

# Biodiversity IQ Quiz

## Teacher's Guide

### Before you Begin:

For each group of three or four students, make a copy of the quiz and the answers.

### What to Do:

**1. Distribute the quizzes and review vocabulary.**

Divide the class into groups of three or four students and give each group a copy of the quiz. Review any words that may be unfamiliar to the students. For now, don't define the word "biodiversity."

**2. Give groups time to complete the quiz.**

Assure the students that this is not a real quiz; it's simply a fun introduction to biodiversity. Also tell them that their answers won't be graded and that it's OK if many of their answers are wild guesses.

**3. Distribute answers to the quiz.**

Have the students score their tests. Afterward, discuss each of the questions and answers. How did they do? Were they surprised by any of the answers? Which ones? You may want to suggest that they take the quiz home to test family members and talk about the answers.

**4. Develop a class definition of biodiversity and a list of reasons why it's important.**

Explain to the students that the quiz was designed to point out some interesting facts about the natural world, as well as to introduce the concept of biodiversity. Ask the students what they think biodiversity means, and have them write their ideas on the board. Then use the background information, along with the glossary, to explain the three levels of biodiversity (genes, species and ecosystems). Next, have the students use the information on the board and in the quiz to list reasons biodiversity is important. Afterward, combine their group lists to form a single class list. Your class list might include food, clothing, housing, ecosystem services, natural beauty, camping and hiking.



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**Extension:**

Have each student select a quiz question that he/she answered incorrectly or a question that interests him/her. Ask the students to research the subject of the question and use the information they find to write a paragraph that either explains the correct answer or gives more details on the subject.



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## What's Your Biodiversity IQ?

Here's your chance to find out what you know about the world's diverse plants, animals and natural places. For each question, circle all the correct answers.

1. Which of the following could the fastest human outrun in a 100-yard race?
  - a. Cheetah
  - b. Wart hog
  - c. Domestic cat
  - d. Wild turkey
2. Which of the following actually exist?
  - a. Ants that "herd" aphids for food
  - b. Slime molds that creep across the ground
  - c. Trees that can grow with their roots under water
  - d. None of the above
3. Which of the following animals can consume at least half of its body weight in food each day?
  - a. Little brown bat
  - b. Masked shrew
  - c. Ruby-throated hummingbird
  - d. None of the above
4. Which of the following best describes the word "biodiversity"?
  - a. Endangered species
  - b. Different kinds of planets in the solar system
  - c. The variety of all life on earth
  - d. Biographies about famous biologists
5. Scientists studying bug zappers have learned some interesting facts. Which of the following are among them?
  - a. Insects are attracted to bug zappers because of the zappers' smokey smell.
  - b. Bug zappers are great for ridding summer nights of mosquitoes
  - c. Bug zappers could be bad news for certain bird, fish, bat and flower species
  - d. There are more than four million bug zappers being used in the United States



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6. Which of the following can be considered an enemy of the San Francisco Bay Estuary and Sacramento-San Joaquin Delta?
- Zebra mussel
  - Mitten crabs
  - Atlantic cordgrass
  - Mercury
7. What is the most serious threat to biodiversity?
- Scientists collecting specimens
  - Habitat loss
  - Tourists
  - Pollution
8. The items on the left have been (or are being) developed into important medicines for humans. Match each item with the medicine made from it by writing the letters in the appropriate blanks.

Bread mold	heart medicine
Willow tree	antibiotic
Vampire bat saliva	pain reliever
Mayapple	medicine to unclog arteries
Coneflower	immune system booster

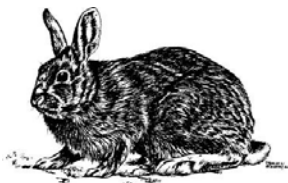
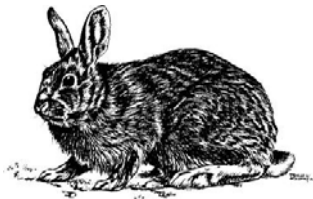
9. Without fungi, which of the following would you not be able to do?
- Eat pizza topped with pepperoni and mushrooms
  - Bake bread
  - Live in a world free of dead things lying all over the place
  - Put blue cheese dressing on your salad
10. Which of the following statements are true?
- Potatoes originated in Ireland
  - The United States grows most of its baking potatoes in Washington
  - More than 5,000 different kinds of potatoes have been identified in South America's Andes Mountains.
  - The French fry, invented by Madame Bonaparte during the French Revolution, became one of Napoleon's favorite snacks.



