

# Science 10

## PROVINCIAL EXAM STUDY BOOKLET

### Unit 1

### Ecology

#### Student Instructions

1. Ensure that you have **blank paper** and a **Data Booklet**.
2. Record all answers on a separate piece of paper.
3. Answer keys are provided by your teacher.
4. When you have finished with this **Study Booklet** please return it to your teacher.

Make **NO MARKS** on this study booklet!

Use the following diagram of Africa to answer the next question.



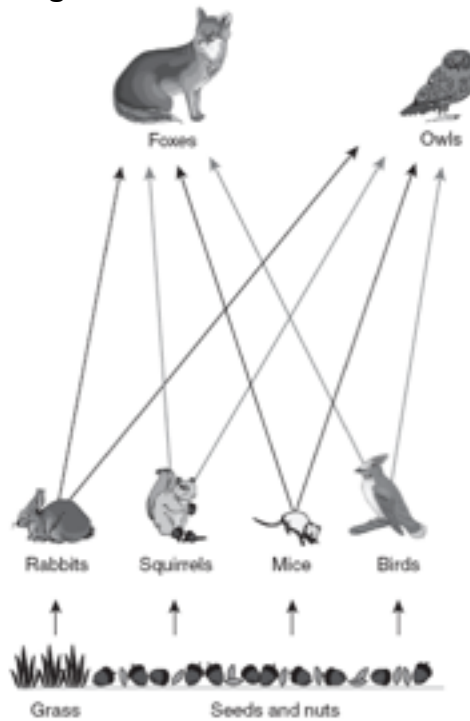
- Which of the following is an example of biome?
  - the Equator
  - the Nile River
  - the city of Cairo
  - the Sahara Desert
- Which of the following is a characteristic of the boreal forest biome?
  - coniferous trees
  - a permafrost layer
  - a constant temperature throughout the year
  - annual rainfall of more than 250 cm per year
- An ecologist wants to gather information about a stream along a mountainside. Which of the following is a biotic factor?
  - water flow rate
  - mineral deposits
  - water temperature
  - variety of life forms

Use the following image of a honeybee pollinating a flower as it gathers food to answer question the next.



- What relationship exists between the honeybee and the flower?
  - predation
  - parasitism
  - mutualism
  - commensalism
- Which of the following contain the greatest carbon stores in gigatonnes of carbon?
  - marine life
  - oil and gas deposits
  - organic matter in soil
  - marine sediments and sedimentary rocks
- Which of the following elements have these three characteristics in common?
  - dissolved in water
  - stored in sediments
  - present in the atmosphere
  - carbon and nitrogen
  - carbon and phosphorus
  - nitrogen and phosphorus
  - carbon, nitrogen and phosphorus
- Which of the following do nitrogen fixation and the decomposition of organic wastes have in common?
  - Both enrich the soil.
  - Both are part of the carbon cycle.
  - Both decrease levels of nitrogen in the soil.
  - Both are responsible for increased levels of carbon dioxide in the atmosphere.

Use the following illustration to answer the next question.



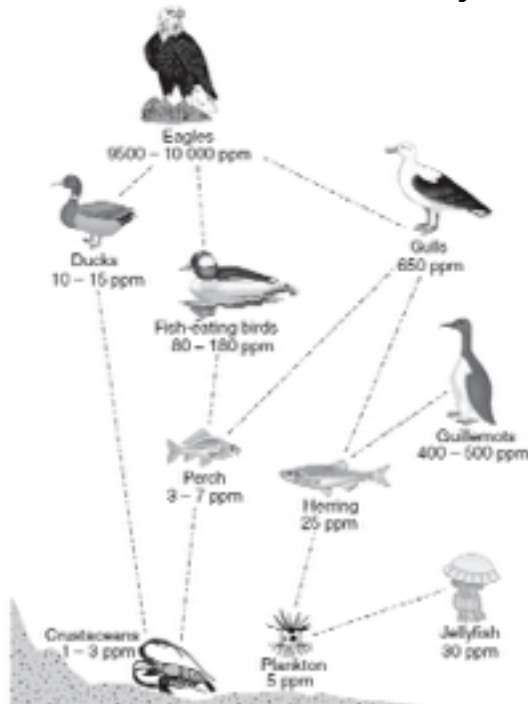
8. Which of the following is likely to occur if a large number of squirrels are removed from the area?
 

A. an increase in the fox population	B. an increase in the owl population
C. a decrease in the plant population	D. a decrease in the rabbit population
  
9. Which of the following best explains the distribution of temperate rainforests?
  - A. warm, moist air near the equator
  - B. intense solar radiation causing arid conditions
  - C. presence of large numbers of small herbivores
  - D. presence of coastal mountains causing high annual precipitation
  
10. In which of the following locations is the annual precipitation the greatest?



- A. (A)                      B. (B)                      C. (C)                      D. (D)

Use the following diagram of PCB levels in a community to answer the next question.



11. Which statement best explains the relatively high level of PCBs in eagles compared to those of guillemots?
- Both species are carnivores.
  - Bullemots eat more herring than eagles do.
  - Levels of PCBs are higher in marine environments.
  - Eagles occupy a higher trophic level than guillemots.

Use the following article to answer the next question.

**"Sorry no eel pie today"**

Eel pie, jellied eels, eel Florentine. The eels used in these dishes used to be abundant in Europe's ponds and streams but they may soon disappear.

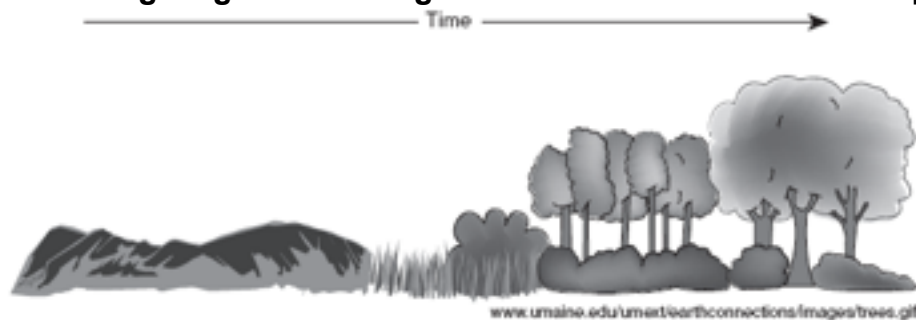
The problem is that it only takes small amounts of polychlorinated biphenyls (PCBs), a common chemical pollutant, to kill eel embryos. Most European eels already have enough PCBs in them to stop them from reproducing.

Overfishing was previously thought to have been the cause of the crash in the eel population. However, now that spawning has been observed in captivity, it has been found that a mother eel transfers PCBs from her body fat to her eggs. As a result, eel embryos die even when their mothers have PCB levels considered safe for human consumption.

Adapted from *New Scientist Print Edition*, March 11, 2006.

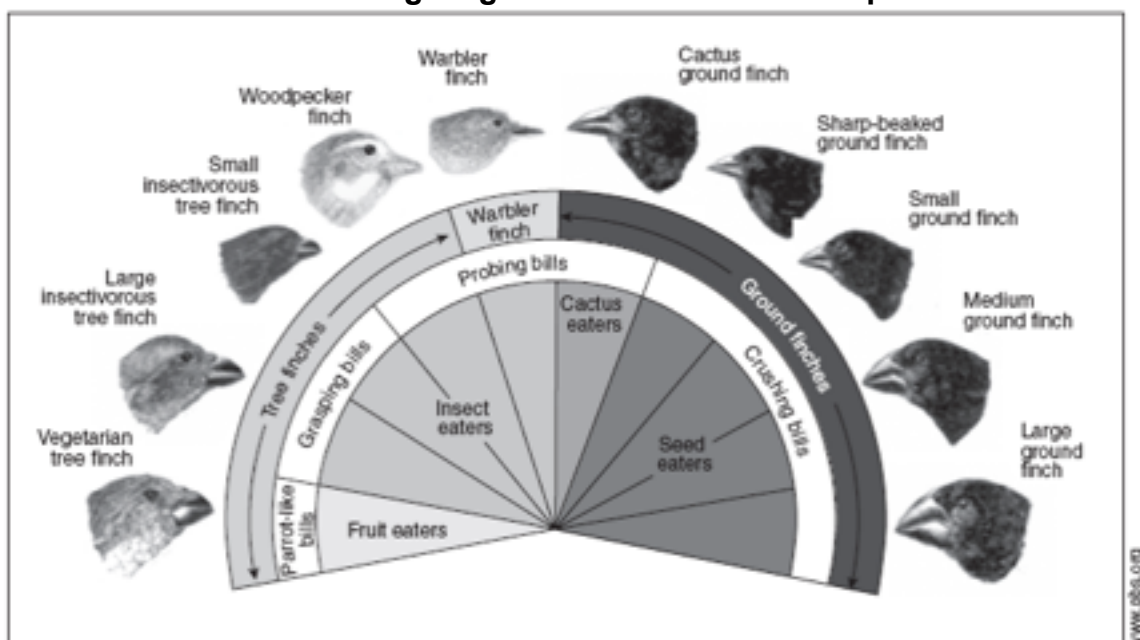
12. Which of the following is responsible for the observed decrease in the European eel population?
- overfishing
  - loss of spawning grounds
  - PCB concentrations in eel eggs
  - increased predation on eel eggs

Use the following diagram of change over time to answer the next question.



