

Name: _____

Science Teacher: _____ Period: _____



Analyzing Ecosystems: Microhabitats, Biomes, & Biodiversity

Hopewell Middle School

Mrs. Rothenhausler, Mrs. Hinds, & Mr. Crellin

1

Name _____ Week _____ Period _____ Student # _____

	Learning Target	Success Criteria	
Reflection			
Reflection			
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Unit 3: Analyzing Ecosystems Part 1 (Ecosystems and Biodiversity)

3

TEKS Analysis

TEKS 7.10A- observe and describe how different environments, including microhabitats in schoolyards and biomes, support different varieties of organisms

Prefix	Root Word	Meaning (Microhabitat)	Give 3 Examples
Micro	habitat		1. _____ 2. _____ 3. _____

Essential Question

What differences can be identified between environments that may influence the types of plants or animals that can survive within them?

In the columns below, list a plant and animal species you would find inhabiting the area.

Biome	Plant species	Animal Species
Tropical Rain Forest		
Desert		
Marine		

TEKS 7.10B- describe how biodiversity contributes to the sustainability of an ecosystem [supporting standard]

Prefix	Root Word	Meaning (Biodiversity)
Bio	diversity	

Recall from 6th grade that an ecosystem consists of biotic and abiotic factors. Describe at least two abiotic factors that an ecosystem requires to support life (biotic factors).

- _____
- _____

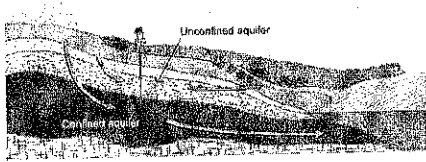
Essential Question

How does an ecosystem with a variety of living plants and animals maintain its resources ?

Quizlet RRISD-Analyzing Ecosystems

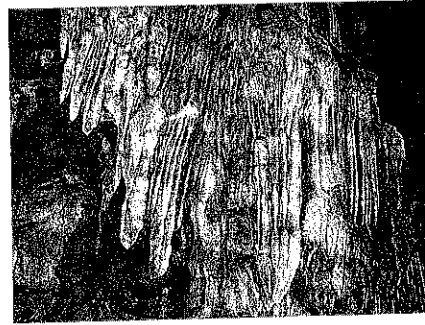
Study online at quizlet.com/_1292d

1. aquifer:



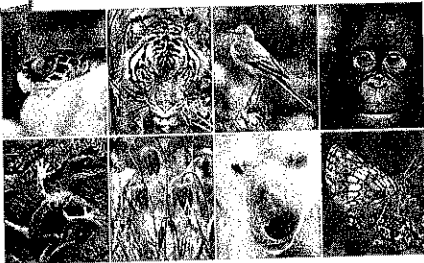
A body of permeable rock that can contain or transmit groundwater.

5. chemical weathering:



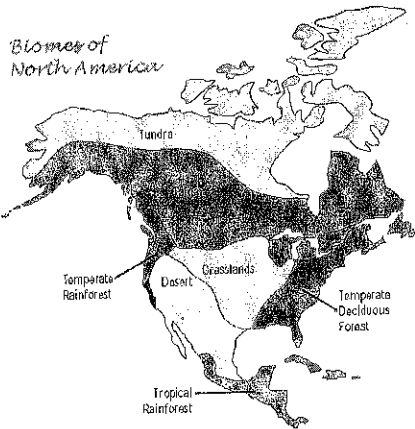
the process that breaks down rock through chemical changes

2. biodiversity:



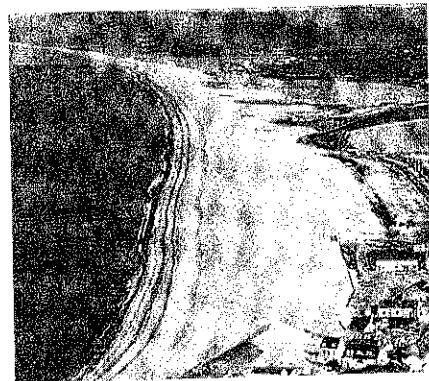
the number of different species in an area

3. biome:



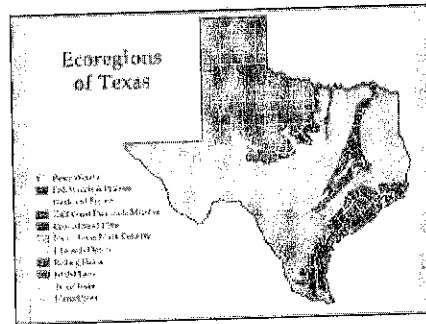
group of ecosystems with similar climates and organisms

6. deposition:



Process in which sediment is laid down in new locations.

7. ecoregion:



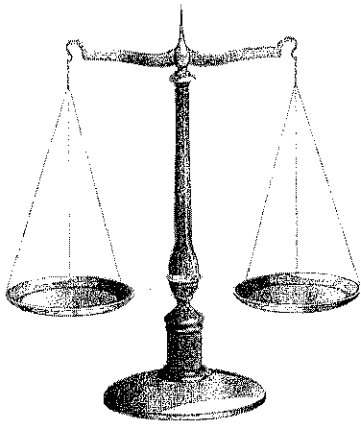
an area defined by its environmental conditions, landforms, and soil characteristics

4. catastrophic event:



disastrous event

8. **equilibrium:**



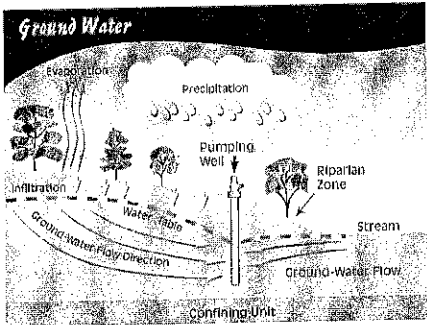
opposing forces in a system are equally balanced or stable (not changing/moving)

9. **erosion:**



Movement of sediment by wind, water, ice, or gravity.

