

Name: _____ #: _____

Ecosystems

STEMscopes: Every organism needs energy in order to survive. Organisms use energy to carry out such functions as respiration, metabolism, movement, and temperature maintenance. Within an ecosystem, energy is obtained from external sources and cycled through a food pyramid. Each level in a food pyramid is called a trophic level.

Standards that will be addressed:

- **5-LS2.1:** Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.
- **5-LS2.A.1:** The food of almost any kind of animal can be traced back to plants. Organisms are related in food webs in which some animals eat plants for food or other animals eat the animals that eat plants. Organisms can only survive in environments in which their needs are met.
- **5-LS2.B.1:** Matter cycles between the air and soil and among plants, animals, and microbes as organisms live and die. Organisms obtain gases and water from the environment and release waste matter (gases, liquids, solids) back into the environment.

Remember to look at the Science tab on our class website for additional resources, information, and updates.

Pages included in the packet:

1. STEMscopedia
2. Linking Literature:
 - a. Frayer Model
 - b. Claim and Evidence
3. Science Today: Invasive Blue Catfish
4. Independent Practice
5. Concept Attainment Quiz

Optional Extension Activities:

- At Home Connection Piece (see class website)
- Web Surfing Science (see STEMscopes account)

Test Date & Journal Collection: *Tentative* November 2nd

- The test will be 5 Multiple Choice Questions and 3 Open-Ended Questions.
- Student journals and packets will be collected and graded on neatness and completion.

Reflect

You wake up early on a Monday morning. You grab something to eat and drink and then go outside to catch the bus. When you arrive at school, you suddenly remember you forgot to do part of your homework! You find a classmate, and she helps you finish up a few science questions. Then you both head into class, where your teacher is starting the school day. From the time you woke up until the time you started class, you were interacting with your environment. Any behavior that causes something to affect something else is called *an interaction*. You ate food, drank liquids, breathed air, and relied on other people for help getting to school and finishing your homework. In the same way, **organisms** interact with their environment every day. These interactions help organisms survive. What are some things organisms might interact with? Are they living or nonliving? Can you think of some ways organisms interact with each other?



organism: a living thing

What is an ecosystem? What are the different parts of an ecosystem?

An *ecosystem* is a community made up of living and nonliving things interacting with each other. *Nonliving things* do not grow, need food, or reproduce. Some examples of important nonliving things in an ecosystem are sunlight, temperature, water, air, wind, rocks, and soil. *Living things* grow, change, produce waste, reproduce, and die. Some examples of living things are organisms such as plants, animals, fungi, and bacteria. Organisms interact with the living and nonliving things in their ecosystem to survive.

A forest is a type of ecosystem. What kinds of living things would you expect to see in a forest? You might see different kinds of animals, such as bears, deer, mice, and snails. You might also see plants, such as trees and bushes. Other living things in the forest might include mushrooms or even bacteria living in the soil. These living things interact with the nonliving things around them, such as sunlight, temperature, water, and soil. The living things in an ecosystem are interdependent. This means that living things depend on their interactions with each other and also nonliving things for survival. For example, a tree depends on sunlight for energy and food. A snail depends on plants for food. A healthy ecosystem is one in which many different *species* are each able to meet their needs in a relatively stable web of life.

What Do You Think?

This bee is collecting pollen from a plant's flower. It uses the pollen to make food for itself and other bees. The bee depends on the plant's flower for food. What living and nonliving things do you think the plant depends on?

How do the nonliving components in an ecosystem support the other components?

Nonliving components are important parts of any ecosystem. Sunlight is one of the most important nonliving components. Light from the Sun helps plants produce food and oxygen. Sunlight also provides heat that makes life on Earth possible. Without the Sun's heat, Earth would be too cold for most living things to survive.

Take a deep breath. Every time you breathe, you take in air. Air is a mixture of gases, including nitrogen, oxygen, and carbon dioxide. These gases are nonliving components needed by almost all organisms on Earth. Water is another important nonliving component. Think about how thirsty you get after you exercise. Your body is telling you that it needs water—you cannot live without it. In fact, about 60% of your body is water!