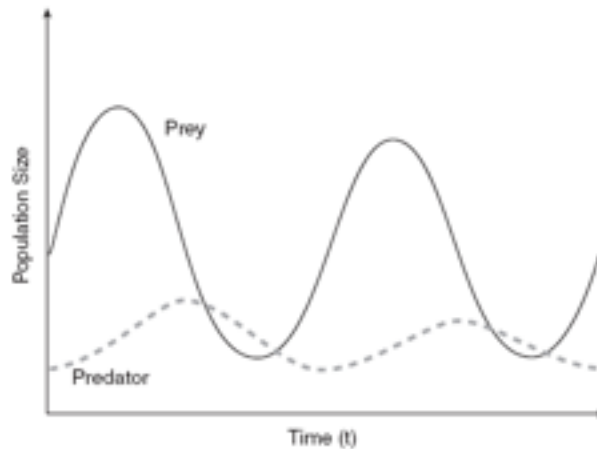
13. The diagram illustrates which of the following?
- biodegradation
  - natural selection
  - adaptive radiation
  - ecological succession

Use the following diagram to answer the next question.



14. The finches on the Galapagos Islands are different from island to island because of which of the following?
- Different ages
  - Different sizes
  - Different predators
  - Different food sources

Use the following graph showing the relationship between predator and prey to answer the next two questions.



15. The increase in the predator population size lags behind the increase in the prey population size.
- A. The statement is supported by the graph.  
 B. The statement is refuted by the graph.  
 C. The statement is neither supported nor refuted by the graph.
16. Which of the following situations contributes to the shape of the graph?

I	When the prey population is small, the predators have more difficulty capturing food and their population starts to decline.
II	In response to predator decline, the prey population starts to increase.
III	Both predator and prey population increase until the increased number of predators causes the prey population to decline.
IV	As the predator population increases and eats more prey, the reduced prey population will lead to starvation among predators.

A. I and II only

B. I and IV only

C. II and III only

D. I, II, III and IV

Use the following article to answer the next question.

#### Were Volcanoes the Crucible of Life?

New research by scientists shows that volcanoes produce large quantities of biologically available nitrogen.

Some bacteria and fungi have evolved the ability to fix nitrogen themselves, and these biological processes, along with mankind's activities (such as the burning of fossil fuels), are the major sources of fixed nitrogen in present-day ecosystems.

Where did the nitrogen that enabled life to evolve come from in the first place? Previously, lightning and asteroid impacts have been suggested as the major fixed nitrogen sources in the Earth's atmosphere of about three billion years ago; volcanism had not previously been thought of as an important process.

New work shows that the high temperatures associated with volcanic activity might also have played an important role in helping to fix nitrogen. Higher levels of fixed nitrogen were found in volcanic plumes than in the surrounding air.

This shows that the heat from volcanoes allow the nitrogen and oxygen in the atmosphere to react together to form fixed nitrogen. The results suggest that volcanism may have been at least as important as lightning and asteroid impacts in converting atmospheric nitrogen into fixed nitrogen on the early Earth.

Adapted from <http://131.111.150.52/news/press/dpp/2005100402>, 4 October 2004.

17. Which of the following describes nitrogen fixation in an active volcanic environment?
- A. Heat from the volcano provides the energy to fix nitrogen.  
 B. Plants growing on cooling ash flows have the ability to fix nitrogen.  
 C. The burning of organic material on the slopes of volcanoes fixes nitrogen.  
 D. Bacteria and fungi on the flanks of the volcano have the ability to fix nitrogen

18. Which of the following natural phenomena is most likely to cause widespread disease in human populations?  
 A. fire            B. El Nino            C. flooding            D. timber pest infestation
19. Which of the following explains why foreign species may be successful in a new ecosystem?  
 A. Predators of the foreign species are absent.  
 B. The foreign species prevents natural selection.  
 C. A native species becomes a parasite on the foreign species.  
 D. The foreign species cause adaptive radiation of native populations.

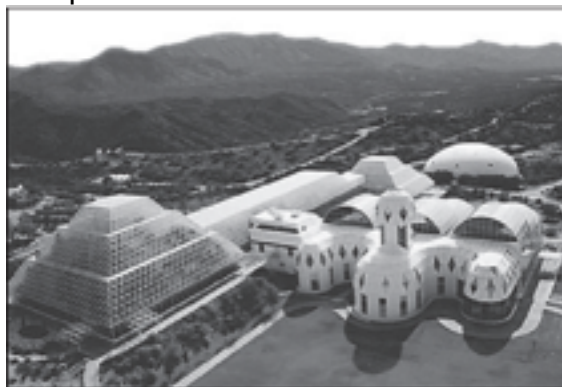
**Use the following article to answer the next two questions.**

In March of 1989, the *Exxon Valdez* oil tanker spilled millions of litres of crude oil into the waters of Prince William Sound in Alaska. The spill killed many organisms, including an estimated 250 000 seabird, 2800 sea otters, 300 harbour seals, 250 bald eagles and as many as 22 killer whales. Billions of salmon and herring eggs, as well as tidal plants and animals, were also smothered in oil.

Most of the fish and wildlife species that were affected have not fully recovered. Of the many species affected by the spill, only the river otter and bald eagle have returned to previous levels.

Killer whales, harbour seals and common loon have shown little signs of recovery in the area. Several other species, including sea otters and Pacific herring have made significant progress toward recovery, but are still not at the levels seen before the incident.

20. Which of the following organisms recovered most quickly after the oil spill?  
 A. harbour seals and salmon            B. river otters and bald eagles  
 C. killer whales and bald eagles            D. sea otters and Pacific herring
21. Which of the following describes the initial impact of the oil spill on the ecosystem?  
 A. Several animal species became extinct.  
 B. Adaptive radiation occurred in the seashore community.  
 C. There was an increase in the rate of ecological succession.  
 D. There was a reduction in the population of certain organisms.
22. Biosphere II was built in Tucson, Arizona. This multi-million dollar experiment enclosed several mechanically maintained environments. These included a tropical rainforest, desert, grassland and a 4 million litre tropical ocean.



Which of the following is represented by the different environments in Biosphere II?

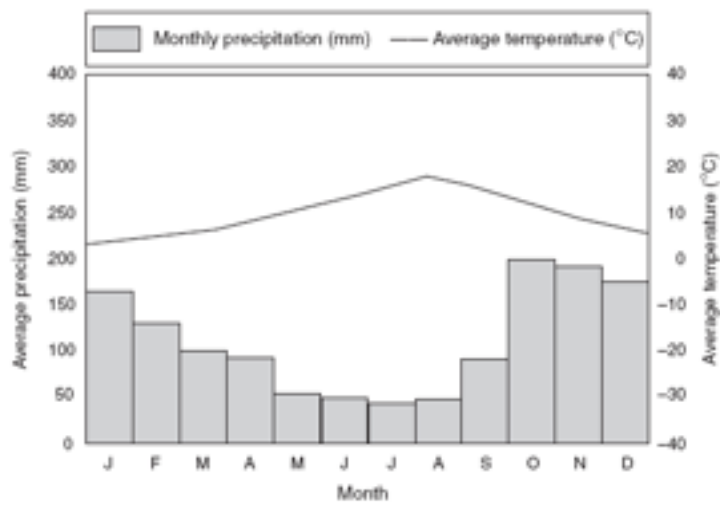
- A. biomes            B. food webs            C. populations            D. ecological succession

23. Which of the following explains why there are very few tall trees in the grassland biome?

I	Low annual rainfall.
II	Summer temperatures only reach 10°C.
III	Frozen ground prevents root growth, allowing little drainage and little decomposition.

