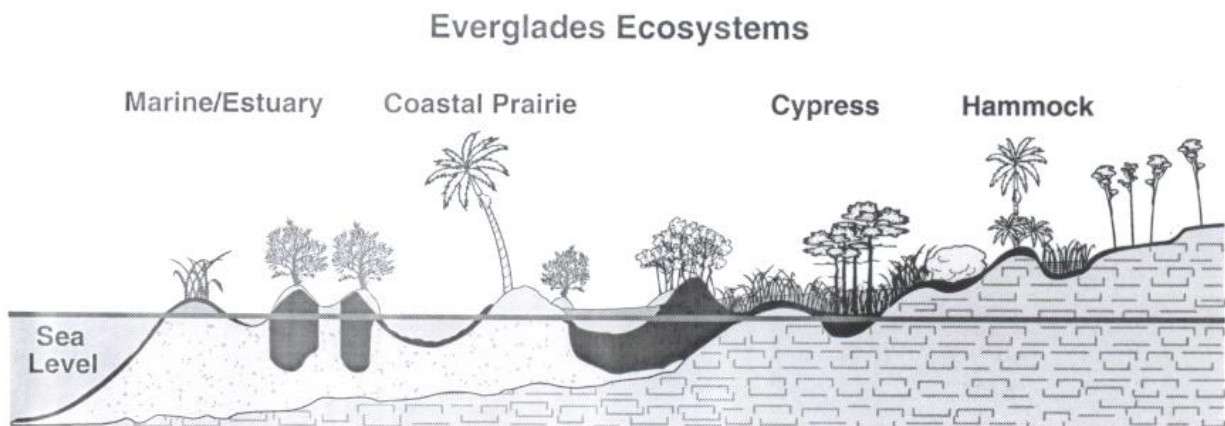


# Environmental Science Final Exam Review Practice Questions

Factory A is allowed to release 100 units of carbon dioxide, but it only needs to release 75 units, so it plans to sell its 25 extra allowances to Factory B. What type of program does this demonstrate?

- A. Carbon footprint
- B. Carbon sequestration
- ☒ C. Cap-and-trade
- D. Kyoto Protocol

Flooding causes some of the soil erosion in the Florida Everglades. A cross section of ecosystems in the Florida Everglades is shown below.



Which of the following ecosystems experiences the **least** amount of flooding and soil erosion?

- A. Marine/estuary
- B. Coastal prairie
- C. Cypress
- ☒ D. Hammock

Scientists once thought there was no life on the deep-sea floor due to the lack of sunlight. However, in the 1970s, complete ecosystems were discovered on the deep-sea floor that depend on energy from chemical reactions rather than energy from sunlight. Which conclusion can be drawn from this discovery? (B.3)

- A. Organisms are able to survive under any conditions.
- B. Observations will always lead to the discovery of new organisms.
- ☒ C. Organisms may be discovered in remote areas and extreme conditions.
- D. Observations collected on existing organisms can apply to any organism.

Planarians are freshwater organisms that can regenerate. Sonia had three petri dishes of planarians. In the same room, the first petri dish was inside a cabinet, the second petri dish was sitting on her desk, and the third petri dish was partially covered by a book. After one hour, she noted the distribution of the planarians in each petri dish. Which was the independent variable in her experiment?

Name: \_\_\_\_\_ Period: \_\_\_\_\_ #ownthestruggle

- ☒ A. Color
- ☐ B. Light
- ☐ C. Movement
- ☐ D. Temperature

The Outer Banks of North Carolina are composed of a string of long, thin islands off the coast. Ocean currents change the shape of the islands by causing erosion of the shorelines. Which of the following would be the **most** effective method to reduce erosion of the shorelines of the islands?

- ☒ A. Preventing tourists from visiting
- ☐ B. Planting native grasses on beaches
- ☐ C. Building more houses on the islands
- ☐ D. Removing native animals from the islands

Engineers are designing a five-story parking garage in an area where seismic activity has been detected. They are planning to do tests to make sure the parking garage can withstand an earthquake. Which would be the **most effective** procedure for these tests?

- ☒ A. Apply simulated earthquake forces to a scale model of the garage.
- ☐ B. Apply simulated earthquake forces during construction of the garage.
- ☐ C. Apply simulated earthquake forces to the entire garage once it has been built.
- ☐ D. Apply simulated earthquake forces that were used on other garages built in the same area.

Which of the following is a mineral that is mined as a fuel source?

- ☒ A. Uranium
- ☐ B. Coltan
- ☐ C. Tantalum
- ☐ D. Salt

Some thunderstorms are caused by convection resulting from the collision of two air masses. Which describes the collision involved in this type of thunderstorm?

- ☐ A. Two cold fronts collide.
- ☐ B. Two warm fronts collide.
- ☒ C. A cold front moves into an area with warm air.
- ☐ D. A warm front moves into an area with cold air.

On flat open farmland, farmers often plant a row of trees as a method of soil conservation. Which statement **best** explains how a row of trees can help conserve soil?

- ☐ A. The trees provide shade, so the soil does not dry out.
- ☐ B. The tree branches protect the soil from the force of acid rain.
- ☒ C. The trees act as a windbreak, reducing soil erosion caused by blowing wind.
- ☐ D. The trees attract animals whose wastes add fertilizer to help prevent soil erosion.

Each year, approximately 5,000 metric tons of mercury compounds are released into the environment either naturally or from human activities. Once mercury enters the water systems, bacteria convert it into an organic form called methyl mercury, introducing it into the food web. Which of the following will happen to the methyl mercury released into the environment? (B.13)

- ☐ A. It will be evenly distributed throughout the food web.
- ☐ B. It will be retained only in filter feeders of the aquatic system.
- ☐ C. It will be retained mostly by the producers and herbivores.
- ☒ D. It will have the highest concentration in the large secondary consumers.

Name: \_\_\_\_\_ Period: \_\_\_\_\_ #ownthestruggle

In what category of waste do paint, household cleaners, medical waste, and solvents belong?

- ☒ A. Hazardous
- B. Compost
- C. Municipal solid
- D. Industrial

An experiment was conducted in a lab to determine the effects of dioxin, a toxic chemical that causes damage to living organisms. A different concentration of dioxin was added to each of ten tanks that contained identical samples of aquatic plants in water. After a month, observations were recorded, the plants were discarded, and the solution from each tank was poured down the laboratory sink. What is the **best** way to improve this experiment in order to minimize the effects of dioxin on the environment?