Temperature is a nonliving component that affects living things in an ecosystem. Think about what happens when the temperature drops in the winter. Animals move to warmer areas or hibernate, trees lose their leaves and stop growing, and people begin to wear warmer clothing. Soil is another kind of nonliving component. In a desert, the soil is very sandy and has little moisture. It can support only certain plants that have adaptations to live with very little rainfall. In a rainforest, the soil can be poor in nutrients but high in moisture. It supports large trees, long vines, and many other kinds of plants that take up nutrients in the soil right away and often grow quickly.



This plant uses nonliving components such as sunlight, water, and carbon dioxide to produce food and oxygen.

Look Out!

Animals compete with each other for nonliving components such as water. But animals aren't the only organisms that compete for the resources around them! Plants also compete with each other and animals for nonliving parts of an ecosystem. Suppose a fire destroys a forest. A short while later, new trees start to grow. At first, many young plants may grow in the forest. But some plants, such as trees, are able to absorb more water and nutrients and they begin to grow taller. As they grow, they block the sunlight to smaller plants growing below. The smaller plants cannot produce enough food to sustain themselves, and die off. Forest ecosystems change because conditions in the forest are constantly changing.

How do the living components in an ecosystem support other components?

Think about some of the living components of a forest ecosystem. How do they interact with other things in the ecosystem? A forest has plants such as grasses, bushes, and trees. The grasses and bushes provide food to animals like deer and mice. Trees provide shade from the sunlight and shelter to other organisms. Birds help spread the seeds of a plant to new areas of the forest. Earthworms mix and move the soil, circulating nutrients back to the ecosystem. When organisms die, their bodies become part of the soil and provide nutrients to plants and other organisms. The living components of the forest depend on each other for survival. Animals that eat only plants are called *herbivores*. Animals that eat only other animals are called *carnivores*. *Predators* are a type of carnivore that catch and eat other animals.



The animals they catch and eat are called *prey*. Animals that eat both plants and animals are *omnivores*. How would you classify yourself?

Look Out!

A single type of organism may play more than one part in an ecosystem. For example, you might think of a snake only as a predator. While a snake does eat other organisms, it may also be food for another predator. Certain birds, such as eagles or hawks, eat snakes for food. The snake is a predator and also a prey animal for other organisms. What do you think would happen if a non-native species were introduced into the ecosystem? The new species could actually damage the ecosystem!

Reflect

Everyday Life: Medicines from Plants

Suppose you wake up one morning with a headache, a cough, a stuffy nose, and a fever. Your doctor might give you antibiotics to fight the infection. Did you know that the first antibiotics came from a fungus? Scientists discovered that a type of mold called *Penicillium* kills certain bacteria that make us sick. This mold was made into a medicine called penicillin. During World War II, penicillin saved the lives of many soldiers who had bacterial infections, and it continues to help people today.

Many of today's medicines come from plants. For example, the cancer drug paclitaxel comes from a yew, which is a type of tree. People with heart problems may take a drug called digitalis, which comes from a plant called foxglove. Some medicines are also manufactured but are often still based on a natural chemical found in plants.

Try Now

Work with a classmate or a small group to record how you interact with your environment every day.

1. Find a partner or make a small group.
2. Work together to list the living and nonliving components you have interacted with today. See how many you can list in three minutes. Use a watch or a timer to keep track of time. You might want to build a T-chart to help organize your list.
 - For example, you might have eaten a piece of fruit at lunch. Fruit comes from plants, so it would count as a living component.
 - You also might have worn a coat to protect yourself from the cold. The cold temperature would count as a nonliving component. (If the coat contains fibers from plants, it counts as a living component).
3. When you are finished, compare your list with another group. What living and nonliving components did they list? Did they list any that you did not? What do you think are the most important components? Could you live without any of these components?



Ecosystems

What Do You Think?

A desert ecosystem is made up of living and nonliving components. Read the list of living and nonliving components below. Where does each component belong? Write the name of each component in the correct column of the table. Then include one way each component interacts with other components in the ecosystem.