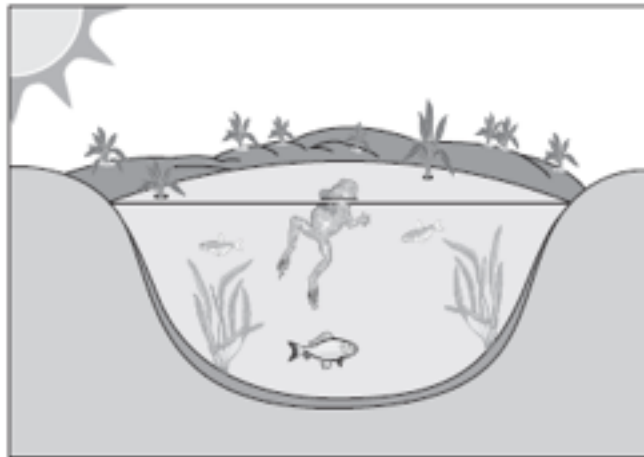
- A. I only            B. I and II only            C. I and III only            D. II and III only

Use the following climatograph to answer the next question.



24. Which world biome is represented by the data in the climatograph?  
 A. desert      B. tundra      C. tropical rainforest      D. temperate rainforest

Use the following graphic of an aquatic ecosystem to answer the next two questions.



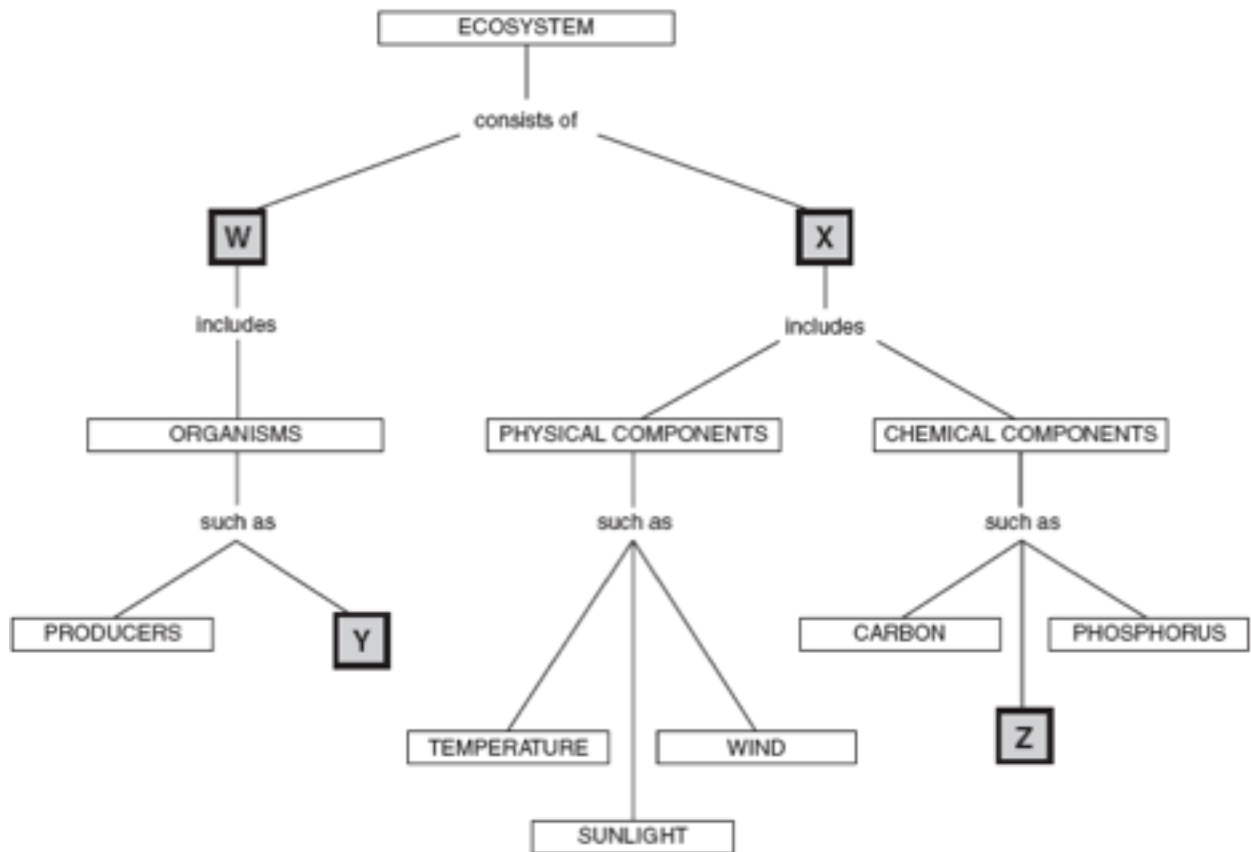
25. Which of the following is an abiotic factor?  
 A. fish      B. frog      C. plant      D. water
26. What process is responsible for providing energy to the ecosystem?  
 A. decomposition      B. commensalism  
 C. photosynthesis      D. bioaccumulation
27. Which of the following species is most likely to occupy the second trophic level in an ecosystem?  
 A. apple      B. bird-eating cat      C. insect-eating bird      D. apple-eating insect

Use the following food chain to answer the next question.



28. If many hawks were killed, what would likely happen to the caterpillar population?  
 A. It would increase.  
 B. It would decrease.  
 C. It would remain stable.  
 D. It would increase, then level off.

Use the following diagram to answer the next question.



29. Which of the following sets of terms correctly represent each of the shaded boxes shown above?

	Box W	Box X	Box Y	Box Z
A	biotic	abiotic	biome	water
B	biotic	abiotic	consumers	nitrogen
C	abiotic	biotic	biome	water
D	abiotic	biotic	consumers	nitrogen

Use the following information to answer the next two questions.

A unique facility in northwestern Ontario is one of Canada's most innovative and successful freshwater research centres. This facility, the Experimental Lakes Area, or ELA, has served for more than thirty years as a natural laboratory. Scientists come here from around the world to study the lakes and streams, their watersheds and the effects of various pollutants on these living systems.

During the 1960s and early 1970s, rapid increases in algae growth caused deterioration of the water quality and the fisheries of Lake Erie and other lakes in North America and Europe. Laboratory studies suggested that several nutrients were responsible; primarily, high levels of phosphorus, nitrogen and carbon.

The ELA studied one lake by dividing it with a plastic curtain and adding various nutrients. The lower basin received additions of carbon, nitrogen and phosphorus; the upper basin received carbon and nitrogen only. The different colour in the lower basin as seen in the photo above is caused by algae growth.