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11. Which of the following are actual species of animals found in the San Francisco-Bay and Delta region?
- a. Smelt
  - b. Red-legged frog
  - c. Kit fox
  - d. Clapper Rail
12. If you decided to throw a party to celebrate the diversity of life on earth and wanted to send an invitation to each species, how many invitations would you need?
- a. 150
  - b. About 3,000
  - c. 652,983
  - d. More than 1.5 million
13. If the number of species on earth was represented by physical size, which of the following would most accurately illustrate the proportion of insects to mammals?



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14. Biodiversity includes:
- The color of your eyes
  - the creatures in your neighborhood soil
  - California
  - Your classmates
15. If we gave a prize for "the strongest creature for its size", which of the following would win?
- Bobcat
  - Bald eagle
  - Ant
  - Turtle
16. Which of the following would people have to do without if there were no bees?
- Almonds
  - Honey
  - Cucumbers
  - Apples
  - Celery
17. Which of the following is an example of an ecosystem service?
- A ladybug that protects your garden by eating aphid pests
  - A company that rakes people's yards
  - A wetland that filters dirty water
  - An ocean that controls the earth's climate
18. Some of the world's most fascinating creatures live in really unusual places. Which of the following is sometimes a home for another living thing?
- A caterpillar's abdomen
  - A termite's gut
  - A white-tailed deer's intestine
  - A human forehead



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19. The Antioch Dunes Evening Primrose was once common along the sand dunes in the East Bay. Which of the following statements explains why this plant is now endangered in California?
- Human development expansion
  - Sand was harvested to make bricks, destroying the habitat
  - Encroachment of non-native grasses
  - Increased roto-tilling of the dunes
20. Which of the following environments on our planet are too harsh to support life?
- Boiling sulfur springs, where temperatures are commonly 212 degrees Fahrenheit.
  - Deep-sea hydrothermal vents called "smokers" where the temperature can reach 662 degrees Fahrenheit.
  - The frigid ice of the Arctic and Antarctic
  - All of the above
  - None of the above

Source: Illinois Biodiversity Basics, Illinois Department of Natural Resources, Chicago Wilderness, World Wildlife Fund.



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## Biodiversity IQ Answers

### 1. Which of the following could the fastest human outrun in a 100-yard race?

- d. wild turkey

Lots of animals are quick on their feet (or wings, or scales, or fins), but speed doesn't necessarily count much these days in the race for survival. Cheetahs, for example, are the fastest land animals in the world (may reach speeds of about 70 miles per hour)—but they're also among the world's most endangered. The fastest humans can finish a 100 yard dash in under 10 seconds. That calculates to about 25 miles per hour; although humans can't sustain that speed long term. The wart hog and domestic cat can both attain speeds of about 30 miles per hour. The wild turkey can only run at about 20 miles per hour.

### 2. Which of the following actually exist?

- a. ants that "herd" aphids for food
- b. slime molds that creep across the ground
- c. trees that can grow with their roots under water

Certain kinds of ants eat the sugary substances excreted by aphids, which are insects that suck plant juices. The ants actually herd colonies of aphids by moving them from place to place and protecting them from enemies. Some slime molds have two distinct phases in their life cycle. In the reproductive phase they are stationary, like a plant with a stalk. From this stalk they produce spores. These slime molds may also exist as mobile amoeba-like organisms that feed by engulfing material. Bald cypress trees grow in swamps in southern Illinois, as well as in the southern United States. These huge trees can grow with their roots continually submerged because of their unique feature, called "knees."

### 3. Which of the following animals can consume at least half of its body weight in food each day?

- a. little brown bat
- b. masked shrew
- c. ruby-throated hummingbird

These small animals need huge amounts of food each day to survive. In fact, a mother little brown bat that is feeding babies must consume more than her body weight in insects each night.

### 4. Which of the following best describes the word "biodiversity?"

- c. the variety of all life on earth



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The variety of life on earth includes plants, animals, microorganisms, ecosystems, genes, habitat diversity and more.