- beetle
- hawk
- mouse
- sunlight
- water
- snake
- cactus

Nonliving	Living	Interaction



Name: _____ Date: _____ Group: _____

Ecosystems Frayer Model

Directions: Complete the charts below about living and nonliving things using information from the text.

Definition and Characteristics		Picture
Examples	Nonliving Things	Nonexamples

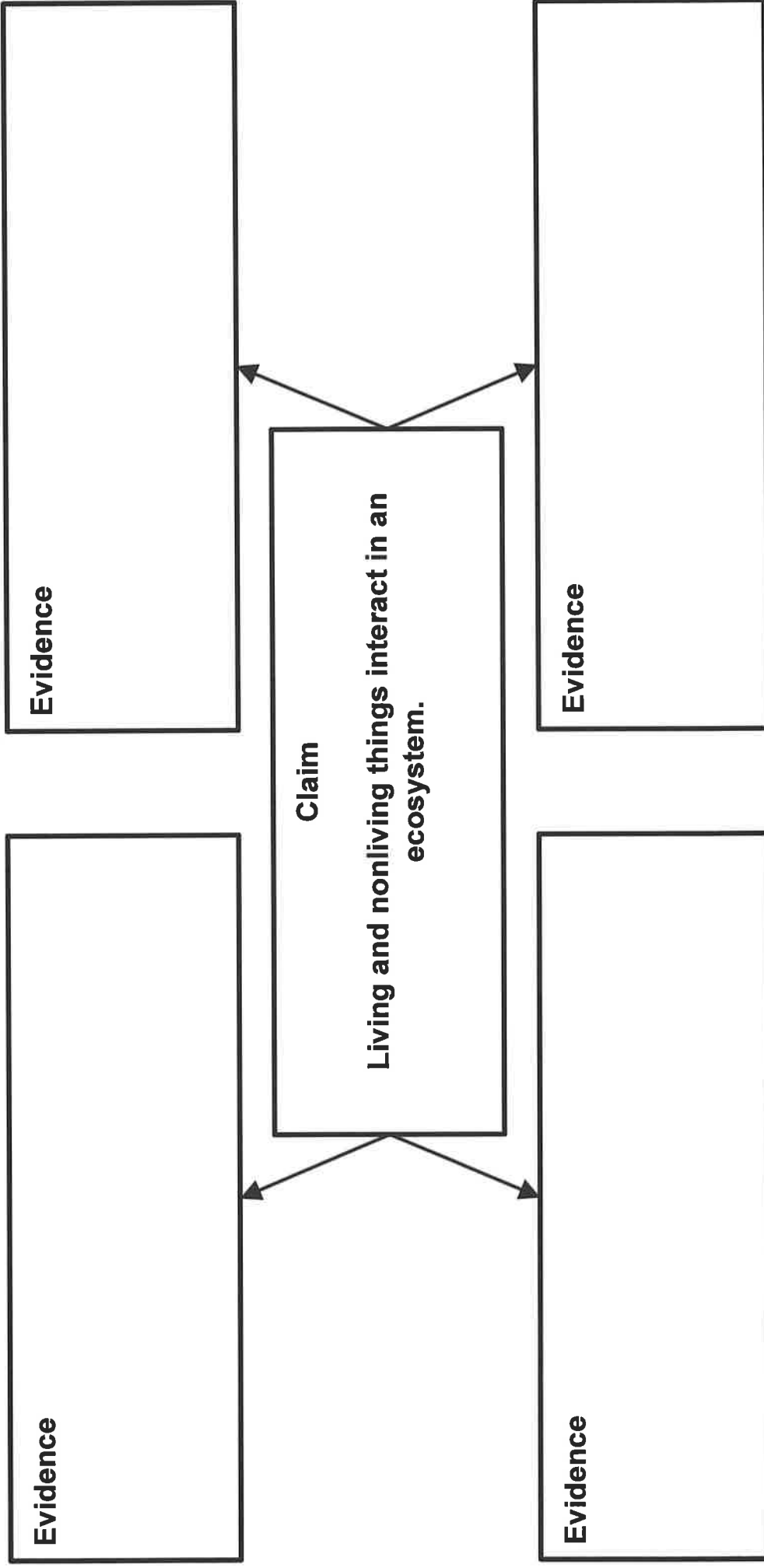
Definition and Characteristics		Picture
Examples	Living Things	Nonexamples