10. **groundwater:**



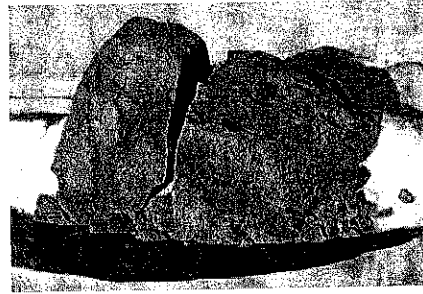
water that fills the cracks and spaces in underground soil and rock layers

11. **lichen:**



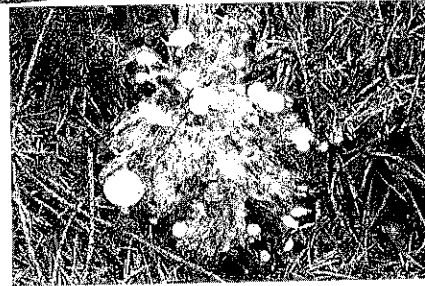
A type of fungus that grows in combination with algae and usually forms crust-like growth on rocks or trees

12. **mechanical weathering:**



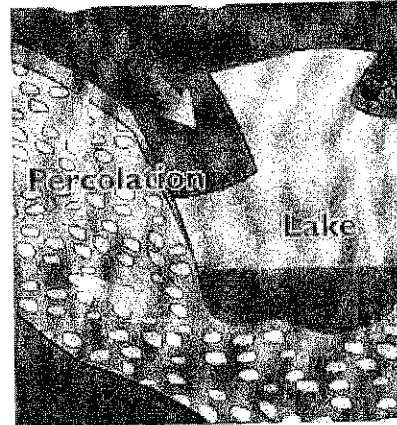
the type of weathering in which rock is physically broken into smaller pieces

13. **microhabitat:**



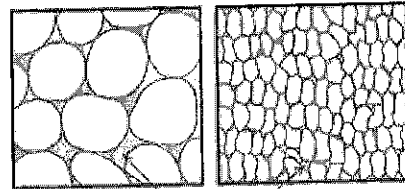
a small specialized habitat within a larger habitat

14. **percolation:**



to pass (a liquid) gradually through small spaces or a porous substance; filter

15. **permeable:**



Pore Space

characteristic of materials such as sand and gravel which allow water to pass easily

16. porosity:



full of tiny holes that water or air can get through

20. secondary succession:



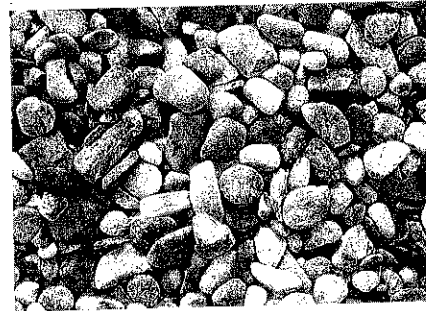
changes that occur AFTER a disturbance in an ecosystem

17. primary succession:



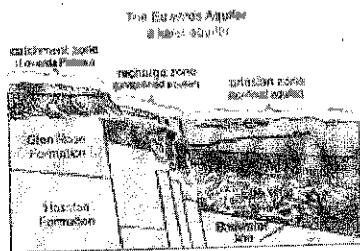
changes that occur in an area where no ecosystem had existed.

21. sediments:



loose particles created by the weathering and erosion of rock

18. recharge zone:



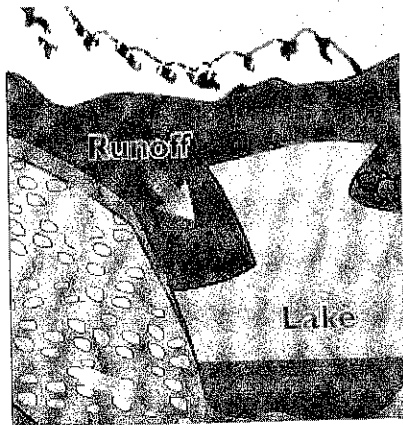
area surrounding an aquifer from which water in the form of precipitation or surface waters replenishes the groundwater stored in the aquifer

22. surface water:



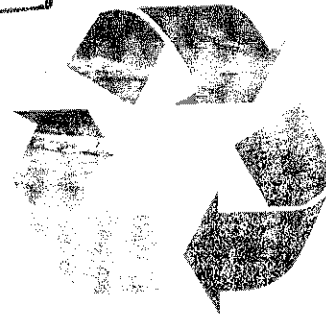
water in streams, rivers, lakes, oceans

19. runoff:



water that flows over the ground surface rather than soaking into the ground

23. sustainability:



able to last or continue for a long time

In the Forest of S.T. Shrew

Jackie sat down with a “humph.” “I don’t think anything lives in these woods,” she thought. “I’ve been walking around for a long time, and I haven’t seen anything except for a couple of squirrels.” Squirrels didn’t really count. She had squirrels in her front yard, and there were squirrels around school. She was supposed to be seeing all kinds of interesting, unusual animals to include in her report for school.

“Pick a place near school or home, and investigate what lives there. Then write a report about all the interesting and unusual things you find.” That was the assignment. Too bad she didn’t live near the pet shop, like Rene Navarro. Then she’d have lots to write about. But no, she had picked this patch of woods behind the playground thinking it would be loaded with animals.

“Now what am I going to do?” she wondered. She closed her eyes to think...

“So, you don’t think anything interesting lives in these woods, huh?” she heard a high-pitched voice ask.

“What was that?” she gasped as she looked around. Sitting next to her, with its head poking out from under the leaves, was a small, furry animal with big whiskers and tiny little eyes. It repeated its question.

“You don’t think anything interesting lives in these woods?”

“Well, I didn’t....” she answered. “Who are you?”

“Everyone calls me S.T.,” he answered. “I’m a shrew—a short-tailed shrew. Now, put your finger on my back.”

“What?” she asked, surprised.

“Look, you would like to know about what lives in these woods, wouldn’t you? So, c’mon. Hurry up!”

Slowly, Jackie reached out her finger and gently touched him on the back. There was a flash and she found herself standing next to S.T., looking him right in the eye. Then she realized that she was standing on four legs and was covered with

fur. She had turned into a shrew! “There, that’s much better,” he said. “Now, follow me.”