**5. Scientists studying bug zappers have learned some interesting facts. Which of the following are among them?**

- c. Bug zappers could be bad news for certain bird, fish, bat and flower species.
  - d. There are more than four million bug zappers being used in the United States.
- A recent study at the University of Delaware on bug zappers came up with some "shocking" results. It revealed, for example, that many species of mosquitoes are not attracted to bug zappers at all. Instead, the zappers' blue light attracts harmless insects in droves, many of which provide food for birds, bats and fishes. Some of the insects that zappers zap are also important to plants, which need the insects for pollination.

**6. Which of the following can be considered an enemy of the San Francisco Bay Estuary and the Sacramento-San Joaquin Delta?**

- a. zebra mussel
- b. mitten crabs
- c. Atlantic cordgrass
- d. Mercury

The Sacramento-San Joaquin Delta is the single largest source of California's water. The San Francisco Bay Estuary is the largest estuary on the West Coast. Both are vital resources for the state's human and wildlife population. But these incredible ecosystems are facing serious threats. nonnative species, such as the zebra mussel and mitten crabs compete for food or threaten the health of native animals. Non-native plants such as Atlantic cordgrass overtake native plants, displace shorebird habitat and choke tidal creeks. Chemicals, such as mercury, that end up in the San Francisco Bay, often last forever and even enter the food chain, making fish in certain areas unsafe for humans and other animals to eat.

**7. What's the most serious threat to biodiversity?**

- b. habitat loss

All over the world habitats are being turned into agricultural land, harvested for wood and fuel, and destroyed or changed to build roads, schools, malls and other human developments. Because the human population is growing so quickly and consuming so many natural resources, habitat loss is occurring at a rapid pace.



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**8. The items on the left have been (or are being) developed into important medicines for humans. Match each item with the medicine made from it by writing the letters in the appropriate blanks.**

- b** bread mold (antibiotic)
- c** willow tree (pain reliever)
- d** vampire bat saliva (medicine to unclog arteries)
- a** mayapple (heart medicine)
- e** coneflower (immune system booster)

Biodiversity is like a gigantic pharmacy. Consider plants: more than one-fourth of the drugs commonly used today were originally derived from plants. Animals are a potentially important source of medicines, too. In fact, you never know where a future medicine might pop up. Who would have thought that vampire bat saliva could be useful? No wonder researchers are looking to biodiversity to find treatments and cures for cancer, AIDS and a host of other diseases.

**9. Without fungi, which of the following would you not be able to do?**

- a. eat pizza topped with pepperoni and mushrooms
- b. bake bread
- c. live in a world free of dead things lying all over the place
- d. put blue cheese dressing on your salad

While some forms of fungi may seem less than noble—athlete's foot fungus, for example—the world could not function long without these humble life forms. Fungi and bacteria play a key role in breaking down organic matter and recycling it back into usable nutrients. Without them, dead things would definitely pile up! Besides, without fungi we wouldn't have tasty treats such as mushrooms, yeast bread or blue cheese.

**10. Which of the following statements are true?**

- c. More than 5,000 different kinds of potatoes have been identified in South America's Andes Mountains.

The potato actually originated in South America. In Peru, some family farmers grow as many as 12 kinds of potatoes. Can you imagine eating purple potato chips or red mashed potatoes? It's possible with the thousands of kinds of potatoes out there. Most supermarkets, however, carry only four or five different varieties. And most of the country's baking potatoes are grown in Idaho. (Washington is the second largest producer of potatoes.)



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**11. Which of the following are actual species of animals found in the San Francisco Bay and Delta region?**

- a. smelt
- b. red-legged frog
- c. kit fox
- d. clapper rail

These are just a few examples of some of the many wonderful creatures of the San Francisco Bay and Delta region. The Delta Smelt is a small, slender fish that is only found in the Sacramento-San Joaquin Estuary. The smelt was once one of the most common fish in the estuary but due to many threats to the population, it is currently listed as a threatened species. The California red-legged frog is the largest native frog in the western United States. It once ranged across much of California but over time much of its habitat has been destroyed and it is currently listed as a threatened species. The San Joaquin kit fox is the smallest member of the dog family in North America. Kit foxes inhabited most of San Joaquin Valley before 1930, but since then populations have been eliminated from large portions of the range and they are now only found in a few counties in southern San Joaquin valley. It is currently listed as an endangered species. The California Clapper Rail is a shy and elusive bird that once lived in coastal marshes throughout central and northern California. Today they can only be found along the San Francisco Bay and are currently listed as an endangered species.

