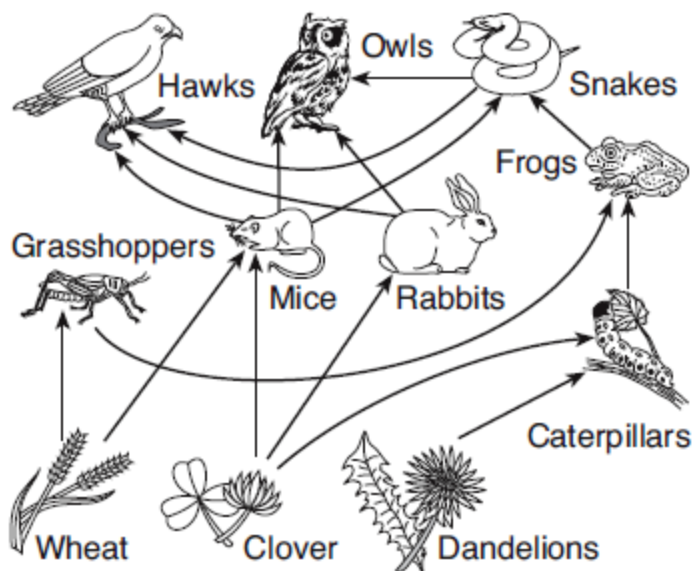


Base your answers to questions 1 through 3 on the diagram below and on your knowledge of biology. The diagram represents a food web in an ecosystem.



- 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
 - an ecosystem that is completely out of balance
 - how ecosystems maintain stability over time**
 - interaction between biotic and abiotic factors within an ecosystem
 - ecological succession in an ecosystem
- Missing from the diagram of this ecosystem are the
 - biotic factors and decomposers
 - abiotic factors and decomposers**
 - autotrophs, only
 - heterotrophs, only
- Which row in the chart below best identifies the relationships between the mice and the wheat?

Row	Role of Mice	Role of Wheat
(1)	producer	consumer
(2)	predator	host
(3)	host	predator
(4)	consumer	producer

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

- All of Earth's water, land, and atmosphere within which life exists is known as
 - a population
 - a community
 - a biome
 - the biosphere**
- The study of the interactions between organisms and their interrelationships with the physical environment is known as
 - ecology**
 - cytology
 - embryology
 - physiology

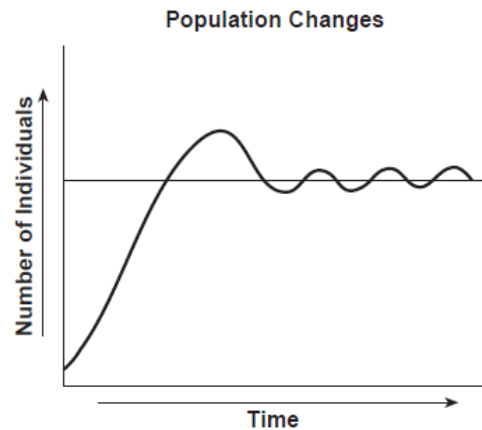
6. The science of ecology is best defined as the study of

- A) the classification of plants and animals
- B) the interactions of living organisms and their environment**
- C) technology and its effects on society
- D) weather and its effects on food production in the ocean

7. Populations of aspen trees in the western United States are being destroyed by an unexplained illness. The altered landscape is affecting the animals that live there. Populations of deer mice are increasing greatly in these areas. Unfortunately, these mice often carry a virus that is deadly to humans. This scenario best illustrates that

- A) a change in the environment always results in disease
- B) humans are the cause of the breakdown of this ecosystem
- C) the stability of this ecosystem is limited by the amount of water available
- D) every population in an ecosystem is linked with other populations**

8. The graph below represents some changes in the number of individuals in a particular population in a stable ecosystem over a period of time.