“Where are we going?” asked Jackie.

“A lot of creatures around here are pretty upset that you don’t know they even exist. So I’ve been appointed to show you around. Besides, now that you’re my size, you’d make a tasty meal for something, so you’ll be safer if you follow me.” And with that he turned and dove down the hole he had popped up out of earlier.

As Jackie stood there wondering what to do, she looked up and saw a large bird flying overhead. “Uh-oh!” she cried and dove into the hole after S.T.

In the Ground

Jackie had never crawled through the ground before and wasn’t sure she liked it. It was dark and damp and smelled like dirt. And there were so many roots everywhere! Tiny roots were constantly brushing by her face. She and S.T. had to crawl up, over, and around larger roots over and over again. Then all of a sudden, S.T. stopped.

“Hey, everyone! We’re here!” he yelled at the dirt walls of the tunnel. At first Jackie could hear and see nothing. Then she noticed a rumbling sound that seemed to be getting louder and louder. Suddenly, heads began popping out of the tunnel wall. There were earthworms and beetles and white grubs and many other creatures Jackie couldn’t identify.

“Do you all live in the ground?” asked Jackie in awe.

“Uh-huh, and lots of others do too,” said one particularly fat earthworm.

“But how do you live?” Jackie asked. “I mean... what is there to eat down here?”

“Well, you could say I eat my way through the soil!” replied the earthworm. “I make a tunnel by eating the dirt, then separating out bits of

plants and other food from the dirt particles. It’s not for everyone, but I love it!” he ended.

“We suck juices right out of roots,” said three white grubs together. “And one day we’ll crawl up out of the ground and become adults.”

“Did you ever wonder what happens to animals that die in the woods?” interrupted a black beetle, waving its antennae back and forth. “It’s thanks to me that they’re taken care of.”

“He means, thanks to all us carrion beetles,” said another black beetle. “We eat them up. Keep the forest clean.”

As Jackie thought about all this, S.T. thanked all the soil creatures for coming. Then he turned to Jackie and said, “Follow me. There’s still a lot more for you to see.”

A Rotten Place to Live

Jackie followed S.T. through the soil for a short distance; then they climbed up to the surface and ran along the ground under a cover of leaves. As they traveled, the leaves crunched and rustled. Jackie could see spiders, centipedes, and other small creatures crawling around. She wanted to stop and talk to them, but S.T. kept moving and she knew she had to keep up with him. Finally, S.T. stopped at the end of a log. S.T. ran onto the top of it and Jackie followed. Most of the top of the log was covered with a thick, green carpet of moss.

“Oooh!” cried Jackie. “It’s so soft. And look at all the other things growing up here.” Jackie ran around on top of the log. She rolled in the soft moss, touching the cool, bright orange fungi that were growing on one end of the log, and sniffing the tops of tall, red-capped lichens as though they were flowers and had a scent. There was even a tiny tree, only about three inches tall, growing out of the log.

(continued on next page)

"Want to see the inside?" asked S.T. "OK," answered Jackie, following S.T. back over the end of the log. She waited as he called to someone named Millie. In just a few seconds a long, dark creature with dozens of legs came crawling out of the end of the log.

"I'm a little too big to go with you on this part of the trip," S.T. told her. "You go with Millie and I'll wait for you here."

"But I'm just as big as you are," said Jackie. But just then Millie reared up and touched Jackie's head with several of her legs. Just as before, there was a flash, and Jackie turned into a millipede just like Millie.

At first Jackie found it a little difficult to move all her legs in a coordinated way. But once she and Millie got inside the log, she was too busy looking around to think about how to walk and she didn't have any trouble at all.

Millie was pointing out things and explaining them to Jackie, who was having trouble absorbing all the information. But finally, she began to get the idea she was in a kind of factory—a factory that breaks logs down into soil. Everywhere they went there were things chewing, tunneling, and boring through the wood. There were wood roaches, small white termites, and hard-shelled pill bugs that rolled into tight little balls as she and Millie went by. There were also insect-eating hunters: huge, shiny-black beetles with giant jaws and centipedes with venomous fangs. And at one point, when they'd crawled deep inside the log, they saw a salamander resting in a dark damp hole in the decaying log.

Jackie had no idea there was so much activity inside a log and was really sorry when they headed back to S.T. But after Millie turned Jackie back into a shrew, Jackie and S.T. said goodbye to Millie and scurried off.

Life at the Top

Soon Jackie and S.T. stopped at the base of a tree. Immediately, a small,

black-capped bird flew down and landed on the leaves next to them.

"I was beginning to wonder whether you were coming," said the bird. "Hello, Jackie—I'm Sitta. Ever felt like flying?" she asked, stretching one of her wings over Jackie's head. There was a flash and then Jackie slowly stretched out her own wings—she had become a nuthatch just like Sitta.

"Let's go!" cried Sitta, and she leaped into the air and flew off. "I'll wait here," S.T. called after them.

Of everything she had done that day, Jackie was sure flying was the best. First they flew up over the trees where Jackie could see many other birds flying in and out of the treetops. Then she and Sitta swooped into the top of one tree and darted in and out among its branches.

Jackie was amazed at all the insects she saw. There were grasshopper-like creatures and other "bugs" sitting on the leaves. There were wasps and flies buzzing around. And there were caterpillars crawling on many of the leaves. Then Sitta fluttered down and landed on the tree trunk. As Sitta led Jackie down the tree head first, Jackie looked closely at the trunk and was amazed at what she saw. There were caterpillars and ants crawling. She saw several spiders and a moth that was almost the same color as the bark—in fact, she almost missed it because it was so perfectly camouflaged against the bark. There were also pale greenish lichens and moss growing on the bark. Eventually, she and Sitta reached the bottom of the trunk.

"This tree is like an apartment building or something," said Jackie as she jumped onto the ground next to S.T. "There are different things living on it all the way from the leaves at the top to the base right here on the forest floor," she added. "I guess I should say right down into the dirt—I shouldn't forget everyone I met

underground earlier!"

