

# Biotic and Abiotic Factors

## Teacher Facilitation Notes

### In General . . .

- Project the slide deck in edit mode—do not show it as a slideshow.
- Hide the speaker notes before projecting. (View/Show Speaker Notes)
- Hide the filmstrip to the left. (View/Hide Filmstrip.)
- Hide the toolbar. (Click on the up arrow at the right end of the tool bar.)
- Call on students to read the various content shown on slides.

### Materials Needed:

Student Recording Sheets  
Student Summative Evaluation

Pencils  
Science notebooks

### Engage

- Read and discuss the slides as desired.
- Have students write the definitions of the terms (environment, ecosystem, biotic and abiotic) in their science notebooks in their own words.

### Explore/Explain: Biotic and Abiotic Factors

- Read the questions on the opening slide for this section. Tell students to think about biotic and abiotic interactions in an ecosystem as they work through this part of the lesson.
- After watching the video, discuss what the students observed. Make sure they understand that biotic factors may include once living organic matter or organic matter from organisms, such as poop.
- Have students list the biotic and abiotic factors they observe in the photo of an African waterhole in their science notebooks. Call on volunteers to identify the factors as you type them in on the slide. (They should list air, even though it is not visible. Discuss why.)
- Read the paragraph about a grasslands ecosystem. Have students answer the questions about the photograph on their recording sheet. Discuss.
- Read through the slides about a pond ecosystem. Have students answer the questions on their recording sheet as they read each slide.
- On the last slide in this section, have students identify the biotic/abiotic factors and the way they interact in each sentence of the table.
- For the two “Living and Surviving” slides, have students discuss the questions in small groups. Then, have the groups share their ideas with the class. Record their ideas on the board or a piece of chart paper.
- Have students define the vocabulary terms in their science notebook.

# Biotic and Abiotic Factors

## Teacher Facilitation Notes, p. 2

### **Elaborate: Amazing Hummingbirds**

- Read and discuss the article about hummingbirds. (You can use the slides for this or duplicate a class set of the article so each student will have a copy to read.)
- Have students answer the questions on their recording sheets. Discuss as desired.

### **Evaluate**

- Read through and discuss each slide. Make sure students can identify the biotic and abiotic factors present and the interactions that occur between these factors.
- Have students complete the quiz independently. Discuss as desired.

# Biotic and Abiotic Factors

Name: KEY

## Evaluation

- Which of the following statements describes an organism interacting with a biotic factor in its ecosystem?
  - A sea otter using a rock to break open an oyster shell
  - A bird building its nest in the branches of a tree
  - An elephant drinking water at a savanna waterhole
  - Sunflowers tilting to follow sunlight throughout the day
  
- Which of the following is an example of a biotic factor interacting with an abiotic factor in its environment? Mark all that apply.
  - A snake suns itself on a rock in the desert.
  - A turtle digs its nest on a sandy beach.
  - A chimpanzee uses a twig to dig ants out of bark on a tree.
  - A dog sheds its hair when summer comes.
  
- The axolotl is a salamander that lives all of its life underwater. To survive, the axolotl uses its feathery gills to breathe underwater and eats mostly worms, insects, and tadpoles. Axolotls can regrow legs or fins if they are bitten off by a predator. The axolotl interacts with an abiotic factor of its environment when it—
  - eats worms or tadpoles
  - hides from predators in plants
  - uses its gills to breathe underwater
  - regrows a leg that was eaten by a stork



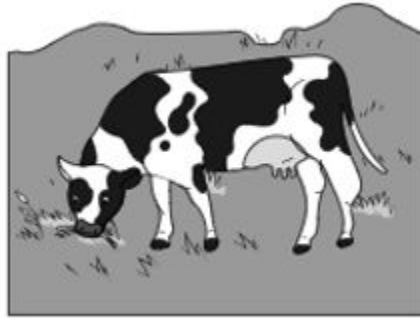
# Biotic and Abiotic Factors

Name: KEY

## Evaluation

This question has two parts. Answer Part A first and then Part B. Use the diagram below to answer both questions.

### Student Observations



**Cow eating grass**



**Horse drinking water**

4. Based on the student's observations, which statement best describes an interaction between one of the animals and a biotic factor in its environment?
- F** The cow is eating grass that grows in soil.
  - G** The cow is breathing oxygen from the air.
  - H** The horse is drinking water from a barrel.
  - J** The horse is being warmed by sunlight.
5. Which statement is the best evidence for the correct answer to Part A?
- A** The grass and the cow are both living things.
  - B** The cow needs the oxygen to survive.
  - C** The water helps keep the horse healthy
  - D** Without sunlight, the horse would get cold.