Photo: [http://www.dfo-mpo.gc.ca/regions/CENTRAL/pub/ela-rle/index\\_e.htm](http://www.dfo-mpo.gc.ca/regions/CENTRAL/pub/ela-rle/index_e.htm)

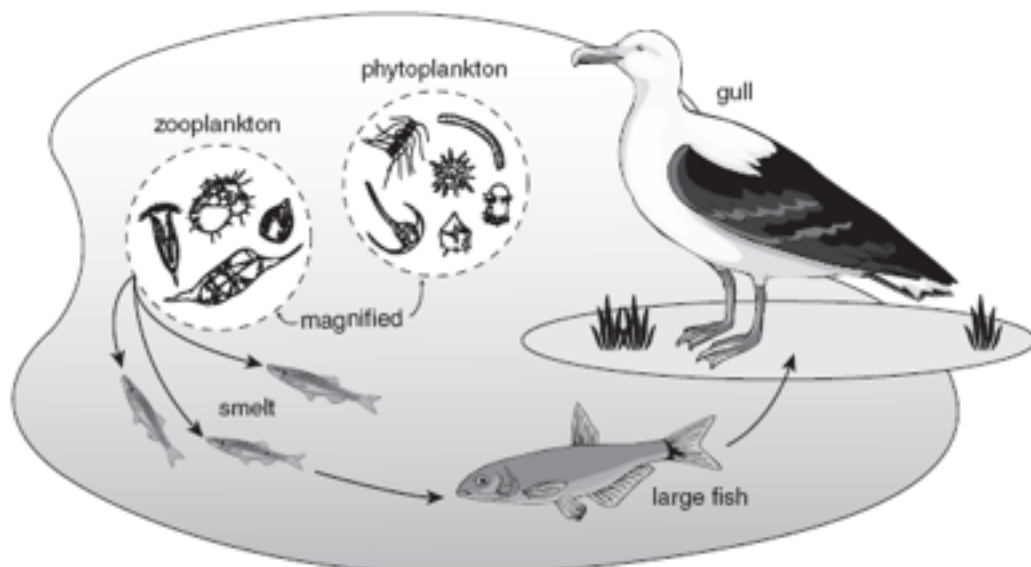
30. What is the experimental variable in this study?

- A. carbon                      B. oxygen                      C. nitrogen                      D. phosphorus



31. What would be an appropriate control for the experiment?
- the plastic curtain
  - the amount of algae growth
  - a similar lake where nutrient levels were not altered
  - the amounts of phosphorus, nitrogen and carbon added to the lake
32. Which of the following is an example of parasitism?
- The red-billed oxpecker climbs over the skin of giraffes, searching for insects to eat. The giraffe is helped because the oxpecker takes away the irritating pests.
  - The dodder is a plant that lives on other plants, getting nutrients from them. Dodders do not have any chlorophyll necessary for photosynthesis and do not make their own food.
  - The remora fish has a suction disk on top of its head, which it uses to harmlessly attach itself to sharks. It is then protected by the shark and can pick up scraps of food the shark drops.
  - Acacia ants protect the acacia tree in Costa Rica. They bite animals that try to eat parts of the tree. In return, the tree provides the ants with a safe place to nest inside its large thorns. The tree also produces a sweet substance for the ants to eat.
33. Which of the following best explains the limited amounts of nitrogen in agricultural land?
- Denitrifying bacteria are scarce.
  - Decomposers remove nitrogen from the soil.
  - Bacteria that perform nitrogen fixation are rare.
  - Ammonium, nitrite and nitrate leach from the soil.
34. Which of the following will remove carbon dioxide from the atmosphere?
- |     |                             |
|-----|-----------------------------|
| I   | planting trees              |
| II  | burning a forest            |
| III | cutting down trees          |
| IV  | maintaining a mature forest |
- I and IV only
  - II and III only
  - III and IV only
  - I, III and IV only
35. Which of the following describes how phosphorus is made available for plants to use?
- Lightning fixes atmospheric phosphorous.
  - Weathering releases phosphorus from rock.
  - Volcanoes release phosphorus from the earth.
  - Cellular respiration releases phosphorus to the atmosphere.

Use the following illustration of a marine ecosystem to answer the next question.

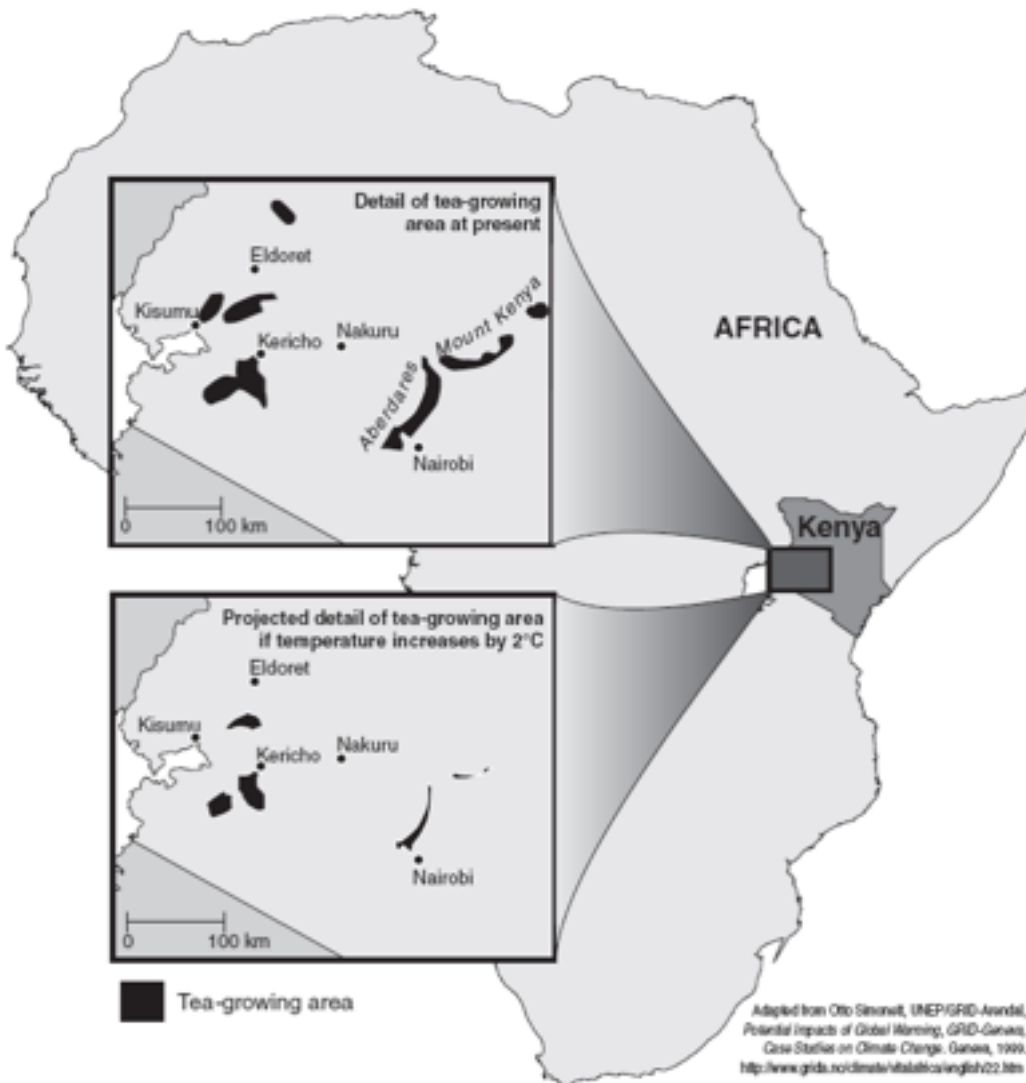


36. Which of the following would most likely be eradicated by bioaccumulation?
- the gull
  - the smelt
  - the large fish
  - the zooplankton

Use the following information to answer the next question.

**Impact of rising temperatures on tea crops in Kenya**

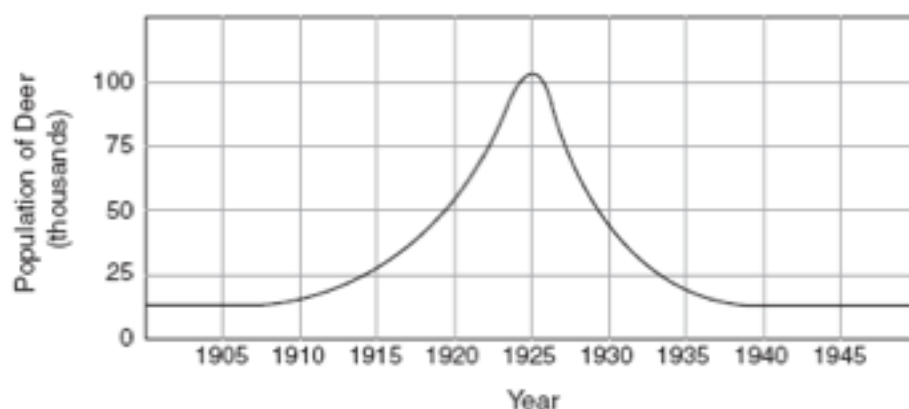
The following shows the current locations of tea-growing areas in Kenya, and how some of these areas are expected to become less suitable for tea-growing if there is an average annual temperature increase of 2°C.