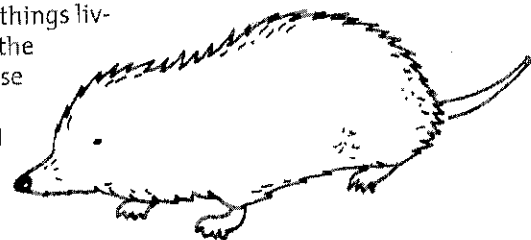
"Well, it's good to hear you talking about all the things that live in and on trees," said Sitta. Then she held her wing over Jackie's head again and flew back up into the trees out of sight.

Home Again

As Jackie once more followed S.T. through the ground, she began wondering where they could be going next. It was dark and damp in the tunnel, and root hairs were brushing by her face. As they ran along, the smell of dirt filled her nose....

Suddenly, Jackie opened her eyes. She was back by the tree she'd sat down against earlier that day. Somehow she'd fallen over and was lying on the ground with her face resting on top of the leaves. Her nose was filled with the smell of dead leaves and dirt. Slowly, Jackie sat up.

Did I dream the whole thing? she wondered as she looked around. "There's a dead log over there like the one I went to with S.T. And the bark of this tree is covered with all kinds of things, just like the one I saw with Sitta," she said as she stood up. Still her adventure seemed impossible. But then Jackie looked at the ground near where she'd been sitting and reached over to the spot that seemed to be where she thought she had first seen S.T. As she carefully lifted up some of the leaves, she could see it: a small hole in the ground. Jackie laughed out loud. "Boy, do I ever have a lot to write about in my report!" she cried. Then she turned and ran all the way home.



9

Science.7.10A

Nature Walk

Name _____

Date _____

Essential Questions

1. How do different environments support different varieties of organisms?

Vocabulary

community, ecoregion, environment, habitat, lichen, microhabitat, organisms, population, species

Scientific Investigation and Reasoning Skills

7.1A, 7.2B, 7.2CD(E), 7.4A

Objectives

1. Observe microhabitats in schoolyards
2. Describe how different environments support different varieties of organisms

Background information: A HABITAT is the area or natural environment in which an organism or population normally lives. A habitat is made up of physical factors such as soil, moisture, range of temperature, and availability of light as well as biotic factors such as the availability of food and the presence of predators. A microhabitat is the smallest part of the environment that supports a distinct flora and fauna, such as a fallen log in a forest, a clump of grass, or a space between rocks.

Materials:

Pencil

Metric Ruler/meter stick

Hand lens

Field guide/publications

Thermometer

Procedure:

1. Walk to Area designated by your teacher.
2. Sit or stand for 10 minutes, focusing on what is in this area. Use the questions below to help you write your observations:
 - a. What is the approximate **temperature** at this location? Is this area in the shade, direct sun or filtered sunlight?
 - b. Look for signs of **water**. Is this area moist or dry? Is it patchy or evenly moist?
 - c. How much **light** is present?
 - d. Is there any sign of **wind** or of the wind's effects, like fallen leaves or branches?
 - e. Look for as many different kinds of **rocks** as you can find. What type are they? How big are they? Are they pebbles on the surface or outcroppings from under the soil? What type of soil is here?
 - f. How many varieties of **plants** are here? Identify what you can. List, describe, sketch or make rubbings of the different kinds of plants you find here.
 - g. Observing the different flowers and plants, do you notice that they attract any 'visitors'? Why do you suppose these organisms are attracted to the flowers?
 - h. Observe the number of different types of **seeds** you see. (Be sure to check your socks – they collect lots of little grass seeds. There are also nuts, berries, pine cones, and many more that are considered seeds.)
 - i. How many different kinds of **animals** can you locate? Look for evidence that animals have been nearby and at this location. List, describe or sketch the evidences.
 - j. Do you notice any other organisms or evidence of other organisms?
 - k. Periodically stop to observe the different **sounds** you hear. Sounds might include: wind in the treetops, birds, insects, traffic, people, animals, etc... Record your observations.
 - l. List, describe or sketch anything else you may find at this location.
3. Continue to next area designated by your teacher.

4. Use the data table to write your observations.

10

Data Table:

	Area 1	Area 2	Area 3	Area 4	Area 5	Area 6
Temperature						
Moisture						
Amount of Light						
Wind						
Rocks/Soil						
Plants						
Animals						
Other Interesting Facts						

Conclude and Apply

Answer the following questions below using complete sentences.

1. Compare the air temperature, amount of light and soil moisture at the various locations.

Using scientific explanations, describe how these different abiotic factors support the types of plant and animal species that can live in those areas. Be sure to support your claims with evidence and reasoning.

2. What kinds of organisms were present in the greatest quantity? (be specific)

Why do you think there are a lot of these plants or animals present?

3. Which microhabitat would best suit the following organisms and why?

Earth worm

Butterfly

Termite

Frog

Anole (Lizard)

Ant

Blue Jay

[Cornell Notes] Unit Topic: Microhabitats and Biomes	Name: _____ Period: _____ Class: _____ Date: _____
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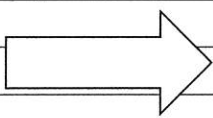
Learning Target: I will learn the relationship between organisms and the environment including _____ in _____ and _____, support different varieties of organisms.	Success Criteria: *I will know how to identify the needs of living things such as shelter, food, energy and water. *I will know how identify different biomes and what organisms they can or can not support.
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Essential Question: How do different environments support different varieties of organisms?