# Biotic and Abiotic Factors

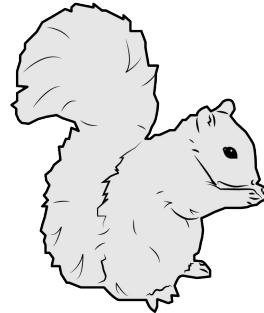
Name: KEY

## Evaluation

6. Some students made a chart about how a squirrel interacts with its environment. Which interaction involves the squirrel and an abiotic factor in its ecosystem?

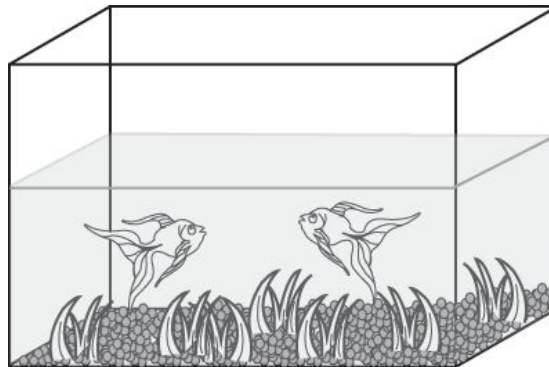
- F** Makes its home in trees
- G** Drinks water from streams
- H** Eats seed and nuts
- J** Is prey for owls and foxes

### Squirrel



- Makes its home in trees
- Drinks water from stream
- Eats seeds and nuts
- Is prey for owls and foxes

7. The illustration shows an aquarium containing goldfish and water plants. How do the fish and the plants interact with each other in the aquarium?



- A** The plants depend on the fish for oxygen, while the fish depend on the plants for food.
- B** The fish supply the plants with food, while the plants provide carbon dioxide for the fish.
- C** The fish provide carbon dioxide for the plants, while the plants provide oxygen and food for the fish.
- D** The plants supply food for the fish, while the fish provide water and light for the plants.

# Biotic and Abiotic Factors

Name: KEY

## Evaluation

8. Which of the following describes an interaction between plants and another biotic factor of the ecosystem that helps the plants survive?

- F** Forest fires destroy most of the plants in an area.
- G** Insects take pollen from one flower to another.
- H** Rainwater is absorbed into the soil where plants live.
- J** Some animals eat different kinds of plants.

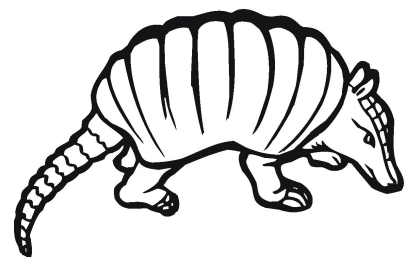
9. The picture shows part of a dandelion plant. What abiotic factor of an ecosystem helps the dandelion spread its seeds?

- A** Insects
- B** Birds
- C** Sunlight
- D** Wind



10. In 1995, Texas adopted the nine-banded armadillo as its official state animal. This animal is nocturnal and lives alone. Which of the following statements best describes how a nine-banded armadillo interacts with an abiotic factor in its ecosystem? The armadillo—

- F** uses its long, sticky tongue to capture insects
- G** uses its snout (nose) and claws to loosen soil and dig holes
- H** scares off predators by using its tail to leap high into the air
- J** mates from July to August and a female can produce over 50 offspring in her lifetime



# Biotic and Abiotic Factors

Name: \_\_\_\_\_

## Explore: Interactions in an Ecosystem

### Grasslands Ecosystem

1. What two biotic factors are interacting in this ecosystem? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
2. What interactions occur between the steer and the cattle egrets? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

### Pond Ecosystem

3. List at least 4 biotic factors you see in the pond ecosystem. \_\_\_\_\_  
\_\_\_\_\_
4. List at least 4 abiotic factors that you see or know are in the pond ecosystem. \_\_\_\_\_  
\_\_\_\_\_
5. What biotic and abiotic factors does the turtle interact with in the pond?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
6. List two other interactions between a biotic and an abiotic factor that might occur in a pond ecosystem. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

# Biotic and Abiotic Factors

## Amazing Hummingbirds

<sup>1</sup>Have you ever seen a hummingbird flying from flower to flower getting nectar? Do you know why we call them hummingbirds? These tiny birds beat their wings so fast when they fly that they make a buzzing noise. They can beat their wings up to 80 times a second!



<sup>2</sup>Hummingbirds also fly in a unique way. They move their wings so fast that they can hover—stay in one spot in the middle of the air. Sometimes they fly or hover upside down. Hummingbirds are the only bird that can fly backward.