- A. Use animals rather than plants
- B. Use a single concentration of dioxin
- ☒ C. Review the results with another scientist
- ☒ D. Discard the materials at a hazardous-waste site

The fact that fossil fuels formed at the bottom of swamps implies that

- A. Most of Earth's surface was once covered by swamps.
- B. There was little or no oxygen in that environment.
- ☒ C. Living things once lived in all parts of Earth.
- ☒ D. Swamps are under large amounts of pressure.

Although acid drainage can be a natural process, it speeds up when an area is strip-mined because strip mining

- ☒ A. Exposes large areas of rock surface that contain sulfide minerals.
- B. Removes large amounts of rock.
- C. Releases large amounts of coal dust, which forms acid drainage.
- D. Exposes underground water, which combines with minerals to form acid.

In an attempt to improve environmental quality, local officials in a county in New York State want to build a garbage-to-steam plant. At the plant, garbage would be burned to produce energy, but air pollution would also be produced. In order to decide whether or not to build this plant, the community must consider

- ☒ A. The trade-offs involved
- B. New genetic technology
- C. The natural process of succession
- D. Energy flow between organisms

Some farmers currently grow genetically engineered crops. An argument *against* the use of this technology is that

- A. It increases crop production
- ☒ B. It produces insect-resistant plants
- ☒ C. Its long-term effects on humans are still being investigated
- D. It always results in crops that do not taste good

Name: \_\_\_\_\_ Period: \_\_\_\_\_ #ownthestruggle

1. An ecosystem is represented below. This ecosystem will be self-sustaining if



- A. the organisms labeled A outnumber the organisms labeled B
- B. the organisms labeled A are equal in number to the organisms labeled B
- C. the type of organisms represented by B are eliminated
- ☒ D. materials cycle between the organisms labeled A and the organisms labeled B

2. According to Darwin's theory of evolution, differences between species may be the result of

- A. the disuse of body structures
- ☒ B. the transmission of acquired characteristics
- ☒ C. natural selection
- D. mutagenic agents

3. Which concept was not included in Charles Darwin's theory of natural selection?

- A. survival of the fittest
- B. struggle for existence
- C. overproduction of offspring
- ☒ D. punctuated equilibrium

4. Mutations can be considered as one of the raw materials of evolution because they

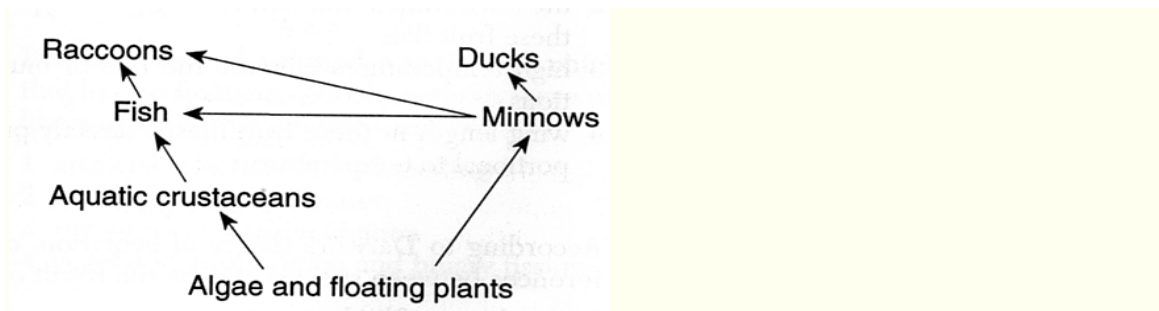
- ☒ A. contribute to new variations in organisms
- B. are usually related to the environment in which they appear
- C. are usually beneficial to the organism in which they appear
- D. usually cause species of organisms to become extinct

All of Earth's water, land, and atmosphere within which life exists is known as

- 1. a population
- 2. a community
- 3. a biome
- ☒ 4. the biosphere

Name: \_\_\_\_\_ Period: \_\_\_\_\_ #ownthestruggle

Which statement best describes some organisms in the food web shown below?



1. Minnows and fish are primary consumers.
2. Algae and floating plants are decomposers.
3. Aquatic crustaceans are omnivores.
4. Raccoons, fish, and ducks are secondary consumers.

Most autotrophs store energy in the form of

1. starches
2. carbon dioxide
3. water
4. nucleic acids

The timber wolves, rabbits, and vegetation in a particular region of northern New York together constitute part of a

1. population
2. community
3. genus
4. species

A rocky island appears as oceanic waters recede. Which of the following forms of vegetation would probably appear first on the bare rocks?

1. lichens
2. weeds
3. shrubs
4. pioneer trees

Name: \_\_\_\_\_ Period: \_\_\_\_\_ #ownthestruggle

After a building was torn down and the area was cleared, grasses began to grow in the area. Several years later, small bushes replaced the grasses. This pattern of plant growth is known as ecological \_\_\_\_\_

- (1) stability
- (2) cultivation
- (3) succession
- (4) coordination

9 Some farmers currently grow genetically engineered crops. An argument *against* the use of this technology is that

- (1) it increases crop production
- (2) it produces insect-resistant plants
- (3) its long-term effects on humans are still being investigated
- (4) it always results in crops that do not taste good

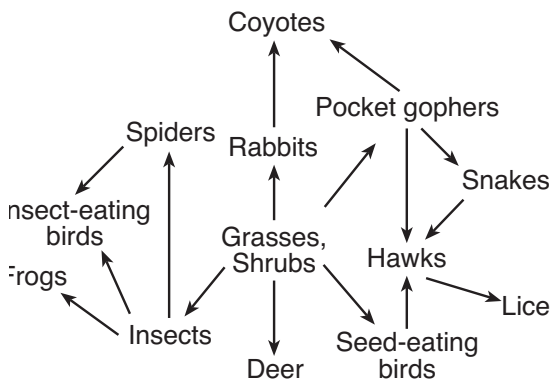
A human activity that could significantly *decrease* the amount of carbon dioxide in the air is

- (1) increasing the use of fossil fuel
- (2) controlling insect pests that eat stored grain
- (3) burning garbage and trash to generate electricity
- (4) preserving and expanding forest habitats that shelter wildlife

The wetland plant purple loosestrife was imported to North America from Europe. Since its introduction, the loosestrife has spread, which has resulted in a dramatic decline in the biological diversity of native wetland plants. A likely reason for the spread of the purple loosestrife is that it can

- (1) successfully compete with native herbivores for food
- (2) serve as an excellent food source for native herbivores
- (3) successfully compete with native plants for space
- (4) prevent the migration of native plants

The diagram below represents a food web.