Questions/Main Ideas:	Notes:
What is a microhabitat?	A _____ within a larger habitat.
	Some examples of microhabitats include:
	Rotting _____
	_____ Rocks
	_____ Hill
	Aquarium
	Puddle
	Shade or _____
	Dry or _____



Why do microhabitats support a variety of organisms?	_____ _____ _____ _____ _____ _____
------------------------------------------------------	----------------------------------------------------



Summary:

Questions/Main Ideas:	Notes:
What is a biome?	A group of ecosystems with similar _____ and _____.
	Some examples of biomes include: Tundra, _____ (Coniferous Forest), Temperate Deciduous Forest, _____, _____, Tropical Rainforest, Freshwater Aquatic, Marine Aquatic
BIOME OVERVIEW	Tundra- Near the northern part of Earth, _____ treeless, mostly frozen, little precipitation, low biodiversity
	Taiga (Coniferous Forest)- Lots of _____ medium rain/snow, long, cold winter, short summer, poor soil
	Deciduous Forest- 4 real _____, good rainfall throughout the year, good soil for plants, variety of plant and animal life
	Grassland- _____, mostly _____ dry and drought plagued, important for food crops, good soil hot summers and cool winters, not enough rain for thick forests
	Desert- Really _____, hot days and cold nights poor soil (rocky or sandy), plants adapted to conserve water
	Tropical Rainforest- Lots of _____ and high biodiversity, very warm all year round, soil is ok, high canopy trees, lots of animals
	Freshwater Aquatic —lakes, rivers, ponds
	Marine Aquatic --Saltwater
Summary:	

Biome Investigation

Name _____

Date _____

Essential Questions

1. How do different environments support different varieties of organisms?
2. How does this biodiversity contribute to the sustainability of an ecosystem?

Vocabulary

- Biodiversity
- Biomes
- Microhabitat
- Species
- Climate

Scientific Investigation and Reasoning Skills

7.1B, 7.2A, 7.2C, 7.2D, 7.3A

Objectives

1. Describe the characteristics of different biomes and the animals and plants found in the different biomes.
2. Describe how biodiversity contributes to the sustainability of an ecosystem.

Procedure:

1. Log on to your computer, and go to <http://www.mbgnet.net/index.html>
2. Use the data table on the next page to record the information for each of the 8 biomes.

Characteristics	Location	Average Temperature	Average Precipitation	Plant Species	Animal Species	Interesting Facts
Biomes						
<i>Tropical Rainforest</i>						
<i>Tundra</i>						
<i>Taiga (Coniferous) Forest</i>						
<i>Desert</i>						
<i>Deciduous (Temperate) Forest</i>						
<i>Grassland</i>						
<i>Freshwater Aquatic</i>						
<i>Marine Aquatic</i>						

Conclude and Apply-- Answer the following questions below using complete sentences.

1. You are blindfolded and dropped by helicopter into an unknown environment. When you remove your blindfold, you must determine what Biome you are standing in. Describe what process you would use to determine the Biome you are in.
2. What are the similar characteristics of the animals within each of these 8 biomes?
3. What are the similar characteristics of the plants within each of these 8 biomes?
4. Would it be possible for a moose, who primarily lives in a taiga biome, to be found in a desert biome? Why? Compare the similarities and differences of the two biomes in your answer.
5. How do the different biomes support different types of organisms?

Biological Diversity: SE 7.10B
How Biodiversity stops disease spread

Adapted from Access Excellence

When a habitat is very diverse with a variety of different species, it is much healthier and more stable. One of the reasons for this is that disease doesn't spread as easily in a diverse community. If one species gets a disease, others of its kind are far enough away (due to the variety of other organisms) that disease is often stopped at the one or two individuals.

In this simulation, we represent a monoculture (the opposite of diversity) of second growth forests, using cards to represent trees in the forest. In this case, Live Oak trees were planted after an old growth forest was cut down. A disease strikes one of the Live Oaks, and because of the proximity of the other Live Oaks, disease spreads quickly.

On a second set of cards, a biological diverse community will be symbolized (an old growth forest) In this scenario, a Live Oak still gets a disease, but this time it does not spread because the other Live Oaks are few and far between.

Please answer the follow up questions in the space below: (refers to the second of the card simulations)

1. What does biological diversity mean?
2. Why didn't all the different trees get the disease? (hint - genetics)
3. Why didn't the disease spread as fast among the Live Oaks in the second simulation as it did in the first simulation?
4. In which forest would you need to use more chemicals to control disease: the Live Oak forest or the more diversified, old growth forest? Why?

5. Summarize what this simulation symbolized.

6. Which forest would have more diversity of wildlife? Why?

7. a. If you cut down the variety in a piece of forest you owned and replanted with 1 type of tree, what will happen to much of the wildlife that was adapted to that forest? (Hint: they cannot just move elsewhere. If other habitats are good, they will probably be near carrying capacity already.)

- b. Will this fate happen to all the wildlife? Explain.

- 8. Many species can only live/reproduce in 1 type of forest. The spotted owl is an example - it can only live and successfully reproduce in old growth forests (big, old cedars, hemlocks, etc.). If these old growth forests are cut down, it's unlikely this owl will survive. Environmentalists call it an "indicator" species." What does this mean? Why be concerned about 1 species?

- 9. Growing one plant, as is the case of growing only Live Oak, is called monoculture. Give an example of growing one plant a) in your home (obvious)

- b) in farms

- 10. Why would you need to use more insecticides in monoculture? Is this good or bad?

- 11. If you wanted to help wildlife, what would you with regards to the landscaping of your own home?

[Cornell Notes] Unit Topic: Biodiversity	Name: _____ Period: _____ Class: _____ Date: _____
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Learning Target: I will learn that there is a direct relationship between the variety of species in an ecosystem/ _____ and the ability of the ecosystem to continue/ _____.	Success Criteria: I will know how to examine a food web and predict what will happen if the ecosystem is disrupted.
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Essential Question: How does biodiversity contribute to the sustainability of an ecosystem?

Questions/Main Ideas:	Notes:
What is biodiversity?	Biodiversity is _____ _____ a. Maintains the health of the Earth and its people. b. Provides us with food and medicine c. Greater the variety of the species, the healthier the Earth/biosphere d. More links in a food web, then _____.
What is sustainability?	Sustainability is _____ _____ a. The more sustainable an ecosystem, the healthier it is because it is able to "deal" with external stress better.
How does biodiversity contribute to the sustainability of an ecosystem?	_____ biodiversity = more sustainable _____ biodiversity = less sustainable a. High biodiversity in an ecosystem means that there is a great variety of genes and species in that ecosystem. b. A great variety of genes and species means that the ecosystem is better able to carry out natural processes in the face of external stress. c. Thus, the ecosystem is more sustainable.