<sup>3</sup>Hummingbirds are very small. One type, the bee hummingbird, is the smallest bird in the world. Bee hummingbirds weigh less than a penny and are just a little bigger than a bee!



<sup>4</sup>Bee hummingbirds use cobwebs and bits of bark to build tiny nests. These nests are only about an inch around. Since their eggs are smaller than peas, these nests are big enough.

<sup>5</sup>Hummingbirds move very fast. It takes a lot of energy to move so fast. This means that they need to eat a lot of food. Their favorite food is nectar, a sweet liquid inside of some flowers. They have to visit hundreds of flowers every day to get enough nectar to live.

<sup>6</sup>Hummingbirds don't use their long beaks like straws—they have a tongue just like you! They flick their tongues in and out of their mouth to lap up the nectar while inside a flower. Flowers give hummingbirds the energy they need.

<sup>7</sup>Hummingbirds help flowers, too. They get pollen on their heads and bills when they lap up the nectar. Flowers use pollen to make seeds. Hummingbirds help move pollen from one flower to the next. This helps flowers make more seeds. More seeds means more flowers. More flowers means more food for hummingbirds. Isn't it nice how that works out?



# Biotic and Abiotic Factors

Name: \_\_\_\_\_

## Elaboration: Amazing Hummingbirds

1. How do hummingbirds help flowers?
  - A They drink nectar.
  - B They move pollen from one flower to the next.
  - C They eat the pollen that the plant produces.
  - D They plant seeds nearby.
  
2. Which best describes the main idea of paragraph 5?
  - F Hummingbirds move very quickly.
  - G Hummingbirds like to eat nectar.
  - H Hummingbirds use lots of energy and eat a lot of nectar.
  - J Nectar is a sweet liquid found inside some flowers.
  
3. What best defines the word *hover* as used in paragraph 2?
  - A To stay in one spot in the air
  - B To drink a lot of nectar
  - C To fly from place to place
  - D To move wings very quickly
  
4. Which title best describes the main idea of this text?
  - F *Bee Hummingbirds--the World's Smallest Bird*
  - G *Pollination: How Birds and Flowers Work Together*
  - H *Hummingbirds: Unique and Uniquely Helpful*
  - J *Interesting Facts about Birds*

# Biotic and Abiotic Factors

Name: \_\_\_\_\_

## Elaboration: Amazing Hummingbirds

5. What interactions benefit both the hummingbird and the flowers in the ecosystem? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
6. Why does the hummingbird have to eat so often? \_\_\_\_\_  
\_\_\_\_\_
7. Why is the ability to hover so useful to a hummingbird? \_\_\_\_\_  
\_\_\_\_\_
8. What biotic factors in its ecosystem does the hummingbird use to build its nest? \_\_\_\_\_  
\_\_\_\_\_
9. What abiotic factors in an ecosystem would a hummingbird interact with?  
\_\_\_\_\_  
\_\_\_\_\_
10. People also interact with biotic and abiotic factors in their own ecosystem. Think about what you have done today. List two interactions you have had with biotic factors and two interactions you have had with abiotic factors.

**Biotic:** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Abiotic:** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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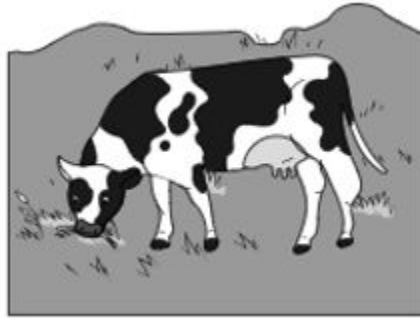
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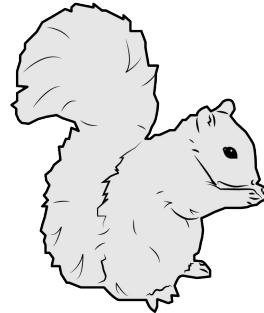
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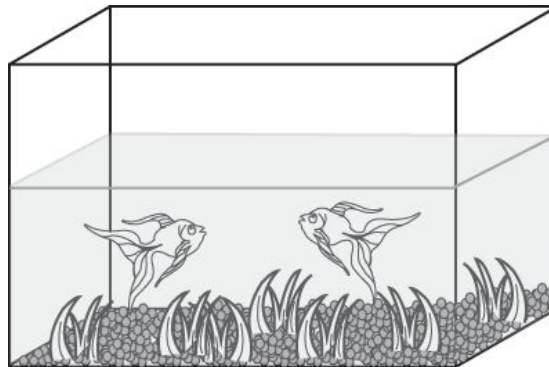
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