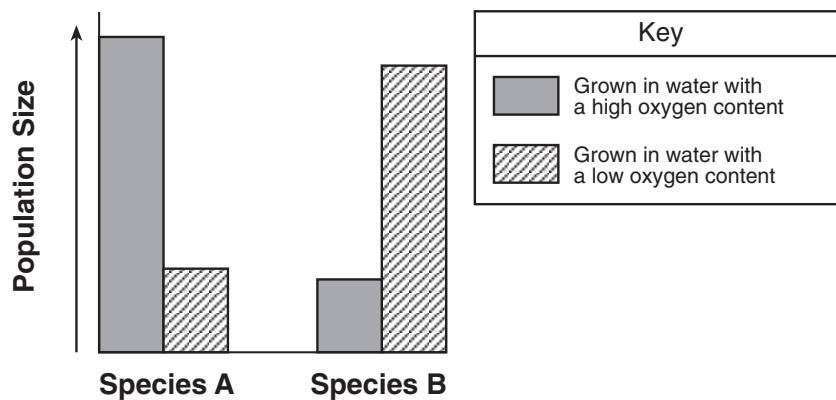


Which statement regarding organisms in this food web is correct?

- (1) There would be more snakes than pocket gophers.
- (2) There would be more coyotes than rabbits.
- (3) There would be more insects than insect-eating birds.
- (4) There would be more hawks than seed-eating birds.

Name: \_\_\_\_\_ Period: \_\_\_\_\_ #ownthestruggle

A graph of the population growth of two different species is shown below.



Which conclusion can be drawn from information in the graph?

- (1) Oxygen concentration affects population sizes of different species in the same manner.
- (2) Species A requires a high oxygen concentration for maximum population growth.
- (3) Species B requires a high oxygen concentration to stimulate population growth.
- (4) Low oxygen concentration does not limit the population size of either species observed.

The carrying capacity for herbivores in a habitat is most directly affected by the availability of

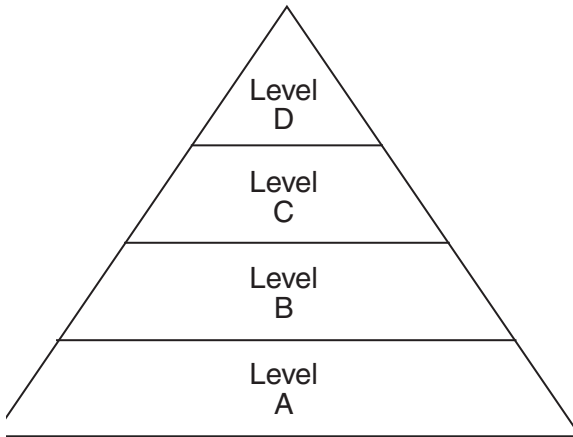
- (1) heat energy released by carnivores
- (2) carbon dioxide in the atmosphere
- (3) photosynthetic organisms
- (4) decomposers in the soil

The increasing demands for fossil fuels has led government and businesses to consider several possibilities to solve the energy crisis. Which solution will reduce the impact of this crisis on the environment and future generations?

- (1) increase the number of drilling sites for crude oil in North America
- (2) build more power plants away from population centers
- (3) limit the number of people in each vehicle
- (4) develop alternative fuel sources that can be produced from renewable resources

Name: \_\_\_\_\_ Period: \_\_\_\_\_ #ownthestruggle

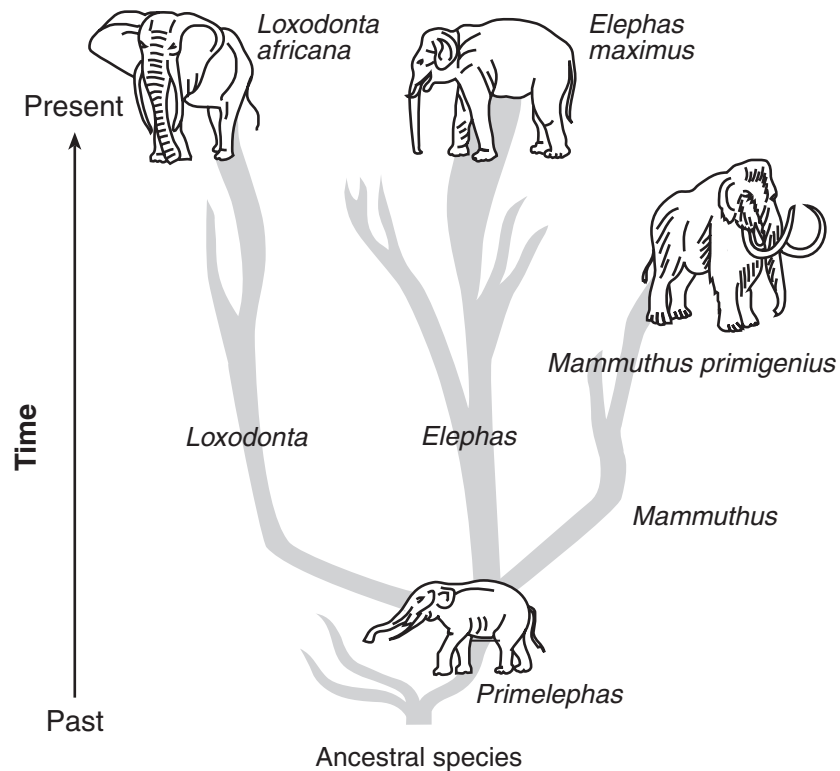
An energy pyramid is represented below.



The energy for use by organisms in level A originally comes from

- (1) producers
- (2) the Sun
- (3) level B
- (4) level D

One possible pathway for the evolution of elephants is represented in the diagram below.



Which statement concerning this pattern of evolution is correct?