**12. If you decided to throw a party to celebrate the diversity of life on earth and wanted to send an invitation to each species, how many invitations would you need?**

- d. more than 1.5 million

Scientists have estimated that as many as 100 million species may actually exist—they just haven't gotten around to identifying all of them yet.

**13. If the number of species on earth was represented by physical size, which of the following would most accurately illustrate the proportion of insects to mammals?**

- c. There are approximately 250 insect species to every mammal species—and that includes only the insects we know about. Scientists think there are millions more species yet to be discovered.

**14. Biodiversity includes:**

- a. the color of your eyes



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- b. the creatures in your neighborhood soil
- c. Illinois
- d. your classmates

Biodiversity describes the incredible variety of life on earth—and that includes the diversity among genes (which control inherited traits like the color of your eyes), species (from huge whales to tiny soil creatures) and ecosystems (from lush cypress swamps to the harsh environmental conditions of a prairie).

**15. If we gave a prize for “the strongest creature for its size,” which of the following would win?**

- c. ant

An ant can carry a load up to 50 times its body weight.

**16. Which of the following would people have to do without if there were no bees?**

- a. almonds
- b. honey
- c. cucumbers
- d. apples
- e. celery

Bees are worth billions of dollars to the agriculture industry. Each year bees pollinate millions of acres of almond and apple trees, cucumbers and celery. Other favorite foods we'd miss without bee pollinators include watermelons, avocados, plums, pears, blueberries, cranberries, cherries and cantaloupes.

**17. Which of the following is an example of an ecosystem service?**

- a. a ladybug that protects your garden by eating aphid pests
- c. a wetland that filters dirty water
- d. an ocean that controls the earth's climate

Ecosystem services include the “free services” provided by ecosystems around the world—and which most of us take for granted. For example, wetlands help control floods, filter pollutants from water and provide habitat for all kinds of birds, fishes and other animals. Ladybird beetles eat aphids, which are common garden pests. And oceans act as a giant thermostat, interacting with the atmosphere and land to control earth's climate.

**18. Some of the world's most fascinating creatures live in really unusual places. Which of the following is sometimes a home for another living thing?**



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- a. a caterpillar's abdomen
- b. a termite's gut
- c. a white-tailed deer's intestine
- d. a human's forehead

The larva of a tomato hornworm may become host to the eggs of the parasitic ichneumon wasp. As the wasp larvae develop, they use the caterpillar for food. Deep within a termite's gut lives a tiny protozoan that helps to digest the termite's woody diet. The white-tailed deer belongs to a group of hoofed mammals that have bacteria living in their digestive tracts. The primary type of bacteria changes through the year to insure the deer can always digest the available food source, that is, green plants in the spring and summer and bark, twigs, grain and acorns in fall and winter.

Without knowing it, most human beings have mites on their forehead. Mites are slender creatures with a wormlike body and a spidery head. A mite is so small it is almost invisible. One species (*Demodex folliculorum*) dwells in the hair follicles, and another (*Demodex brevis*) lives in the sebaceous glands.

**19. The Antioch Dunes Evening Primrose was once common along the sand dunes in the East Bay. Which of the following statements explains why this plant is now endangered in California?**

Human development expansion

Sand was harvested to make bricks, destroying the habitat

Increased roto-tilling of the dunes

Encroachment of non-native grasses

In the early 1900's the sand dunes in the Delta began to experience dramatic change as human development expanded. The sand was harvested to make bricks and mining and other industrial development dramatically reduced the dune habitat. The dunes were roto-tilled to prepare for incoming development and non-native plants arrived and crowded out existing native plants. The Antioch Dunes Evening Primrose was listed as an endangered species in 1978.

**20. Which of the following environments on our planet are too harsh to support life?**

e. none of the above

Amazingly, life has been discovered in all of these harsh environments. Newly identified microorganisms called "extremeophiles" thrive in unimaginable conditions, like boiling sulfur springs and polar ice fields.



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