37. What factors might change, causing the tea-growing areas to shrink if the temperature increases?
- A. I and II only                      B. III and IV only  
 C. II, III and IV only                D. I, II, III and IV

I	elevation
II	type of pests
III	moisture levels
IV	type of diseases

Use the following graph of a deer population over time to answer the next question.



38. Which of the following is the most likely explanation for the change in the number of deer from 1925 to 1935?
- A. Food resources were depleted and starvation occurred.  
 B. Drought caused a large number of deer to enter the area.  
 C. Improved natural habitat provided additional protection from predators.  
 D. A number of predatory species drove the local deer population to extinction

Use the following map of Canada biomes to answer the next question.  
Shading represents different biomes.



39. Which of the following abiotic factors would be similar within the boreal forest biome?

I	industrial pollution
II	average temperature
III	annual precipitation

A. I only

B. I and II only

C. I and III only

D. II and III only

Use the following information to answer the next question.

In the 1880s, Hawaiian sugar cane growers deliberately introduced the mongoose from India in an attempt to control the rat population. At the time, the rat population was increasing at an alarming rate and posed a serious threat to their crops. Unfortunately, the mongoose ate native birds and their eggs instead. The resulting tragedy was that many bird populations decreased almost to the point of extinction. Getting rid of the mongoose has proven nearly impossible. This foreign species became as much of a pest as the rats they were brought in to eliminate.

Adapted from: <http://www.birdinghawaii.co.uk/nonavianground2.htm>



40. If the mongoose had been introduced to Canada, this tragedy might not have occurred. Why was Hawaii particularly susceptible to the ecological disruption caused by the introduction of the mongoose?

I	Hawaii had no natural predators for the mongoose.
II	There were not enough rats to feed the mongoose.
III	The native Hawaiian bird species evolved in isolation and had no adaptations to escape the mongoose.

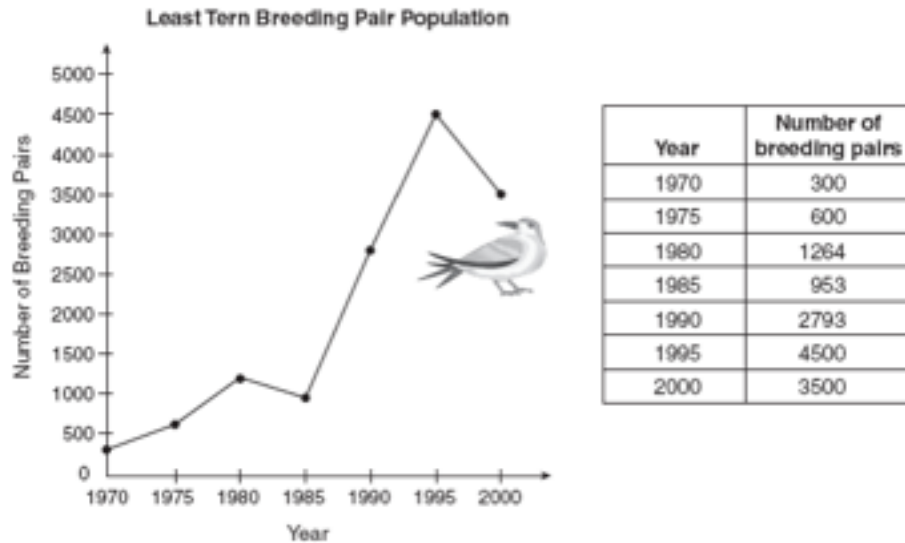
A. I and II only

B. I and III only

C. II and III only

D. I, II and III

41. The Least Tern is a recovering endangered bird species that occupies shorelines in North America. The number of breeding pairs was only 300 in 1970 and the number began to increase.



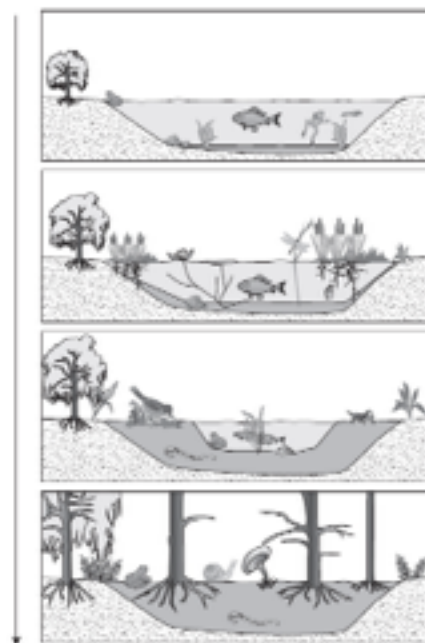
Which of the following management strategies is most likely responsible for the recovery of the Least Tern?

- A. preservation of shoreline habitat
- B. introduction of a competing species
- C. introduction of 600 breeding pairs in 1975
- D. development to improve predators access to nesting sites

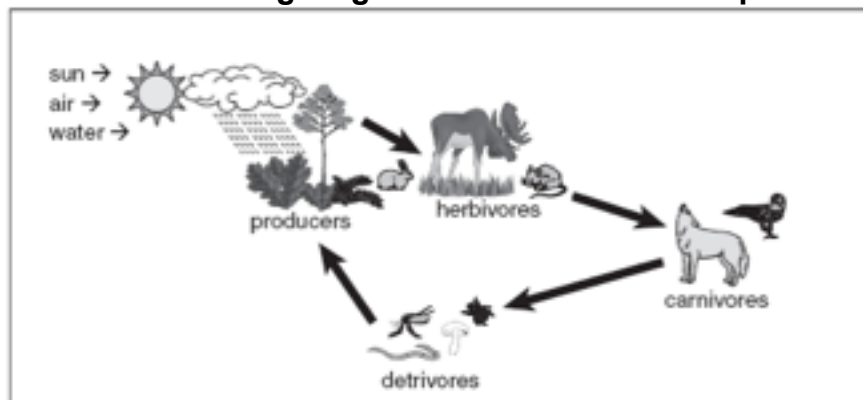
**Use the following sequence of diagrams showing change over time to answer the next question.**

42. Which of the following is represented?

- A. biodegradation
- B. natural selection
- C. adaptive radiation
- D. ecological succession



**Use the following diagram to answer the next question**



43. Which of the following describes the sun, air and water in the diagram shown above?

- A. biotic factors
- B. trophic levels
- C. abiotic factors
- D. bioaccumulation

44. Which of the following is an omnivore?



45. Which of the following is an abiotic factor that is a limited resource within deep water marine ecosystems?

- A. light      B. prey      C. food      D. photosynthesis

46. Which of the following describes detritivores?

- A. organisms that are parasites      B. organisms that photosynthesize  
 C. organisms that feed on producers      D. organisms that feed on plants and animal remains

**Use the following information to answer the next question.**



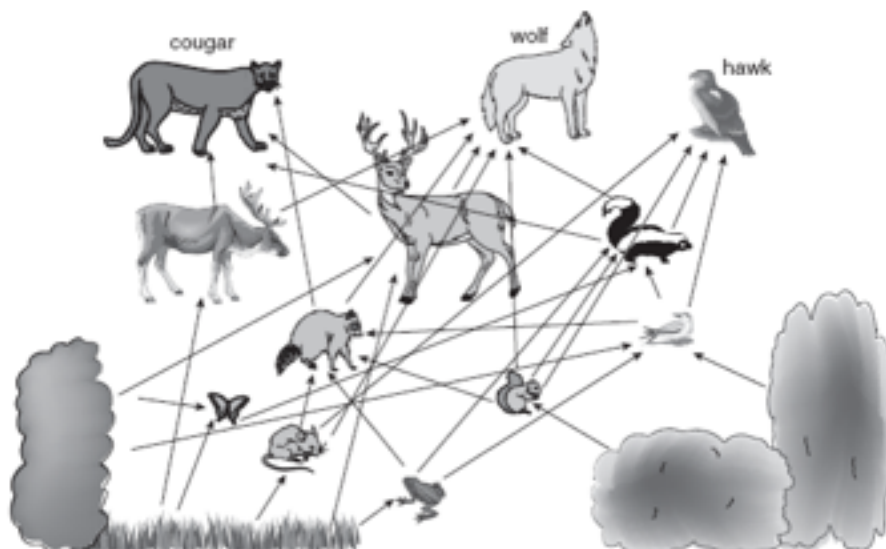
In the relationship illustrated above, the birds are known for preying on parasites that feed on the hippopotamus. The hippopotamus allows the birds to safely hunt on its body and in its mouth. From the bird's point of view, this relationship not only provides a ready source of food but also a safe place to eat considering that few predators would dare strike a bird in such close proximity to a hippopotamus.