- (1) Evolution always results in favorable traits.
- (2) Evolution does not always result in a species that will survive to present time.
- (3) Evolution leads to less complex organisms.
- (4) Evolution results in the same changes in all species.



Name: \_\_\_\_\_ Period: \_\_\_\_\_ #ownthestruggle

Which compounds present in insects are composed of the amino acids that provide the Venus flytrap and sundew with much of their nitrogen?

- (1) proteins
  - (2) sugars
  - (3) carbohydrates
  - (4) fats
- 

Base your answers to questions 32 and 33 on the statement below and on your knowledge of biology.

Scientists have found a gene in the DNA of a certain plant that could be the key to increasing the amount of lycopene, a cancer-fighting substance, in tomatoes.

32 The process of inserting this gene into the DNA of a tomato plant is known as

- (1) selective breeding
- (2) genetic engineering
- (3) cloning
- (4) replication

2 Which row in the chart below best describes decomposers?

| Row | Method of Nutrition | Recycles  |
|-----|---------------------|-----------|
| (1) | autotrophic         | nutrients |
| (2) | heterotrophic       | nutrients |
| (3) | autotrophic         | energy    |
| (4) | heterotrophic       | energy    |

Certain antibacterial soaps kill 99% of the bacteria present on hands. Constant use of these soaps could be harmful over time because

- (1) more pathogens may be resistant to the soap
- (2) microbes prevent viral diseases
- (3) large populations of pathogens are beneficial to the hands
- (4) the soap stimulates skin cell division

Name: \_\_\_\_\_ Period: \_\_\_\_\_ #ownthestruggle  
A photograph of a polar bear in its environment is shown below.

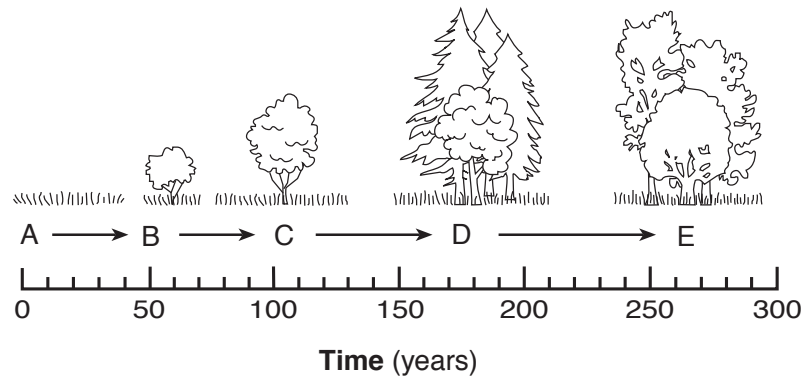


Source: [http://www.bbc.co.uk/schools/gcsebitesize/science/ocr\\_gateway/environment/3\\_adapt\\_to\\_fit1.shtml](http://www.bbc.co.uk/schools/gcsebitesize/science/ocr_gateway/environment/3_adapt_to_fit1.shtml)

One possible reason why polar bears might not be able to survive if the environment they live in changes is because

- (1) the species will experience decreased competition for mates
- (2) the new environment will cause greater variation in the species
- (3) there will be a larger variety of food sources available
- (4) they are adapted to the specific environment in which they now live

An ecological process is represented below.



Which statement describes an event in this process?

- (1) Community B modifies the environment, making it suitable for community C.
- (2) Community D modifies the environment, making it suitable for community C.
- (3) Community E will develop into community A, if the environment remains stable.
- (4) Community A organisms will develop directly into community D organisms.

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

People living in and around the Amazon rain forest have used parts of the gaviola tree to prepare medicines. Research is being conducted to determine if this tree can provide cures for many types of cancer. Continued destruction of rain forests might

- (1) reduce biodiversity and remove organisms with the potential to help humans
- (2) increase biodiversity and remove damaged and diseased trees
- (3) reduce biodiversity and increase the reproductive rates of all organisms
- (4) increase biodiversity and ecosystem stability where humans plant crops

A fundamental concept of ecology is that living organisms

- (1) are independent and do not interact with each other or with the physical environment
- (2) do not interact with other living organisms, but do interact with the physical environment
- (3) interact with each other, but do not interact with the physical environment
- (4) interact with other living organisms and interact with the physical environment

Many families now use compost to make the soil in their gardens more fertile. They collect vegetable scraps and yard trimmings, place them in a compost pile or special container, and let them decompose. The organisms primarily responsible for decomposing the vegetable scraps and yard trimmings are

- (1) plant parasites
- (2) autotrophs
- (3) bacteria and fungi
- (4) scavengers and viruses

16 Which human activity would interfere most directly with the production of oxygen in the environment?

- (1) using fertilizer for agriculture
- (2) using nuclear fuels
- (3) accelerating deforestation
- (4) preserving wetlands

17 Tissues of oleander plants contain chemicals that are poisonous to many mammals. The production of these poisonous chemicals most likely benefits oleanders by preventing leaf loss caused by

- (1) lack of rain
- (2) scavengers
- (3) mineral absorption
- (4) herbivores

18 Sugar maples and white pines are two different tree species that often grow side by side in the Adirondack Mountains. Which statement concerning these trees is correct?

- (1) Since they are both trees, they can interbreed.
- (2) Since they are not closely related, they do not compete with one another.
- (3) Even though they are both trees, each plays a different role in the ecosystem
- (4) They utilize totally different abiotic resources.

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

21 Many families now use compost to make the soil in their gardens more fertile. They collect vegetable scraps and yard trimmings, place them in a compost pile or special container, and let them decompose. The organisms primarily responsible for decomposing the vegetable scraps and yard trimmings are

- (1) plant parasites
- (2) autotrophs
- (3) bacteria and fungi
- (4) scavengers and viruses

22 In 2003, the city of Rochester, New York, began killing weeds with steam. A machine heats water to 280°F then sprays it on the weeds with great pressure. The extreme heat destroys the cellular structure of the plants. What is a possible *disadvantage* of this method of weed control?

- (1) It can be used safely in areas where children play.
- (2) It reduces the number of mutations in the ecosystem.
- (3) It destroys weeds without chemicals.
- (4) It alters the habitats of some beneficial insects.

