

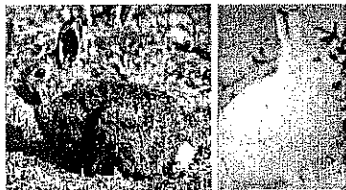
IV. Practice Questions

Section 1.1

Biomes and ecosystems are divisions of the biosphere: Biomes

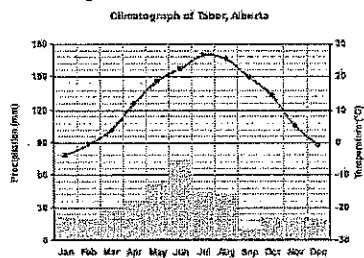
Circle the letter of the best answer.

- Which biome is not found in Canada?
 - boreal forest
 - temperate deciduous forest
 - temperate rainforest
 - tropical rainforest
- Students made lists of the biotic and abiotic components of their neighbourhood. Which of the following lists describes only abiotic components of their neighbourhood?
 - fungi, flower, water
 - temperature, latitude, soil
 - sunlight, moisture, bacteria
 - grass, precipitation, latitude
- Snowshoe hares of the boreal forest have fur that changes from summer brown to winter white to camouflage them from predators. What kind of adaptation is this an example of?



- chemical adaptation
- structural adaptation
- behavioural adaptation
- physiological adaptation

Use the following climatograph of Taber, Alberta, to answer question 4.



- In which biome is Taber, Alberta, located?
 - temperate deciduous forest
 - boreal forest
 - grassland
 - desert
- Which feature below is not a biotic component of a boreal forest biome?
 - mammals with thick, insulating coats
 - many marshes, shallow lakes, and wetlands
 - coniferous trees with waxy needles to resist water loss
 - small mammals that burrow in the ground to stay warm
- Which combination of abiotic factors best explains why the regions along the equator receive the greatest amount of precipitation?
 - sunlight and latitude
 - sunlight and elevation
 - latitude and ocean currents
 - ocean currents and elevation

IV. Practice Questions

Section 1.2

Biomes and ecosystems are divisions of the biosphere: Ecosystems

Circle the letter of the best answer.

- What is the best reason to explain why fewer plants can grow in deep water than can grow in shallow water in a marine ecosystem?
 - There are more predators in deep water.
 - The temperature of the water is colder at deep levels.
 - Water pollution is more concentrated at deep levels than at shallow water levels.
 - The amount of light available for photosynthesis is less in deep water than in shallow water.
- What is the largest division of the biosphere?
 - biome
 - habitat
 - ecosystem
 - population
- Barnacles attach to whales and are transported to new locations in the ocean to find new food sources. Whales are not harmed in this process. What type of symbiotic relationship is this an example of?
 - parasitism
 - mutualism
 - interaction
 - commensalism
- What is the correct order of the ecological hierarchy, from smallest to largest?
 - ecosystem, population, community, organism
 - organism, community, population, ecosystem
 - organism, population, community, ecosystem
 - population, ecosystem, organism, community
- Which of the following statements about mutualism is false?
 - Mutualism is a symbiotic relationship in which both organisms benefit.
 - In some mutualistic relationships, two species are unable to survive without each other.
 - In one type of mutualism, one species defends another species against attacks in return for food and shelter.
 - One species protects another species from predators by camouflage. The host species is not harmed in the relationship.
- Use this graph of the population of moose and wolf to answer the question below.

Moose and Wolf Populations on Isle Royale

Isle Royale in Lake Superior has been designated an International Biosphere Reserve. The wolves of Isle Royale have no natural predators and primarily hunt and eat moose. In what years did the prey population increase likely due to a decline in the predator population?

 - 1963–1966
 - 1985–1988
 - 1978–1981
 - 2003–2006

IV. Practice Questions

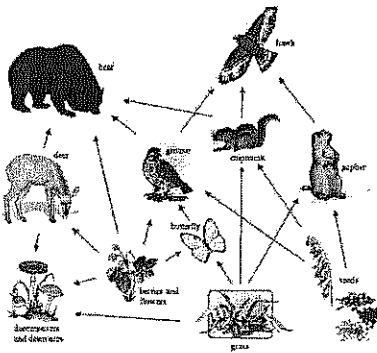
Section 2.1

Energy flow and nutrient cycles support life in ecosystems: Energy Flow in Ecosystems

Circle the letter of the best answer.

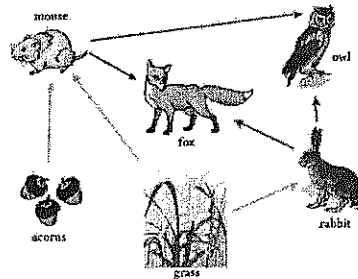
- Which of the following statements about biomass is true?
 - Food webs are used to show the available biomass in an ecosystem.
 - Biomass is usually expressed in units of metres per gram or kilogram.
 - Biomass is the total mass of living plants, animals, fungi, and bacteria in a particular area.
 - The biomass of animals on Earth is over 100 times greater than the biomass of plants.
- A field of wheat is an example of which member of a food chain?
 - decomposer
 - biodegrader
 - consumer
 - producer

Use this picture of a food web to answer question 3.