Adapted from an excerpt, "Examples of symbiosis in action," [www.wordinfo.info](http://www.wordinfo.info)

47. What relationship exists between the birds and the hippopotamus?

- A. predation      B. mutualism      C. parasitism      D. commensalism

**Use the following food web to answer the next question.**

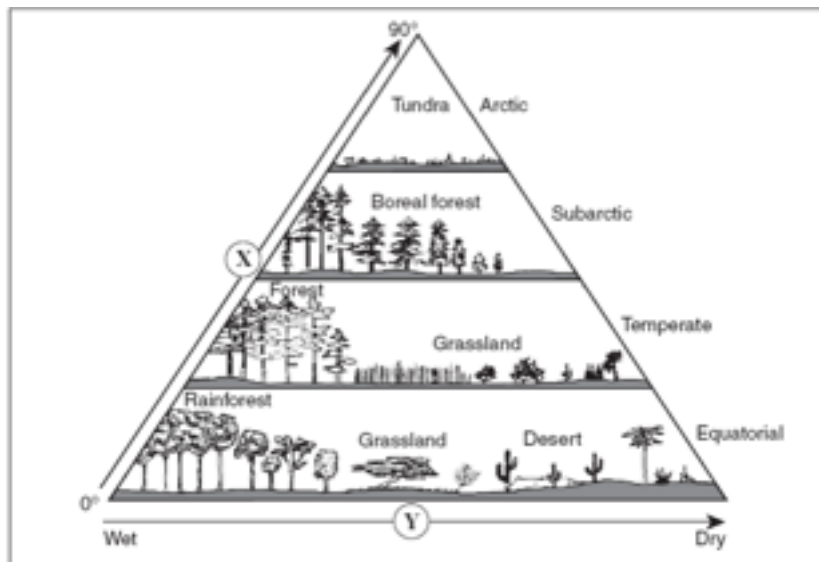


48. What do the cougar, wolf and hawk all have in common with one another?

- A. They all hunt deer.      B. They are all parasites.  
 C. They are all predators.      D. They all have a mutualistic relationship.

49. What process directly converts atmospheric nitrogen,  $N_2$ , into a form that plants can use?  
 A. denitrification    B. sedimentation    C. nitrogen fixation    D. leeching and runoff
50. Which of the following has the greatest difference between carbon released and carbon stored each year?  
 A. growth and decay of plant life  
 B. change in land use for agriculture  
 C. gas exchange at the surface of the ocean  
 D. circulation of intermediate and deep ocean water
51. Which of the following is an example of oxygen and carbon dioxide exchange?  
 A. Herbivores use carbon dioxide and produce oxygen.  
 B. Top predators use oxygen and produce carbon dioxide.  
 C. Microbes and worms add oxygen to the atmosphere and remove carbon dioxide.  
 D. Fossil fuel combustion adds oxygen to the atmosphere and removes carbon dioxide.

Use the following diagram to answer the next two questions.



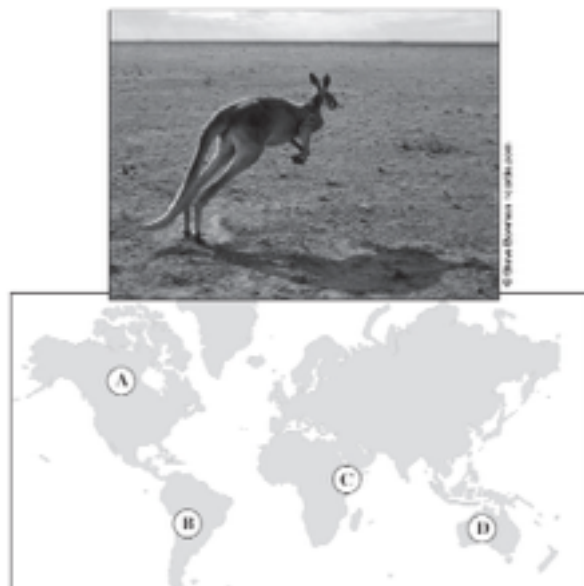
52. Which of the following describes the change represented by the direction of arrow X?

I	increasing latitude
II	increasing temperature
III	increasing precipitation

- A. I only    B. II only    C. III only    D. I, II and III

53. Which of the following describes the change represented by the direction of arrow Y?
- A. increasing latitude    B. decreasing precipitation  
 C. decreasing temperature    D. increasing diversity in life forms

Use the following photograph and map to answer the next question.



54. Where would you expect to find the biome shown in the photograph?  
 A. (A)    B. (B)    C. (C)    D. (D)

Use the following graph and information to answer the next two questions.

Causes of Deforestation in the Amazon, 2000–2005



The Amazon rainforest is a major player in the amount of carbon dioxide that is removed from the atmosphere. However, deforestation, which provides grazing land for cattle ranches, reduces the number of trees that help to rid the atmosphere of carbon dioxide and other greenhouse gases. Furthermore, the practice of burning to clear woodland leads to a massive release of carbon dioxide into the atmosphere during combustion. Deforestation of the Amazon rainforest leads not only to a reduction of the amount of carbon dioxide taken out of the atmosphere, but also to an increased release of carbon dioxide into the atmosphere. Plant growth provides a crucial sink for carbon absorption.

Graphic: [www.mongabay.com](http://www.mongabay.com)

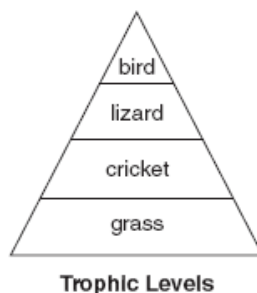
55. What is the major reason for deforestation in the Amazon?  
 A. logging                      B. forest fires                      C. agriculture                      D. cattle ranches

56. How does deforestation in the Amazon contribute to an increase in the level of carbon dioxide in the atmosphere?

I	It increases the rate of photosynthesis.
II	It removes plants that act as carbon sinks.
III	It releases carbon dioxide into the atmosphere through combustion.

- A. I and II only                      B. I and III only                      C. II and III only                      D. I, II and III

Use the following diagram to answer the next question.



57. In which of the following would biomagnification result in the highest concentration of pesticides?  
 A. birds                      B. grass                      C. lizards                      D. crickets

Use the following cartoon to answer the next question.



58. On which of the following concepts is the cartoon based?  
 A. extinction                      B. symbiosis                      C. natural selection                      D. ecological selection

Use the following article to answer the next question.

### Quarter of Mammals "Face Extinction"



Siberian tigers may vanish within three decades.

The destruction of habitats and the introduction of foreign species from one part of the world to another are blamed for the loss of biodiversity. More than 11 000 endangered animals and plant species are facing extinction - including more than 1 000 mammals, nearly a quarter of the world's total.

The species likely to vanish within three decades include the black rhinoceros, the Siberian tiger and the Asian Amur leopard.

All of the factors which have led to the extinction of species in recent decades have intensified. The encroachment of human settlement into wilderness regions, rainforest and wetlands destruction, and the impact of industry have had a dramatic impact on the survival of threatened animals and plants.

Adapted from an article by Corinne Podger, "Quarter of mammals face extinction,"  
BBC News, May 21, 2002.  
Photograph: news.bbc.co.uk

59. According to the article, which of the following are factors that have led to the extinction of plant and animal species on the planet?

I	destruction of rainforests and wetlands
II	the removal of foreign species from an ecosystem
III	destruction of habitats due to the impact of industry

- A. I and II only                      B. I and III only                      C. II and III only                      D. I, II and III

Use the following article to answer the next question.