Summary:

Name: _____ Teacher: _____ Period: _____ Date: _____

Story Gallery Walk Answer Document

Directions: Start of the question you are directed to by your teacher. There are two stories posted around the room; One on blue paper, one on Pink. Each question is numbered. To find out the story being told you must fill in the blank that has the same number as the question you are looking at, in the correctly colored section.

Pink Story:

_____ is _____ a _____
(1) (2) (3)

_____ with _____ to _____
(4) (5) (6)

_____ while _____ a _____
(7) (8) (9)

_____ !
(10)

Blue Story:

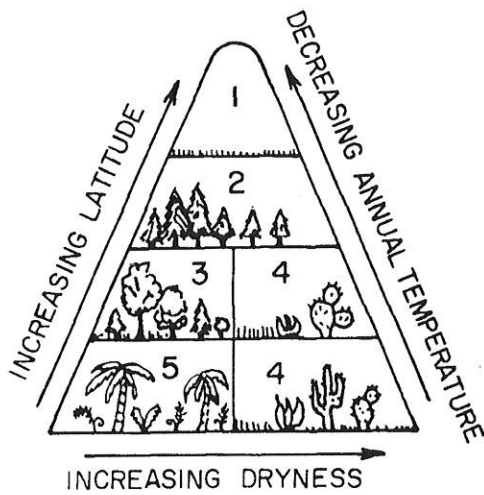
_____ is _____ a _____
(1) (2) (3)

_____ with _____ to _____
(4) (5) (6)

_____ while _____ a _____
(7) (8) (9)

_____ !
(10)

Base your answers to questions 1 through 4 on the diagram below which represents the major terrestrial biomes and on your knowledge of biology.



1. Which biome would have succulent plants as well as plants with reduced leaf surfaces?

- (A) 5 (C) 3
(B) 2 (D) 4

2. Which organisms most likely make up the dominant vegetation in biome 1?

- (A) lichens and mosses (C) evergreens
(B) shrubs and succulents (D) conifers

3. Which fauna would most likely be associated with biome 2?

- (A) monkey and leopard
(B) pronghorn antelope and bison
(C) moose and black bear
(D) kangaroo rat and lizard

4. Which biome would most likely have moderate precipitation, cold winters, warm summers, and deciduous trees?

- (A) 1 (C) 3
(B) 2 (D) 4

5. In a certain area, the climate is seasonal, (cold winters, warm summers), rainfall is moderate, and most trees shed their broad leaves in the fall. This area is known as a

- (A) tundra
(B) taiga
(C) temperate deciduous forest
(D) tropical rain forest

6. Which land biome is characterized by conifers, which include spruce and fir, as the dominant vegetation?

- (A) taiga (C) desert
(B) tundra (D) grassland

7. Which organisms would most likely be the pioneer organisms on a newly formed volcanic island?

- (A) conifers (C) deciduous trees
(B) lichens (D) tall grasses

8. Which climatic condition, flora, and fauna are characteristic of a tundra biome?

- (A) subsoil permanently frozen, lichens, and moose
(B) subsoil permanently frozen, lichens, and caribou
(C) long winters, conifers, and moose
(D) long winters, conifers, and caribou

Base your answers to questions 9 through 11 on the list of molecules below. Select the biome, *chosen from the list below*, that is most closely associated with that phrase.

Biomes

- (1) Tundra
(2) Taiga
(3) Tropical forest
(4) Grassland
(5) Desert

9. Constant, warm temperature; heavy rainfall

- (A) 1 (D) 4
(B) 2 (E) 5
(C) 3

10. Wide variation in daily temperature; little rainfall

- (A) 1 (D) 4
(B) 2 (E) 5
(C) 3

11. Lichens and mosses present; subsoil permanently frozen

- (A) 1 (D) 4
(B) 2 (E) 5
(C) 3

12. Base your answer to the following question on the listed below.

- (A) Tundra
(B) Taiga
(C) Temperate deciduous forest
(D) Tropical rain forest
(E) Desert

In which biome are drought-resistant shrubs and succulent plants located?

- (A) A (D) D
(B) B (E) E
(C) C

13. Which is the normal sequence of land biomes from the Equator to the North Pole at the same altitude?

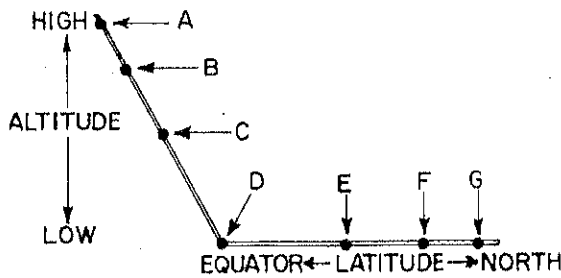
- (A) tundra, taiga, tropical rain forest, temperate deciduous forest
(B) tropical rain forest, tundra, taiga, temperate deciduous forest
(C) tropical rain forest, temperate deciduous forest, taiga, tundra
(D) temperate deciduous forest, tundra, taiga, tropical rain forest

14. Which ecological unit provides the physical setting for the poem below?

The days be hot, the nights be cold,
 But cross we must, we rush for gold.
 The plants be short, the roots spread wide,
 Me leg she hurts, thorn's in me side.
 I fall, I crawl, I scream, I rave,
 Tiz me life that I must save.
 How can it be, I've come undone,
 Here 'neath this blazin' eternal Sun?
 The days be hot, the nights be cold,
 Me lonely bones alone grow old.

- (A) a desert biome (C) a deciduous forest
 (B) a terrestrial food chain (D) a coniferous-tree biome

Base your answers to questions 15 and 16 on the diagram below which represents a comparison between latitudinal and altitudinal life zones (biomes) in the Northern Hemisphere and on your knowledge of biology.



15. Which letter represents the biome which characteristically has permanently frozen ground?
 (A) G (C) C
 (B) F (D) D
16. Which letter most probably represents an area for a tropical rain forest?
 (A) E (C) F
 (B) B (D) D
17. Base your answer to the following question on the biomes listed below and on your knowledge of biology.