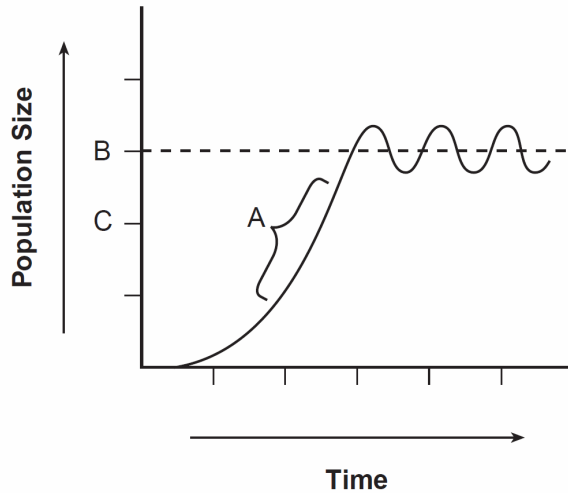
Which statement best describes the trend shown in this graph?

- A) Ecosystem conditions will eventually cause a population to become extinct.
- B) In a stable ecosystem, the number of individuals in a population is usually maintained within a certain range.**
- C) The interactions between a population and various factors in an environment are always predictable.
- D) In order for any ecosystem to maintain a balance, populations must be reduced to half their original number.

Unit 6 - Evolution

Base your answers to questions 9 and 10 on the graph below and on your knowledge of biology. The graph shows the growth of a population of rabbits in a specific ecosystem.

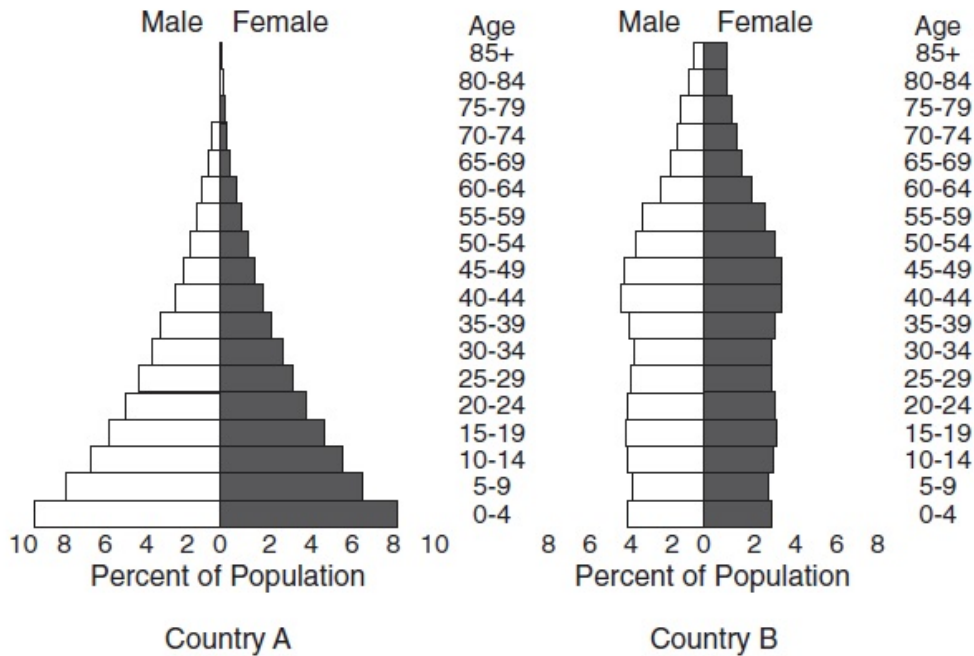
Rabbit Population in a Specific Ecosystem



9. Which environmental factor could have caused the change indicated at *A*?
- A) increased predation by herbivores
 - B) **increased availability of food**
 - C) increased number of decomposers
 - D) increased competition among carnivores
10. Over a period of time, the location of the dashed line would move from location *B* to location *C* on this graph if
- A) the birthrate of the rabbit population was equal to the death rate of the rabbit population
 - B) there was a decrease in the number of rabbit predators and an increase in the availability of plants
 - C) **there was a decrease in the availability of minerals, water, and shelter**
 - D) the entire rabbit population migrated to a new ecosystem containing more autotrophs