- Which is the best description for the role of the grizzly bear in this food web?
 - detrivore
 - omnivore
 - carnivore
 - herbivore

Use this picture of a food web to answer questions 4 and 5.



- Which organisms in this food web are the primary consumers?
 - owl and fox
 - rabbit and fox
 - acorns and grass
 - rabbit and mouse
- At which trophic level is the fox in this food web?
 - first
 - second
 - third
 - fourth

How Nitrogen Is Returned to the Atmosphere and Removed from Ecosystems

- Denitrification** is the process through which nitrogen is returned to the atmosphere.
- In a series of chemical reactions, denitrifying bacteria convert nitrate (NO_3^-) back into nitrogen gas (N_2).
- N_2 is also returned to the atmosphere through volcanic eruptions.
- Excess nitrogen dissolves in water, enters the waterways, and washes into lakes and oceans.
- Nitrogen compounds eventually become trapped in sedimentary rocks and are not released until the rocks weather.

Human Activities and the Nitrogen Cycle

- Human activities have doubled the amount of available nitrogen in the biosphere in the last 50 years. This increase has been due to the following:
 - Burning fossil fuels and treating sewage releases nitrogen oxide (NO) and nitrogen dioxide (NO_2).
 - Burning also releases nitrogen compounds that increase acid precipitation in the form of nitric acid (HNO_3).
 - Acid precipitation has a lower pH (higher acidity) than precipitation that does not contain pollutants.
 - pH is a measure of how acidic or basic a solution is.
 - Acid precipitation has negative effects on forests, soils, and freshwater and the organisms living in those ecosystems.
 - Agricultural practices often use large amounts of nitrogen-containing fertilizers.
- Excess nitrogen is washed away or leaches into the waterways.
 - Excess nitrogen promotes huge growth called "blooms" in aquatic algae.
 - Algal blooms use up CO_2 and O_2 and block sunlight, killing many aquatic organisms.
 - Algal blooms can also produce neurotoxins that poison animals.

Quick Check

- How is the process of denitrification different from nitrogen fixation and nitrification? _____
- List three human activities that increase the amount of available nitrogen in the biosphere. _____
- Excess nitrogen in the ecosystem increases the amount of algal blooms. List two negative effects of algal blooms. _____

Quick Check

Use this table to answer questions 1 and 2.

TABLE 2.2 Bioaccumulation of DDT in a Food Chain

Consumer	Bioaccumulation (ppm)
Plankton	0.04
Minnow	0.94
Adult fish	2.07
Heron	3.57
Osprey	13.80
Cormorant	26.40

1. Approximately how many times more concentrated is DDT in herons than it is in minnows?
2. Explain why the concentration of the pesticide DDT is less in plankton than in cormorants.

Heavy Metals: Lead, Cadmium, and Mercury

1. Heavy metals are metals such as lead, cadmium, and mercury, which have no known vital or beneficial effect on organisms, and their accumulation over time in the bodies of mammals can cause serious illness.
2. Lead is not considered safe at any level.
 - Many electronics contain lead and must be recycled carefully.
 - Lead can cause anemia (a blood condition) and nervous and reproductive system damage.
 - Lead is harmful if it is absorbed through the skin, inhaled, or ingested (eaten).
3. Cadmium is used in the manufacture of plastics and nickel-cadmium batteries.
 - Cadmium is toxic to earthworms and causes many health problems in fish.
 - In humans, the main source of cadmium is exposure to cigarette smoke.
 - Cadmium causes lung diseases, cancer, and nervous and immune system damage.
4. Mercury has entered ecosystems through the burning of fossil fuels, waste incineration, mining, and the manufacture of items like batteries.
 - Coal burning adds 40 percent of the mercury released into the atmosphere.
 - Mercury bioaccumulates in the brain, heart, and kidneys of many animals.
 - Fish bioaccumulate methylmercury compounds, adding risk for any organisms that eat the fish, including humans.

Reducing the Effects of Chemical Pollution

1. If chemicals are trapped in the soil, they cannot enter the food chains as easily.
2. Bioremediation is the use of micro-organisms or plants to help clean up chemical pollution.
Example: The oil industry sometimes uses bacteria to "eat" oil spills.

IV. Practice Questions

Section 3.1

Ecosystems continually change over time: How Changes Occur Naturally in Ecosystems

Circle the letter of the best answer.