- Biomes*
 (A) Tropical rain forest
 (B) Temperate deciduous
 (C) Taiga
 (D) Tundra
 (E) Grassland
 (F) Desert

Which biome is characterized by considerable variability in rainfall and temperature and the presence of antelope and bison?
 (A) A (C) C
 (B) B (D) D

18. The stable stage that is established in an area as a result of the process of ecological succession is known as the
 (A) heterotroph community (C) biotic stage
 (B) pioneer stage (D) climax community

Base your answers to questions 19 and 20 on the biomes below. For each statement in questions select the biome, chosen from the list below, that is best described by that statement.

- Biomes*
 (1) Tundra
 (2) Desert
 (3) Tropical forest
 (4) Taiga
 (5) Temperate deciduous forest

19. A coniferous forest growing just below the tree line and mountains is densely populated by climax communities of spruce and fir trees.
 (A) 1 (D) 4
 (B) 2 (E) 5
 (C) 3
20. Forests of maple, beech, oak, and hickory make up the dominant vegetation.
 (A) 1 (D) 4
 (B) 2 (E) 5
 (C) 3

21. If a person traveled south from the Arctic Circle to the Equator, what would be the most probable sequence of land biomes he would pass through?
 (A) temperate forest → taiga → tundra → tropical forest
 (B) taiga → tundra → temperate forest → tropical forest
 (C) tundra → tropical forest → taiga → temperate forest
 (D) tundra → taiga → temperate forest → tropical forest

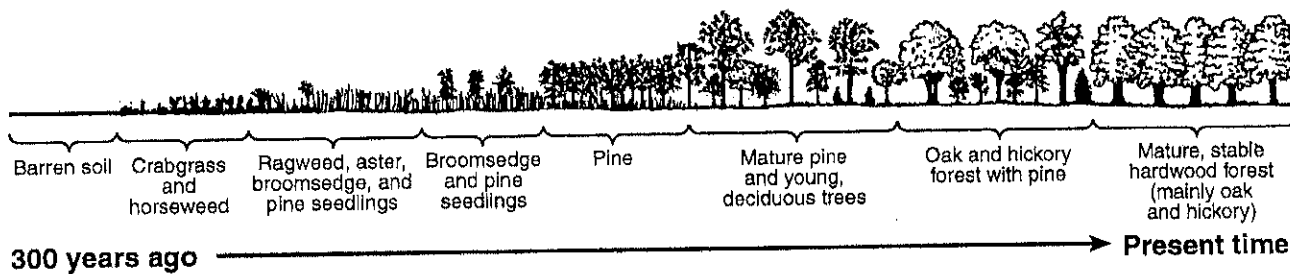
22. Which animal species are part of the climax fauna throughout most of New York State?
 (A) caribou, crow, and snowy owl
 (B) elk, moose, and black bear
 (C) gray squirrel, fox, and deer
 (D) water snake, grizzly bear, and mayfly

23. A slab of bare rock is covered with lichens. In time, mosses cover the rock, followed by grasses, and finally by small shrubs and tree saplings. In this example, the lichens represent
 (A) a climax community (C) secondary consumers
 (B) a dominant species (D) pioneer organisms

24. Many years ago, a volcanic eruption killed many plants and animals on an island. Today the island looks much as it did before the eruption. Which statement is the best possible explanation for this?
 (A) Altered ecosystems regain stability through the evolution of new plant species.
 (B) Destroyed environments can recover as a result of the process of ecological succession.
 (C) Geographic barriers prevent the migration of animals to island habitats.
 (D) Destroyed ecosystems always return to their original state.

25. The first living things to grow successfully on a newly formed sand dune are known as
 (A) saprophytes (C) carnivorous plants
 (B) pioneer organisms (D) heterotrophs

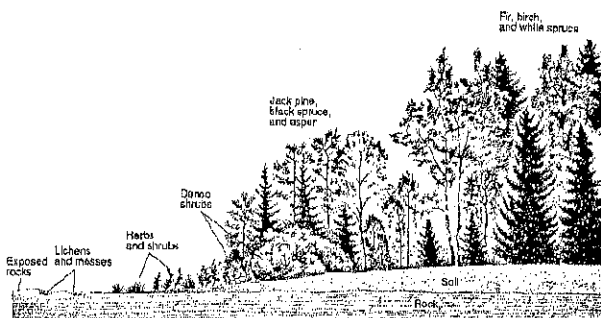
26. Base your answer to the following question on the diagram below, which shows the sequence of plant communities that have occupied land that was left barren 300 years ago, and on your knowledge of biology.



In which biome would this sequence of plant communities most likely be found?

- (A) taiga (B) tundra (C) tropical rain forest (D) temperate deciduous forest

Base your answers to questions 27 and 28 on the diagram below and on your knowledge of biology



27. What would most likely happen if a forest fire destroyed the fir, birch, and white spruce?
 (A) A pond community would develop in this region.
 (B) Secondary succession would begin to take place.
 (C) Only animal life would continue to inhabit this region.
 (D) The area would no longer support living things.

28. Why will the herbs and shrubs most likely replace the lichens and mosses?
 (A) An increase in carbon dioxide in the soil will make it possible for taller plants to grow.
 (B) Increased cultivation by humans will provide more fertile soil.
 (C) The lichens and mosses will modify the environment, making it more favorable for herbs and shrubs.
 (D) Herbs and shrubs are the climax community for this environment.

29. Starting on bare rock, what is the usual ecological succession of organisms?

- (A) grasses → shrubs → lichens → trees
 (B) lichens → shrubs → grasses → trees
 (C) grasses → shrubs → lichens → trees
 (D) lichens → grasses → shrubs → trees

30. Which succession sequence would most probably lead to the establishment of forests on barren rock areas?

- (A) mosses → grass → lichens → woody shrubs
 (B) lichens → mosses → grass → woody shrubs
 (C) woody shrubs → grass → mosses → lichens
 (D) grass → mosses → woody shrubs → lichens

31. A pond surrounded by a beech-maple forest dries up. What will most likely happen if the pond remains dry for one more year?