Unit 6 - Evolution

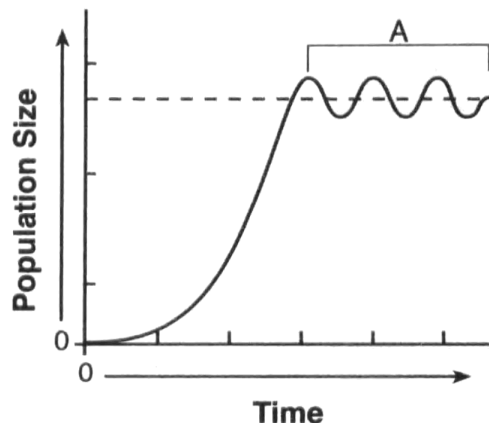
Base your answers to questions 11 and 12 on the diagram below and on your knowledge of biology. The diagram represents the current percentage of each population by age and gender (male/female) for two countries.



Adapted from: *Campbell Biology, 8th edition*

11. At the present time, both populations have the same number of individuals. In which of these countries will the population growth over the next 20 years place the greatest strain on the environment?
- A) Country A, since the larger percentage of young could result in rapid population growth
B) Country B, since the smaller percentage of young could result in rapid population growth
C) Country A, since the smaller percentage of people over 60 uses the most resources
D) Country B, since the larger percentage of people over 60 uses the fewest resources
12. Approximately what percent of the population of Country A is less than 10 years old?
- A) 8% B) 16% C) 32% D) 64%

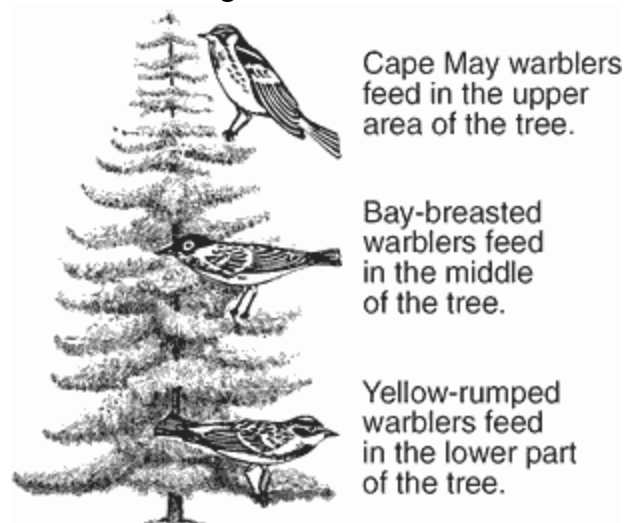
13. The graph below indicates the size of a fish population over a period of time.



What does the section of the graph labeled *A* represent?

- A) biodiversity within the species
 - B) nutritional relationships of the species
 - C) a population becoming extinct
 - D) a population at equilibrium**
14. Owls periodically expel a mass of undigested material known as a pellet. A student obtained several owl pellets from the same location and examined the animal remains in the pellets. He then recorded the number of different prey animal remains in the pellets. The student was most likely studying the
- A) evolution of the owl
 - B) social structure of the local owl population
 - C) role of the owl in the local ecosystem**
 - D) life cycle of the owl
15. Which statement best describes a situation where competition occurs in an ecosystem?
- A) A deer outruns an attacking wolf.
 - B) A deer, during the winter, consumes tree bark.
 - C) A deer and rabbit consume grass in a field.**
 - D) A deer and a rabbit are both startled by a hawk flying overhead.

16. The ecological niches of three bird species are shown in the diagram below.



What is the advantage of each bird species having a different niche?

- A) As the birds feed higher in the tree, available energy increases.
- B) More abiotic resources are available for each bird.
- C) Predators are less likely to feed on birds in a variety of locations.
- D) There is less competition for food.**

17. Base your answer to the following question on the information below and on your knowledge of biology.

The dodo bird inhabited the island of Mauritius in the Indian Ocean, where it lived undisturbed for years. It lost its ability to fly and it lived and nested on the ground where it ate fruits that had fallen from trees. There were no mammals living on the island.