1. Marsupials are mammals that have a pouch in which females raise their young through early infancy. Many marsupials, such as kangaroos and koala bears, live in Australia, where it is believed that they all evolved from a common ancestor. Each species occupies its own ecological niche within Australia. This an example of which type of process?
 - A. artificial selection
 - B. adaptive radiation
 - C. primary succession
 - D. ecological succession
2. Which of the following statements about natural selection is not true?
 - A. The finches of the Galapagos Islands are an example of natural selection.
 - B. The development of antibiotic-resistant bacteria is an example of natural selection.
 - C. Natural selection occurs when an organism tries to change and adapt to new surroundings.
 - D. In natural selection, members of a species who have a favourable trait will be more likely to reproduce.
3. What do the following events have in common?
 - flooding
 - tsunami
 - drought
 - insect infestation
 - A. They occur only in coastal areas.
 - B. They result in primary succession.
 - C. They affect biotic and abiotic factors of mature communities.
 - D. They have all increased in frequency because of climate change.
4. Which of the following statements regarding pioneer species is not true?
 - A. Galapagos finches are an example of a pioneer species.
 - B. Pioneer species change the biotic and abiotic environment in a variety of ways.
 - C. Pioneer species are the first organisms that survive and reproduce in an area.
 - D. Lichens that grow on rock in areas where glaciers have retreated are an example of a pioneer species.
5. An example of natural selection is the increase in the population of dark-coloured moths during the Industrial Revolution in England. During this time, large amounts of ash and soot released into the atmosphere blackened the trees and vegetation near industrial areas, which was the habitat of the moth. Before the Industrial Revolution altered the environment, the light-coloured moth population was much higher than the dark-coloured moth population. Which of the following reasons best explains the increase in the dark-coloured moth population?
 - A. The colour of the moths alternates every few years between light and dark.
 - B. The dark-coloured moths were better able to avoid predators through camouflage against the dark-coloured trees.
 - C. The dark-coloured moths were the moths that were more exposed to pollution, which changed their pigmentation.
 - D. The light-coloured moths were more susceptible to the environmental impact of the ash and soot in their environment.

IV. Practice Questions

Section 3.2

Ecosystems continually change over time: How Humans Influence Ecosystems

Circle the letter of the best answer.

Use the following information to answer questions 1 and 2.

A large moss-covered rock provides a habitat for a community of organisms. Algae, bacteria, fungi, and insects live on the rock. In an experiment, researchers scraped most of the moss off of the rock. They left one large patch of moss in one region of the rock. They also left six much smaller patches close together in another region of the rock. They repeated the same procedure on six different rocks. After six months, the patches were analyzed and researchers counted the number of distinct species living in each region.

- What do the two regions represent in the experiment?
 - Larger patch: control
Six smaller patches: habitat loss
 - Larger patch: control
Six smaller patches: habitat fragmentation
 - Larger patch: habitat fragmentation
Six smaller patches: control
 - Larger patch: habitat loss
Six smaller patches: control
- Across all six rocks, an average of 40 percent of the species became extinct in the smaller patches. What could the researchers conclude from this experiment?
 - This experiment shows how to create a sustainable ecosystem.
 - Habitat loss does not affect the biodiversity of the rock ecosystem.
 - Many of the species living on the rock were affected by habitat fragmentation.
 - The species were able to move among the smaller patches to obtain the nutrients they needed.

3. Which of the following is not a characteristic of a sustainable ecosystem?

- biodiversity
- no resource use
- responsible land use
- ability to sustain ecological process

4. Which of the following is an example of a sustainable land use approach in British Columbia?

- grassland management plans
- urban expansion into farmlands
- cutting large areas of forest
- draining and drying out wetlands

5. Which of the following statements about deforestation are true?

I	Deforestation is a problem only in tropical rainforests.
II	Deforestation reduces the number of plants and animals living in an ecosystem.
III	Deforestation can cause soil erosion.

- I and II only
- I, II, and III
- II only
- II and III only

6. Which of the following statements about land use is not true?

- Bare fields can cause topsoil erosion.
- The use of tractors can cause soil compaction.
- Mine reclamation can cause water contamination.
- Road construction can cause habitat fragmentation.

IV. Practice Questions

Section 3.3

Ecosystems continually change over time: How Introduced Species Affect Ecosystems

Circle the letter of the best answer.

1. Which of the following characteristics accurately describe most invasive species?

I	aggressive competitors
II	low reproduction rates
III	lack natural predators in new habitats
IV	contribute to biodiversity loss

- I and II only
- I, II, III, and IV
- I, III, and IV only
- III and IV only

2. An invasive predator species is introduced into a new environment. The predator is quickly able to find suitable prey. In a short period of time, the prey population has been dramatically reduced by the new predator. Which of the following best explains how the predator was able to do this?

- The prey population began to occupy a new niche.
- The prey population had a high reproduction rate.
- The invasive predator became a parasite on the prey species.
- The prey population probably did not have adaptations to escape or fight the new predator.

3. What type of impact has the European starling had on native birds in British Columbia?

- predation
- competition
- habitat alteration
- disease and parasites

4. Which of the following species have these three characteristics in common?

- invasive species
- outcompete native species
- found in British Columbia

- gypsy moth and grey squirrels
- grey squirrels and American bullfrog
- gypsy moth and American bullfrog
- grey squirrels and red squirrels

5. Which of the following statements accurately describes introduced species?

- They naturally inhabit the new environment.
- Native species is another name for introduced species.
- Many are harmless or beneficial in their new environment.
- They are always intentionally introduced into a new environment.

6. Which of the following are reasons why there has been an increase in invasive introduced species?

I	creation of new niches in ecosystems
II	increased international air travel
III	increase in biodiversity of ecosystems
IV	climate change

- I, II, and III only
- II and IV only
- III and IV only
- I, II, III, and IV