</p>
<p>Succession (Ecological Succession)</p>	<p>Transition of species present in a community in an area virtually barren of life, or after a disturbance</p> 

QUESTIONS:

1. A very hot wildfire burns up an acre of prairie. Organisms above and below ground get wiped out, and even the abundance of soil nutrients suffers. What will happen first in the area's recovery?
 - A. Organisms will return to the soil
 - B. Weeds will return.
 - C. Humans will plant saplings
 - D. Rain will bring nutrients

2. Which statement is false following a catastrophic wildfire?

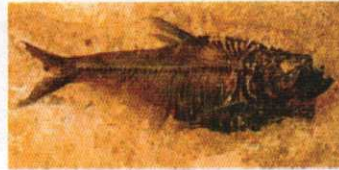


- A. Plants and animals will return to the area over time.
 - B. The area will remain charred and devastated.
 - C. Weeds will grow in the area before trees do.
 - D. The area will experience changes in species composition over time.
3. A hot wildfire whipped through a large, flat, forested area, burning down every tree and leaving the ground bare. An angry resident thinks the local emergency crews should have done more, and he states that "Now, nothing will ever live here again!" Defend or criticize his statement, explaining your position.
4. The table below charts the different types of organisms that are living within the Basket Fern and when they started living in the fern. The Basket Fern started growing on the tree 80 years ago. What has occurred over the last 80 years to the Basket Fern?

Time (years ago)	Type of Organism	Number of Organisms
78	Ants	279
35	Orchids	5
7	Frogs	37
4	Laughing Kookaburra Birds	4

- A. It has developed into a static environment
 - B. It has changed biomes
 - C. It has gone through succession and created new niches
 - D. It has lost its biodiversity
5. Heavy spring rains flood a large area, severely eroding banks and taking chunks of vegetation and animal burrows downriver. What prediction can you make?
- A. Weeds and annual plants will take root in the area first.
 - B. Burrowing animals will return.
 - C. Nothing will ever grow here again.
 - D. Both A and B

6. You are out in a desert area with a crew of anthropologists digging for fossils. The area only gets about three inches of annual rainfall. A couple of different species of sagebrush and grass grow here, used by a few different small rodent species. During your crew's dig, you uncover fossils of ancient fish and snail species. Based on your observations, describe how the area shifted from one supporting aquatic species to one supporting terrestrial species.



7.11.A examine organisms or their structures such as insects or leaves and use dichotomous keys for identification

Dichotomous Key

Dichotomous Key - a tool that allows the user to determine the identity of items by their characteristics, such as insects, leaves, trees, mammals, reptiles and others.

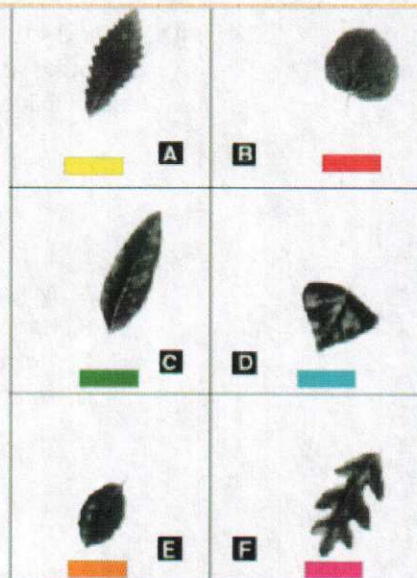
Follow the clues in a **dichotomous key** to identify the organism!



Dichotomous Key for Leaves

Key to Common Leaves

- 1a. If the edge of the leaf has no teeth, waves, or lobes, go to 2. ■ ■
- 1b. If the edge of the leaf has teeth, waves, or lobes, go to 3. ■ ■ ■
- 2a. If the leaf has a single bristle at its tip, it is a shingle oak. ■
- 2b. If the leaf has no single bristle at its tip, go to 4. ■ ■
- 3a. If the leaf edge is toothed, it is a lombardy poplar. ■
- 3b. If the leaf edge has waves or lobes, go to 5. ■ ■
- 4a. If the leaf is a heart-shaped leaf with veins branching from the base, it is a redbud. ■
- 4b. If the leaf is not heart shaped, it is a live oak. ■
- 5a. If the leaf edge has lobes, it is an English oak. ■
- 5b. If the leaf edge has waves, it is a chestnut oak. ■

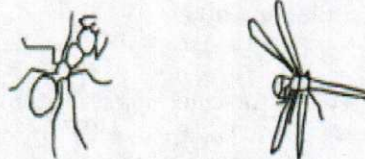


QUESTIONS:

1. Four different species of bats have been identified – *Myotis lucifugus*, *Macotus californicus*, *Myotis yumaensis*, and *Mormoops megalophylla*. Which two species are the most closely related?
- A. *Myotis lucifugus* and *Macotus californicus*
 - B. *Macotus californicus* and *Mormoops megalophylla*
 - C. *Myotis yumaensis* and *Myotis lucifugus*
 - D. Not enough information provided to draw a conclusion

Explain your answer choice here:

2. Two plants have the same type of leaves and are the same color. What might be another differentiating characteristic to examine?
- A. Number of petals
 - B. Number of stamen
 - C. Position of ovary
 - D. All of the above
3. Examining two kinds of insects, which observable characteristic would likely be included on a dichotomous key?



- A. Creepy-looking eyes or nice-looking eyes
 - B. Feet tickle when crawling on arm or feet hurt when crawling on arm
 - C. Wings or no wings
 - D. Both A and C
4. You have spotted a certain butterfly species in large groups, but only in the spring season. Which of the following characteristic is the most helpful in identifying the butterfly with a dichotomous key?



- A. Migrates north every spring
- B. Hangs on branches to rest
- C. Flutters wings more quickly on hot days
- D. Hindwing has a tail