In the spring, deciduous trees begin producing thin, broad, light-weight leaves. This type of leaf structure easily captures the sunlight needed for food production (photosynthesis). The broad leaves are beneficial when temperatures are warm and there is plenty of sunlight. However, when temperatures are cold, the broad leaves expose too much surface area which can lead to water loss and tissue damage. To help prevent this damage from occurring, deciduous trees have internal and physical adaptations that are triggered by seasonal changes.

Adapted from an excerpt, "Forest Adaptation," www.rbcarlton.com

60. What physical adaption of deciduous trees is triggered by cooler temperatures?  
A. Leaves turn green.                      B. Trees drop their leaves.  
C. Photosynthesis increases.                      D. Leaves become needle-like.
61. What method of pest control could cause the most harm to the environment?  
A. introducing a new species to prey on the beetles  
B. using traps with fir or pine scents to attract beetles  
C. breeding new varieties of fir and pine trees that are resistant to the pests  
D. disguising fir and pine trees with scents from other trees to fool the beetles
62. Which of the following is an example of a population?  
A. all of the animals in a valley  
B. all of the Pacific rattlesnakes in a valley  
C. all of the rattlesnakes and garter snakes in a valley  
D. all of the grasses, tumbleweed plants, pine trees, chipmunks, snakes and deer in a valley



Use the following article to answer the next two questions.

### If Trees Are Masked by the Wrong Scent, Can Beetles Find Them?

The Douglas-fir beetle and the mountain pine beetle may soon be outwitted through the magic of chemistry. Both insects cause havoc in BC forests, damaging fir and pine trees. Beetles tunnel into the bark of trees to lay their eggs. They find the trees they're interested in by scent. Trees release distinct scents into the air, and the beetles are experts at following them.

Beetles tunneling into the bark of trees gradually circle all around the tree trunk. Through the bark. Once the bark is damaged, the flow of water and nutrients from the roots to the needles is disrupted, causing the death of the tree.

Scientists plan to mask the trees with scents from other types of trees that don't interest the beetles. This way, the beetles won't recognize their host trees. If they can't detect them, they'll leave them alone.

Researchers are testing scent compounds to see which work best at fooling the determined beetles. Single test trees have been successfully protected by "the wrong" scent. Hopefully, in the near future, large stands of trees may be protected.

Adapted from a news release issued by Simon Fraser University, "SFU Researcher Fools Forest Pest into 'Barking up the Wrong Tree'," December, 1997.

61. Which of the following statements are supported by the article?

I	Beetles choose trees by scents the trees release.
II	Beetles lay their eggs in the bark of fir and pine trees.
III	Beetles mark trees with their scent, attracting other beetles to the tree.

- A. I and II only      B. I and III only      C. II and III only      D. I, II and III

62. What is the relationship between the beetles and the fir trees?

- A. parasitism      B. mutualism      C. decomposer      D. commensalism

Use the following picture to answer the next question.



65. Which world biome is represented by the photograph?

- A. desert      B. tundra      C. boreal forest      D. temperate deciduous forest

Use the following article on wildflowers in the Italian Alps to answer the next question.

**Warming Threatens Wildflowers**

Climate change is causing wild mountain flowers to move to higher altitudes, and probably to their eventual extinction. Fifty-two species of plants monitored in the Italian Alps are now found 425 metres higher than they were 48 years ago, in response to a 1.5°C rise in temperature. Researchers point out that as some species have already reached the tops of mountains, they will become extinct if the climate continues to warm.

Adapted from an article, "Warming threatens wildflowers," *The Vancouver Sun*, August 7, 2007.

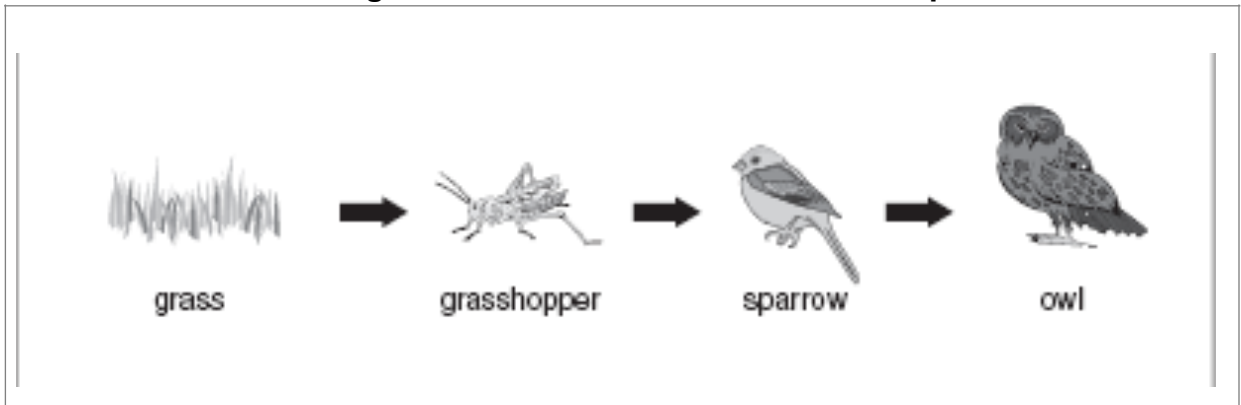
66. Which of the following is the abiotic factor that would cause these wildflowers to become extinct?

- A. competition
- B. grazing animals
- C. warm temperature
- D. insects for pollination

67. You have been asked to design a controlled experiment to test the effect of light on the growth of tomato plants. Which of the following is a valid hypothesis?

- A. Bean plants and tomato plants will grow at the same rate when exposed to light.
- B. As the length of time tomato plants are exposed to light increases, their growth increases.
- C. Small tomato plants exposed to 10 hours of light will grow twice as fast as large plants exposed to 5 hours of light.
- D. If the amount of light that tomato plants are exposed to is constant, then an increase in temperature will increase their growth.

Use the following food chain to answer the next two questions.



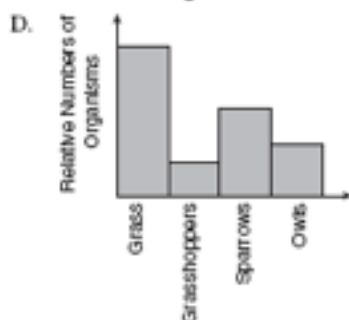
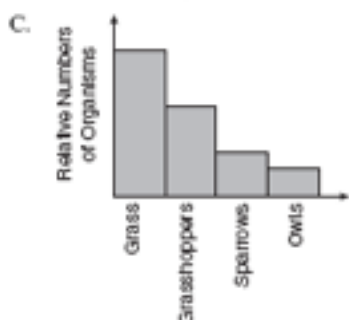
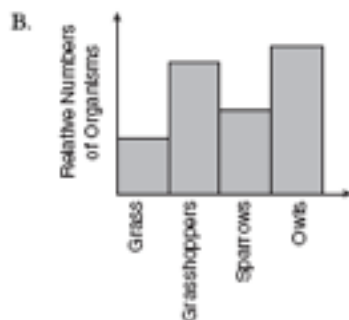
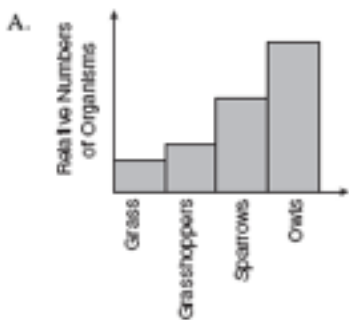
68. The grasshopper is a