Name: _____ Date: _____ Group: _____

Claim and Evidence

Directions: After reading the text, provide four pieces of evidence that support the claim in the center box.





Name: _____ Date: _____ Group: _____

Invasive Blue Catfish



1. Why are there so many blue catfish in the bay?

2. How are the blue catfish disrupting the ecosystem?

3. The blue catfish are an invasive species because they did not originally live in the bay. Create a public service announcement that warns people against adding plants and animals to ecosystems where they do not belong.



Independent Practice

Name: _____ Date: _____ Group: _____

Part I: Secret Word

Directions: Use the clues to complete the puzzle and find the secret word.

1. These are extremely small decomposers.
2. I use only nonliving matter to make my food.
3. This diagram shows how energy from the Sun and matter from the soil flow to all living things in an ecosystem.
4. I am considered this because I must eat other living things to get energy.
5. In a food web, this shows how _____ moves.
6. Types of _____ are fungi, bacteria, and invertebrates.
7. If I am an omnivore, then I eat both meat and _____.
8. Cows are an example of this type of consumer in a food web.
9. As a carnivore, I would have very sharp teeth to eat _____.

1.	M _____		S
2.	P _____		___ R
3.	F _____		___ ___ B
4.	C _____		___ ___ R
5.	E _____		
6.	D _____		___ S
7.	P _____		___
8.	H _____		___ ___ E
9.			___ T



Independent Practice

Name: _____ Date: _____ Group: _____

Part II: Break the Code

Directions: Read each clue and write the word or phrase using the code. Match each number under the line to the pair of letters for that number. Decide which letter to use to correctly spell the word or phrase.

AB	CD	EF	GH	IJ	KL	MN	OP	RS	TU	VW	XY
1	2	3	4	5	6	7	8	9	10	11	12

- An area that has rocks, water, sunlight, as well as several different organisms.
- This shows how multiple plants and animals get energy in an ecosystem.
- I describe the extremely small organisms that break down dead plant and animal matter to return the energy to the soil, like bacteria.
- A person is this type of consumer.
- Lions, cheetahs, and leopards are examples of this type of consumer.
- This is the opposite of a producer because it doesn't make its own food.
- My job in my ecosystem is to break down dead and decaying matter.
- I only eat producers.
- I use matter in the soil and the Sun to make my own food.

3 2 8 9 12 9 10 3 7

3 8 8 2 11 3 1

7 5 2 9 8 1 3 9

8 7 7 5 11 8 9 3

2 1 9 7 5 11 8 9 3

2 8 7 9 10 7 3 9

2 3 2 8 7 8 8 9 3 9

4 3 9 1 5 11 8 9 3

8 9 8 2 10 2 3 9



Concept Attainment Quiz

Name: _____ Date: _____ Group: _____

I. Vocabulary Matching

_____ Living and nonliving things surrounded by their environment

_____ Things that happen as a result of an action

_____ Living things that have similar characteristics and can reproduce with each other

_____ Tell or guess in advance

_____ To make different

A. Ecosystem

B. Change

C. Predict

D. Effects

E. Species

II. Identification Match the organism or action with the environmental change it causes.

a) Beaver, dam building

b) Forest fire

c) Lack of rainfall

d) Invasive water plant arrives

e) Grasshopper outbreak

f) Coyote disease decreases their population

i. New plants can grow because of an increase in sunlight on the forest floor

ii. Zebras migrate farther to find water holes

iii. Pond floods

iv. Sunlight is blocked for native seagrasses

v. Crops are wiped out along the prairie

vi. Mice population explodes