- (A) A beech-maple forest will replace the pond.
 (B) No further change will occur in the area previously covered by the pond.
 (C) Grasses will most likely grow on the bottom of the dried-up pond.
 (D) The pond will fill in due to seasonal dieback of aquatic vegetation.

32. An established ecosystem may remain stable over hundreds of years because

- (A) species interdependence is absent
 (B) there is a lack of variety in the species
 (C) no competition exists between the species
 (D) there are natural checks on species

33. Which statement describes what will most likely happen in an ecosystem recovering from a large fire that occurred 25 years ago?

- (A) The biotic and abiotic factors will stabilize within another 10 years, preventing any further changes in the ecosystem.
 (B) The organisms in the ecosystem will slowly multiply, then die when they run out of food, causing a catastrophic decrease in biotic populations.
 (C) The communities of the ecosystem will bring about changes in abiotic conditions, making it difficult for some existing organisms to continue to live in the area.
 (D) The abiotic conditions of the ecosystem will change, but the biotic factors will be stable enough to prevent the introduction of new organisms into the area.

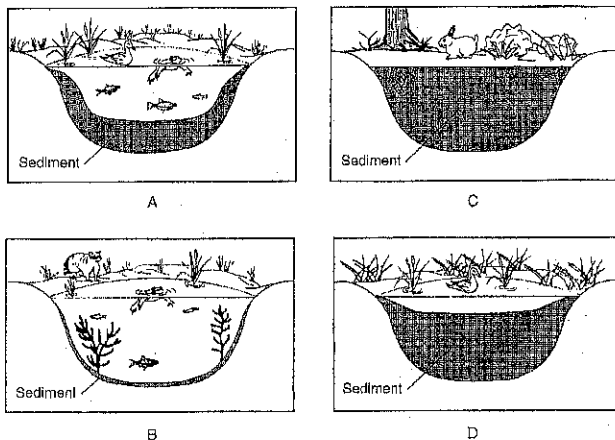
34. Which statement best describes the pioneer organisms involved in ecological succession?

- (A) They do not require sunlight.
 (B) They are the last organisms to appear.
 (C) They modify the environment.
 (D) They are restricted to desert biomes.

35. Several years after a building had been torn down and the ground cleared, grasses began to grow in that area. After 10 years, small bushes replaced the grasses. This pattern of plant growth is known as

- (A) biological control (C) land-use management
 (B) ecological succession (D) cover cropping

Base your answers to questions 36 and 37 on the diagrams below and on your knowledge of biology. The diagrams represent events that occurred during succession in a pond.



36. What is the correct sequence of the stages of succession in this pond?

- (A) $B \rightarrow A \rightarrow D \rightarrow C$ (C) $C \rightarrow A \rightarrow D \rightarrow B$
 (B) $A \rightarrow B \rightarrow C \rightarrow D$ (D) $B \rightarrow D \rightarrow A \rightarrow C$

37. Which organism is one of the first autotrophs to appear in this succession?

- (A) frog (C) tree
 (B) aquatic plant (D) fish

38. A climax community is generally established most directly as a result of a

- (A) catastrophic climatic change
 (B) series of successive ecological stages
 (C) long period of evolutionary change
 (D) change in the dominant fauna

39. As succession proceeds from a shrub community to a forest community, the shrub community modifies its environment, eventually making it

- (A) more favorable for itself and less favorable for the forest community
 (B) more favorable for itself and more favorable for the forest community
 (C) less favorable for itself and more favorable for the forest community
 (D) less favorable for itself and less favorable for the forest community

40. What is a characteristic of a stable environment?

- (A) It usually contains only one type of producer.
 (B) It usually contains a great diversity of species.
 (C) It contains simple food chains that have more consumers than producers.
 (D) It contains complex food webs that have more heterotrophs than autotrophs.

41. Base your answer to the following question on the information below and on your knowledge of biology.

Years after the lava from an erupting volcano destroyed an area, lichens started to grow in that area. These were gradually replaced by grasses, shrubs, conifers, and finally, by a deciduous forest.

In this sequence of events, the lichens functioned as

- (A) primary consumers (C) abiotic factors
 (B) climax organisms (D) pioneer organisms

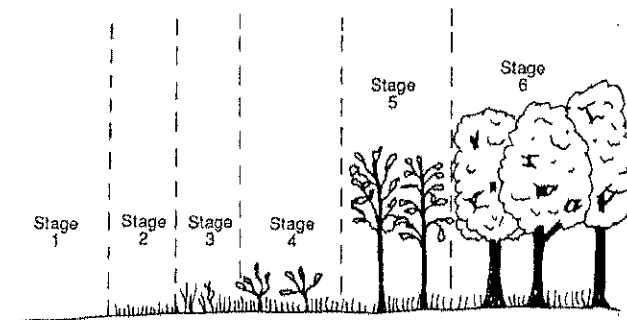
42. The type of climax vegetation that becomes established in an area depends most upon the

- (A) rate of photosynthesis in autotrophs
 (B) number of carnivores present
 (C) climatic conditions present
 (D) concentration of nitrogen in the air

43. What will most likely result after a fire or other natural disaster damages an ecosystem in a certain area?

- (A) The area will remain uninhabited for an indefinite number of centuries.
 (B) A stable ecosystem will be reestablished after one year.
 (C) An ecosystem similar to the original one will eventually be reestablished if the climate is stable.
 (D) The stable ecosystem that becomes reestablished in the area will be different from the original.

44. Which statement about the diagram of primary plant succession below is true?



- (A) Stage 1 represents the climax stage.
 (B) Stage 6 will replace stage 5.
 (C) Stage 2 will replace stage 3.
 (D) Stage 4 represents a major New York State biome.

45. A new island formed by volcanic action may eventually become populated with biotic communities as a result of

- (A) a decrease in the amount of organic material present
 (B) decreased levels of carbon dioxide in the area
 (C) the lack of abiotic factors in the area
 (D) the process of ecological succession