- A. producer
- B. detrivore
- C. primary consumer
- D. secondary consumer

69. The greatest biomagnifications of a herbicide applied to grass would be found in

- A. The owl
- B. The grass
- C. The sparrow
- D. The grasshopper

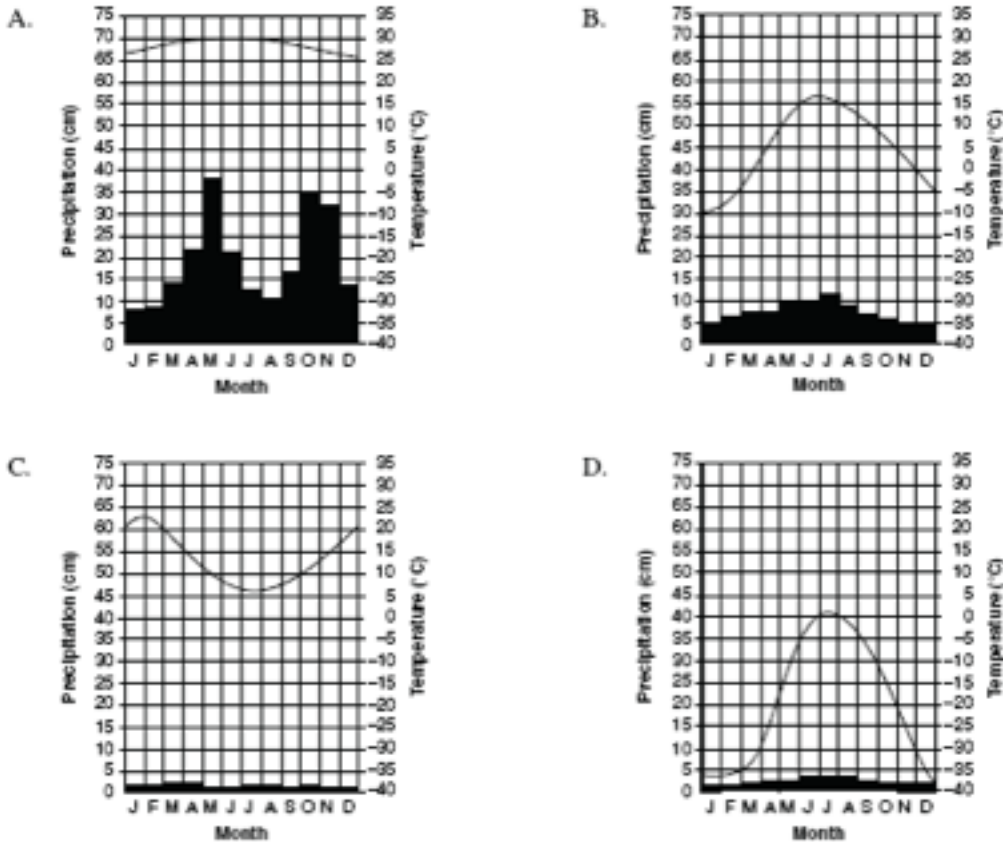
70. Which of the following graph represents the relative numbers of organisms in the food chain?



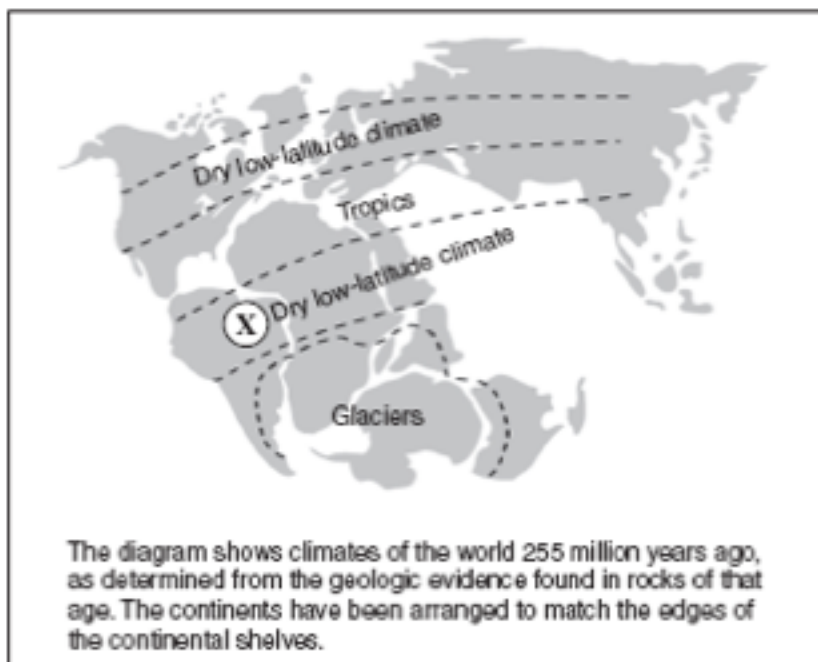
71. Which of the following is a valid contrast between the phosphorous cycle and the nitrogen cycle?

- A. nitrogen enters terrestrial ecosystems through fertilizers but phosphorous does not
- B. nitrogen enters the atmosphere through bacterial action but phosphorous does not
- C. nitrogen enters ecosystems through leeching and runoff but phosphorous does not
- D. nitrogen enters terrestrial ecosystems through decay of plants and animal wastes but phosphorous does not

72. Which of the following is a climatograph for a city in the desert of the southern hemisphere?



Use the following information to answer the next question.



73. Which biomes would exist today and which would have existed 255 million years ago at location X?

	Today	255 million years ago
A.	desert	tropical rainforest
B.	desert	desert
C.	tropical rainforest	desert
D.	tropical rainforest	tropical rainforest

74. The breakdown of organic substances including pollutants into simpler compounds through biological action is called

- A. biodiversity      B. biodegradation      C. bioaccumulation      D. biomagnification

75. Adaptive radiation is most likely to occur

- A. when environmental conditions change in the members of a species lack adaptive traits to survive  
B. when environmental conditions remain the same and the proportion of individuals within the species that lack adaptive traits increases  
C. when environmental conditions remain the same and the proportion of individuals within the species that possess similar adaptive traits increases  
D. when environmental conditions change and the adaptive traits of the species favour survival and reproduction of members with different traits

76. During the eruption of Mount St. Helens in 1980 the surrounding forest was covered with volcanic ash and mud flows. Slowly soil formed and pioneers plants followed. Shurbs and tree now also grow there. This is an example of


- A. natural selection      B. bioemagnification  
C. primary succession      D. climax community

**Use the following article to answer the next two questions.**

**The Urban Bird**

Entire populations of birds across Europe are changing their songs in order to be better heard above the noise of the city.

It is well established that some birds are able to change their songs to adapt to different environments. In 2004, researchers showed that individual nightingales made their songs much louder so they could be heard over urban noise. Now, researchers have shown this adaptation is happening within other bird populations in cities around Europe.



Researchers in the Netherlands recorded and compared *Parus major* (a type of song bird) singing in 10 European cities and in nearby forests. The songs are used for attracting mates or defending territory. They found that in all cities, the birds' songs were sung faster and in higher pitches than in nearby forests. Researchers noted that the differences between the urban and rural songs are 'remarkably' consistent across all of the sites surveyed.

This is explained by the fact that urban noise pollution, most of which comes from traffic, tends to be at a lower pitch. This drowns out low-pitched birdsong notes.

Another factor contributing to the high-pitched and faster urban songs is the relative openness of city landscapes compared to forests. Earlier work showed that songs in forested habitats were sung lower and more slowly than those in open countryside because these songs are less likely to be lost in reflections in the dense foliage found within forest habitats.

Adapted from an article by Catherine Brahe, "Urban songbirds raise their voices to be heard," *NewScientist.com*, December 4, 2006.

77. The change in bird songs is due to

- A. urban noise pollution      B. dense foliage in forest habitats  
C. air pollution in European cities      D. decrease in the song bird population

78. If the development of different songs among urban and country birds results in two species, this is an example of

- A. natural selection      B. foreign species  
C. a climax community      D. ecological succession

## Unit 1 - Ecology

1. D
2. A
3. D
4. C
5. D
6. A
7. A
8. D
9. D
10. D
11. D
12. C
13. D
14. D
15. A
16. D
17. A
18. C
19. A
20. B
21. D
22. A
23. A
24. D
25. D
26. C

27. D
28. B
29. B
30. D
31. C
32. B
33. D
34. A
35. B
36. A
37. C
38. A
39. D
40. B
41. A
42. D
43. C
44. A
45. A
46. D
47. B
48. C
49. C
50. D
51. B
52. A
53. B
54. D

55. D
56. C
57. A
58. C
59. B
60. B
61. A
62. B
63. A
64. A
65. B
66. C
67. B
68. C
69. A
70. C
71. B
72. C
73. C
74. B
75. D
76. C
77. A
78. A