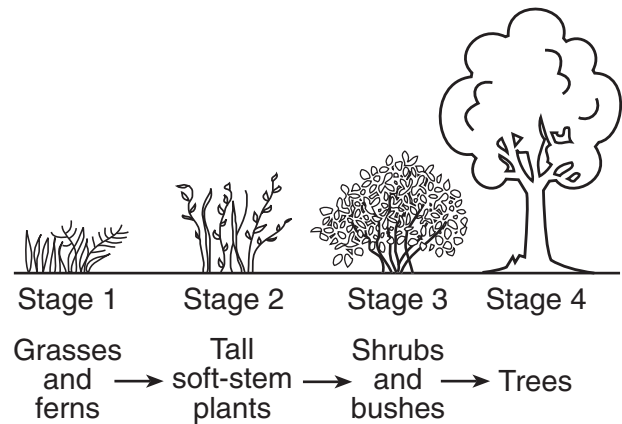
27 Rabbits introduced into Australia over one hundred years ago have become a serious pest. Rabbit populations have increased so much that they have displaced many native species of herbivores. Which statement best explains the reason for their increased numbers?

- (1) Rabbits have a high metabolic rate.
- (2) There are few native predators of rabbits.
- (3) Additional rabbit species have been introduced.
- (4) There is an increase in rabbit competitors.

28 Which human activity would preserve finite resources?

- (1) deforestation
- (2) removing carnivores from a forest
- (3) recycling aluminum
- (4) heating homes with fossil fuels

24 Changes in an ecosystem over a long period of time are shown in the diagram below.



These changes will most likely lead to a

- (1) stable ecosystem that can last for many years
- (2) loss of heterotrophs that cannot be recovered
- (3) long-term rise in environmental temperatures
- (4) forest consisting of only producers and decomposers

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

23 A food chain is represented below.

grass → rabbit → hawk

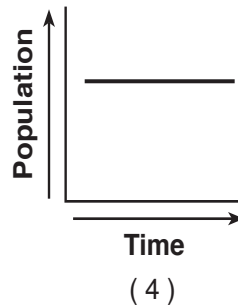
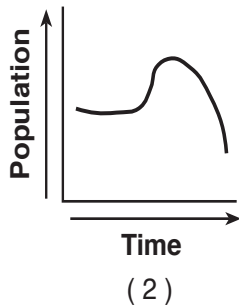
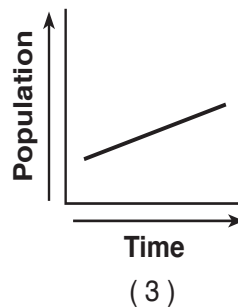
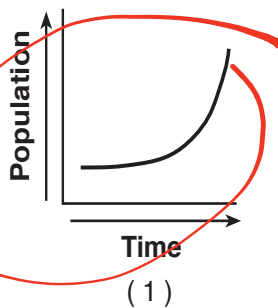
Structures within the rabbit are formed using

- (1) solar energy from the grass
- (2) heat energy lost to the environment
- (3) chemical energy from the hawk
- (4) chemical energy from the grass

24 The graduating class of a high school would like to give the school a gift that would have a positive impact on the environment. Which plan would be the best choice?

- (1) making wooden benches by harvesting trees from school property
- (2) planting native trees along the border of the school property
- (3) introducing a new population of foxes, the school mascot, to school grounds
- (4) clearing an area to make room for additional student parking

25 Which graph best illustrates the change in the human population over the past 2000 years?



28 In New York State, cars are inspected to be sure they are not releasing excessive amounts of several gases into the atmosphere. This is done in an effort to

- (1) recycle more nutrients
- (2) reduce biodiversity
- (3) reduce global warming
- (4) increase the growth rates of forests

29 Damage to the ozone shield over the United States is likely to cause

- (1) increased warming of local ecosystems
- (2) increased exposure to ultraviolet light
- (3) reduction in the pH of acid precipitation
- (4) reduction in the frequency of floods and droughts

29 Abandoned railroad tracks are overgrown with weeds. Ten years later there are small aspen trees growing in the middle of the tracks. This change is an example of

- (1) ecological succession
- (2) biological evolution
- (3) genetic variation
- (4) heterotrophic nutrition

30 Which action would be *least* likely to harm endangered species?

- (1) releasing more carbon dioxide into the atmosphere
- (2) reducing the human population
- (3) decreasing the amount of dissolved oxygen in the oceans
- (4) reducing the thickness of the ozone layer

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

*Directions (31–43): For each statement or question, record on the separate answer sheet the number of the word or expression that, of those given, best completes the statement or answers the question.*

Base your answers to questions 31 through 33 on the information below and on your knowledge of biology.

An experiment was carried out to answer the question “Does the pH of water affect the growth of radish plants?” Two groups of ten radish plants were set up. One group was watered with water having a pH of 3.0, and the other group was watered with water having a pH of 7.0. Both groups of plants received the same amount and intensity of light, the same amount of water, and they were grown in the same type of soil. The heights of the radish plants were measured every 2 days for a period of 2 weeks.

31 Which sentence is a possible hypothesis that was tested in this experiment?

- (1) Does the pH of water affect the growth of radish plants?
- (2) Will the amount of water alter the heights of the radish plants?
- (3) The temperature of the water will affect the heights of the radish plants.
- (4) The pH of the water will affect the heights of the radish plants.

32 What was the dependent variable in this experiment?

- (1) heights of the plants
- (2) pH of the water
- (3) temperature of the water
- (4) type of soil

33 Which activity might help to increase the validity of this experiment?

- (1) repeating the experiment several times
- (2) using two different types of radish seeds in each group
- (3) using the same pH for both groups of plants
- (4) placing one set of plants in sunlight and one in darkness

40 Potatoes were the main crop in Ireland in the 1800s. Almost the entire population of Ireland was dependent on a single variety of potato, the “lumper.” These potatoes were reproduced by a method of asexual reproduction known as vegetative propagation. In the middle of the 1800s, a disease caused by a fungus killed almost the entire lumper crop within two years. As a result, millions of people in Ireland died of starvation. The most likely reason the potato disease was able to destroy the potato crop in such a short time is that the

- (1) potato population lacked variations
- (2) lumper variety had a long reproductive cycle
- (3) lumper had several variations caused by vegetative propagation
- (4) potato population in Ireland utilized all of the finite resources

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

### Tracking the Big Horn

Bighorn sheep, *Ovis canadensis*, are a majestic symbol of the mountainous West. They browse at high altitudes and in steep, rocky areas from Texas to British Columbia. Rams' horns curl around their eyes and grow up to 45 inches long. Males butt horns to establish dominance during the fall rut [mating season]. Ewes [females] sport shorter, spiked horns similar to a mountain goat's. From their first days of life, bighorns are surefooted enough to scale cliffs too steep for most predators to follow....

Two centuries ago, an estimated 1.5 million to 2 million bighorn sheep lived in North America; today, a mere 28,000 remain. Diseases caught from domestic sheep, competition from livestock for forage, and trophy hunting for their horns caused populations to plummet [drop rapidly]. Bighorns graze in mountain meadows, habitat that is being lost to expanding forests, which are growing beyond their historic boundaries in part because the wildfires that are used to hold them in check have been suppressed. Glacier National Park, home to 400 to 600 bighorn sheep, lists the animals as a "species of concern," that is, at risk of becoming endangered....

Source: Becky Lomax, *Smithsonian Magazine*, March, 2008  
"Tracking the Big Horn"

**Note: The answers to questions 49 and 50 should be recorded on your separate answer sheet.**

49 The feeding activity of the bighorn sheep is best described as

- |                                      |  |
|--------------------------------------|--|
| (1) consumers feeding on autotrophs  | (3) autotrophs feeding on decomposers  |
| (2) decomposers feeding on consumers | (4) autotrophs feeding on heterotrophs |

50 Which statement best accounts for the decline in bighorn sheep populations?

- (1) Predators of the sheep decreased in number.
- (2) Sheep ewes that have shorter, spiked horns increased in number.
- (3) Human activities directly and indirectly affected the sheep.
- (4) The sheep were listed as a "species of concern" by Glacier National Park.

51 State *one* way that young bighorn sheep are able to avoid predators. [1]

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

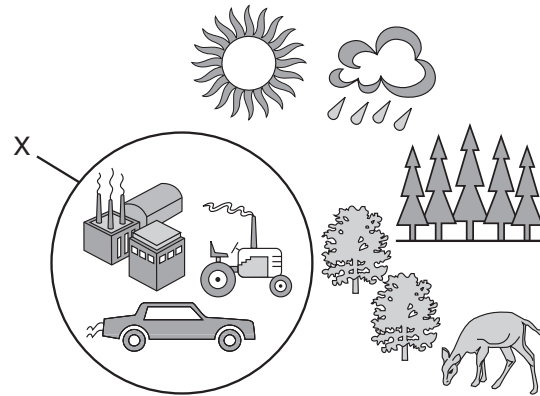
1 Fish absorb oxygen through the gills, earthworms absorb oxygen through the skin, amebas take in oxygen through the cell membranes, and cows inhale oxygen through the nasal passages into their lungs. This statement demonstrates that living things

- (1) rely on similar or the same processes, but accomplish them in different ways
- (2) rely on different processes and accomplish them in different ways
- (3) rely on different processes, but perform them in the same or related ways
- (4) have no relationship to one another, and are all independent individuals

2 In New York State, small farms that were abandoned many years ago have become hardwood forests. This is an example of

- (1) local deforestation
- (2) biotechnology
- (3) ecological succession
- (4) habitat loss

4 The diagram below represents factors that affect New York State ecosystems.



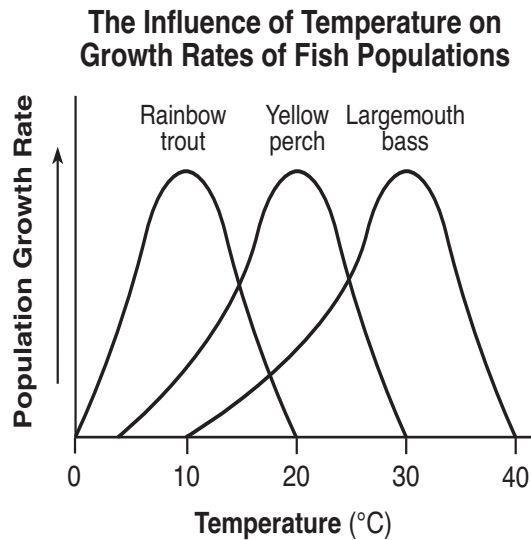
An increase in human activity at X would most likely result in

- (1) a decrease in rainfall in the area
- (2) a decrease in available carbon dioxide
- (3) an increase in air pollution in the area
- (4) an increase in the supply of fossil fuels



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

- 23 A study was done on three different fish species living in a pond in New York State. The influence of temperature on the growth rates of the fish populations is shown in the graph below.



In this pond where these fish live, temperature is a

- (1) limiting factor
- (2) hereditary factor
- (3) source of ATP
- (4) source of solar energy

- 5 Which type of organism helps to reduce atmospheric carbon dioxide?

- (1) carnivores
- (2) producers
- (3) decomposers
- (4) herbivores

- 3 Which statement best describes an ecosystem maintaining a state of approximate equilibrium?

- (1) Nutrients from decayed organisms are recycled in a forest ecosystem.
- (2) All the frog species in a South American rain forest become extinct.
- (3) A mutation spreads through a species of bacterium, making them unable to decompose wastes.
- (4) Mice are released into a field ecosystem as food for a declining predator population.

- 7 In some parts of the world, forests are being cut down and burned to clear land for new homes and new farmland. A *negative* effect of these activities might be

- (1) an increase in global warming
- (2) destruction of the ozone shield
- (3) a decrease in the average temperature of the atmosphere
- (4) an increase in biodiversity of the deforested areas

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

The photograph below shows two penguins of the same species displaying different feather color patterns.

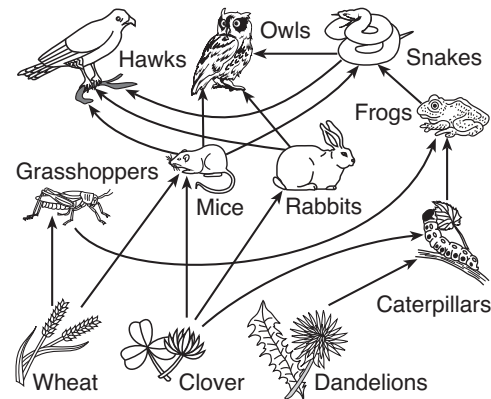


Source: [http://green.yahoo.com/blog/guest\\_bloggers/24/all-black-penguin-discovered.html](http://green.yahoo.com/blog/guest_bloggers/24/all-black-penguin-discovered.html)

The newly discovered all-black penguin had only black feathers since emerging from the egg. The sudden appearance of this characteristic was most likely due to

- (1) a change in environmental conditions
- (2) deposition of oil on the feathers due to pollution
- (3) a random change in the sequences of bases in DNA
- (4) a change in the diet of the penguin chick

Base your answers to questions 32 through 34 on the diagram below and on your knowledge of biology. The diagram represents a food web in an ecosystem.



32 If the population of hawks in this area increases, their prey populations might decrease. Later, with fewer prey, the hawk population might decrease. The prey populations might then increase. This is an example of

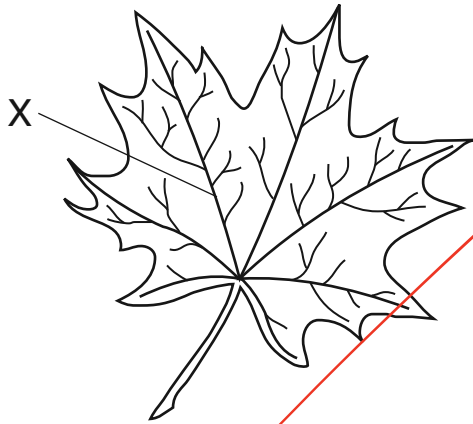
- (1) an ecosystem that is completely out of balance
- (2) how ecosystems maintain stability over time
- (3) interaction between biotic and abiotic factors within an ecosystem
- (4) ecological succession in an ecosystem

33 Missing from the diagram of this ecosystem are the

- (1) biotic factors and decomposers
- (2) abiotic factors and decomposers
- (3) autotrophs, only
- (4) heterotrophs, only

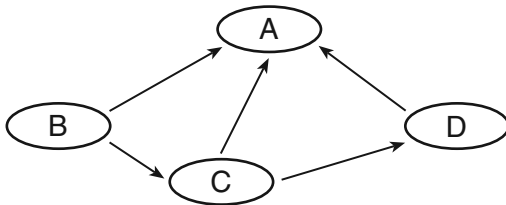
Name: \_\_\_\_\_ Period: \_\_\_\_\_

33 Which statement is a valid inference concerning structure X represented in the diagram below?



- (1) Structure X contains guard cells that regulate glucose intake.
- (2) Structure X carries out heterotrophic nutrition.
- (3) Structure X produces gametes for asexual reproduction.
- (4) Structure X transports materials for metabolic activities.

34 The diagram below represents a food web composed of producers, consumers, and decomposers.

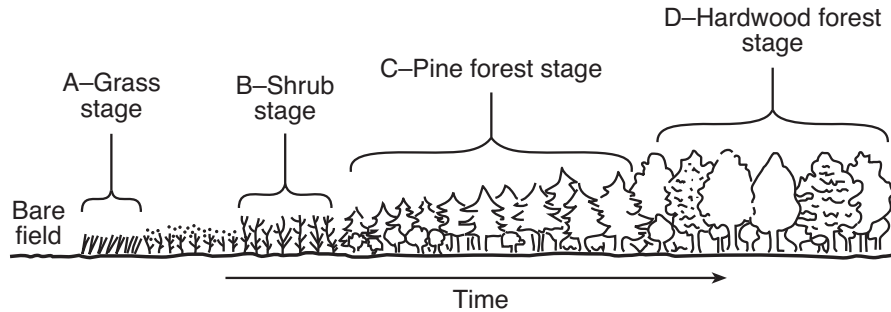


Which group would represent the decomposer organisms?

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

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

29 The diagram below represents different stages of an ecosystem over a period of time.

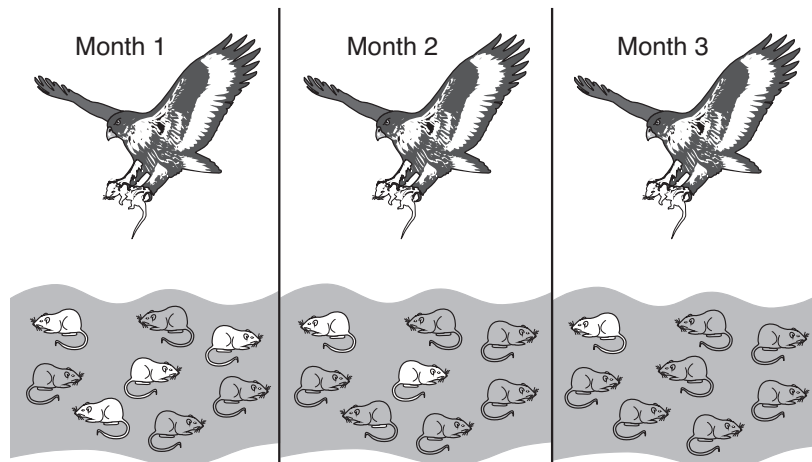


Which stage of the ecosystem has the greatest long-term stability?

- (1) A
- (2) B

- (3) C
- (4) D

30 The diagram below represents the same field of mice hunted by a hawk over a period of three months.



The overall changes in the population of mice can be explained best by

- (1) natural selection
- (2) succession

- (3) reproduction
- (4) mouse extinction

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

26 In order for an ecosystem to remain stable there must be

- (1) drastic modifications to the environment
- (2) interrelationships and interdependencies among organisms
- (3) limited biodiversity
- (4) gradual changes in the climate

27 Some data suggest that the average global temperature will increase by  $1^{\circ}\text{C}$ – $2^{\circ}\text{C}$  by the year 2050. If this occurs, a major concern for humans would most likely be that

- (1) sea levels might rise enough to flood some coastal areas
- (2) long-term stability of the climate will benefit ecosystems
- (3) the availability of salt water for agricultural use will increase
- (4) the threat of extinction of land organisms will decrease

28 A wetland provides a variety of services for an ecosystem, such as filtering pollutants from the water, allowing animals to lay eggs and reproduce, and producing fertile soils for plants. When humans build houses on wetland areas, they always

- (1) change this area so these processes can still take place
- (2) create new habitats for the wetland species
- (3) transport the wetland species to a new area
- (4) make changes that might not be reversible

29 Which occurrence most likely led to the other three?

- (1) Human population growth reached 6.8 billion in 2010 and it continues to increase.
- (2) The number of African elephants has declined from 1.2 million in 1979 to about 20,000 today.
- (3) Approximately 6,500 gallons of oil were spilled into a river in Illinois after a pipeline broke.
- (4) At one time, rain forests covered 14 percent of Earth and today they cover only 6 percent.

30 A community is trying to decide on the location for a new shopping center. Two possible locations have been proposed, with each location having some benefits and some problems. The proper approach to deciding the best location would be to

- (1) select the site that could hold the most stores
- (2) select the site that would be the least expensive to develop
- (3) compare the problems, but not the benefits
- (4) compare the trade-offs of building at either location

## OPEN ENDED

Growers of fruit trees have always had problems with insects. Insects can cause visible damage to fruits, making them less appealing to consumers. As a result of this damage, much of the fruit cannot be sold. Insecticides have been useful for controlling these insects, but, in recent years, some insecticides have been much less effective. In some cases, insecticides do nothing to stop the insect attacks. Provide a biological explanation for this loss of effectiveness of the insecticides. In your answer, be sure to: (B.13)

A. Identify the original event that resulted in the evolution of insecticide resistance in some insects

B. Explain why the percentage of resistant insects in the population has increased

C. Describe *one* alternative form of insect control, other than using a different insecticide that fruit growers could use to protect their crops from insect attack.

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

Base your answers to questions 44 through 48 on the data table below, which shows the estimated population of wolves in Minnesota from 1995 through 2002.

**Minnesota Wolf Population**

| Year | Estimated Population |
|------|----------------------|
| 1995 | 2000                 |
| 1996 | 2200                 |
| 1997 | 2300                 |
| 1998 | 2450                 |
| 1999 | 2500                 |
| 2000 | 2600                 |
| 2001 | 2600                 |
| 2002 | 2600                 |

*Directions* (44–46): Using the information in the data table, construct a line graph on the grid, following the directions below.

44 Label the  $y$ -axis on the line provided. [1]

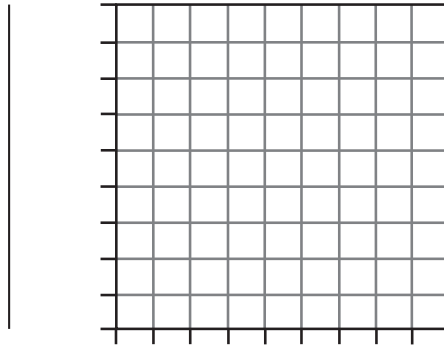
45 Mark an appropriate scale, without any breaks, on each labeled axis. [1]

46 Plot the data on the grid. Surround each point with a small circle and connect the points. [1]

Example: 

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

**Minnesota Wolf Population**



**Year**

**Note: The answer to question 47 should be recorded on your separate answer sheet.**

47 The most likely explanation for the size of the wolf population for the 2000–2002 period is that the population

- |  |  |
|--|--|
| (1) reached the carrying capacity of the environment | (3) began reproducing at a faster rate |
| (2) stabilized due to global warming                 | (4) was affected by a new pathogen     |

48 Wolves prey on animals such as deer. Identify *one* adaptation of deer that would help them to survive in an area populated by wolves. [1]

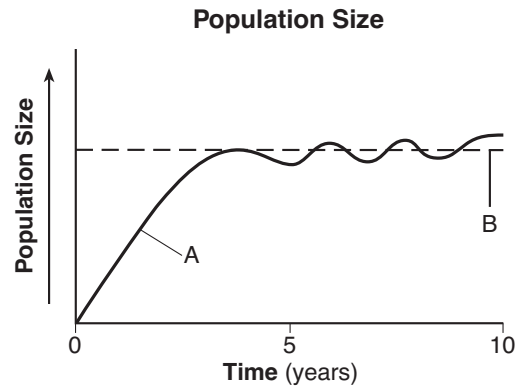
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Name: \_\_\_\_\_ Period: \_\_\_\_\_

Base your answers to questions 48 and 49 on the graph below and on your knowledge of biology. The graph shows the size of a population over time.



48 State *one* reason for the changes in population size represented by line A between years 5 and 10. [1]

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**Note: The answer to question 49 should be recorded on your separate answer sheet.**

49 Which term best identifies line B in the graph?

- (1) niche of the species in the environment
- (2) biodiversity in the environment
- (3) carrying capacity of the environment
- (4) number of populations in the environment



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

*Directions (56–72):* Record your answers in the spaces provided in this examination booklet.

- 56 When insects are accidentally transported from one country to a new habitat in another country, the population of these insects often increases rapidly. State *one* environmental factor in the new habitat that would account for this increase in the population. [1]

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Base your answer to question 57–60 on the information below and on your knowledge of biology.

The year 2010 was declared the International Year of Biodiversity. However, significant loss of biodiversity is still occurring. Researchers around the world are working on a variety of ways to protect natural resources. According to an article in *Science News*, March 13, 2010, “reversing the downward spiral of biodiversity will take more than protecting wild places, but that’s where scientists are starting.”

- 57–60 Explain the importance of biodiversity to an ecosystem. In your answer, be sure to:
- state *one* effect of a loss of biodiversity in an ecosystem [1]
  - identify a source of variation within a species that leads to biodiversity [1]
  - identify *one* specific ecosystem that has shown a decrease in biodiversity and state *one* cause of the decrease in biodiversity in the ecosystem you identified [1]
  - identify *one* human activity, other than setting up protected wildlife areas, that has helped to preserve biodiversity [1]

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

### **Invasion of the Giant Rodents**

Large, 20-pound rodents [nutria] that were originally from South America are spreading northward from the southern United States.

The nutria were brought in and raised in the southern United States for their fur. Nutria escaped and started a wild population.

They have since moved up the east coast, damaging plant life in Delaware and Maryland. Currently, they have reached New Jersey. These rodents are damaging New Jersey's marshland ecosystems.

A nutria can eat up to 5 pounds of marshland plants a day. This loss of plant life is harming the marshland ecosystems.

- 61 A wildlife manager in New Jersey wants to use poisons to destroy the nutria. State *one* problem that might result from this action. [1]

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- 62 State *one* reason why the removal of plant life by the nutria can harm marshland ecosystems. [1]

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