In 1505, the first humans set foot on Mauritius. The island quickly became a stopover for ships engaged in the spice trade. The dodo was a welcome source of fresh meat for the sailors and large numbers of dodos were killed for food. In time, pigs, monkeys, and rats brought to the island ate the dodo eggs in the ground nests.

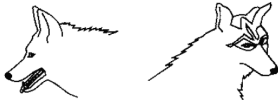


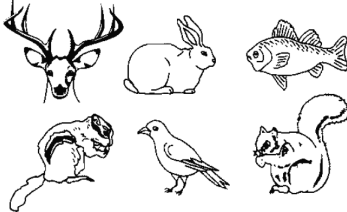
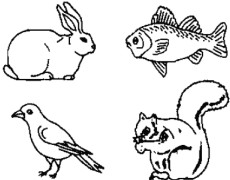

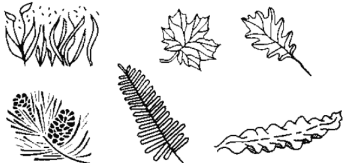
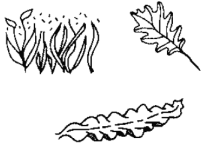




Which statement describes what most likely happened to the dodo bird within 100 years of the arrival of humans on Mauritius?

- A) Dodo birds developed the ability to fly in order to escape predation and their population increased.
- B) The dodo bird population increased after the birds learned to build their nests in trees.
- C) Human exploitation and introduced species significantly reduced dodo bird populations.**
- D) The dodo bird population became smaller because they preyed upon the introduced species.

-
18. Some scientists have collected and stored seeds for many types of food-producing plants. The purpose of this is to

- A) increase the destruction of environments
- B) continue the deforestation of world ecosystems
- C) decrease the dependence on plants for food
- D) preserve the diversity of plant species**

19. The diagram below represents the varying biodiversity in three ecosystems.

Ecosystem A	Ecosystem B	Ecosystem C
<p>Carnivores</p> 	<p>Carnivores</p> 	<p>Carnivores</p> 
<p>Herbivores</p> 	<p>Herbivores</p> 	<p>Herbivores</p> 
<p>Autotrophs</p> 	<p>Autotrophs</p> 	<p>Autotrophs</p> 
<p>Decomposers</p> 	<p>Decomposers</p> 	<p>Decomposers</p> 

The level of biodiversity in ecosystem *A* is high because it has the

- A) least variety of energy levels
- B) **greatest variety of genetic material**
- C) greatest number of decomposers
- D) least number of ecological niches

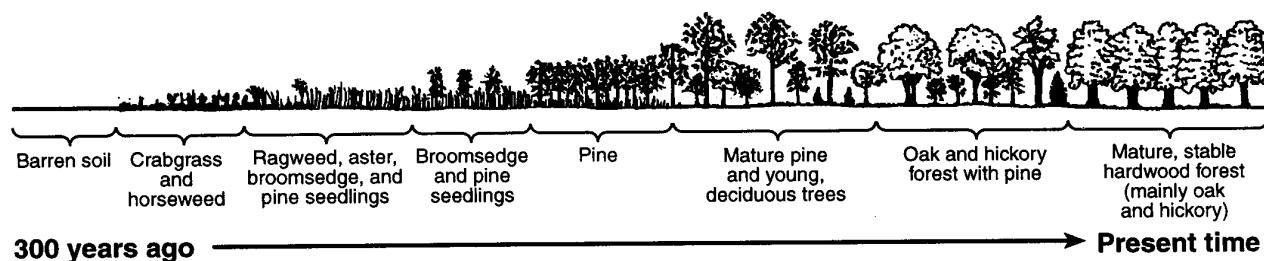
20. The hemlock wooly adelgid is an invasive insect species that is destroying native hemlock trees in New York State. These insects can upset natural ecosystems because they

- A) provide food for native bird species
- B) can carry diseases that can be spread to pets
- C) increase biodiversity in New York State forests
- D) **disrupt habitats that native species depend upon**

21. Humans have altered ecosystems by activities that are sometimes deliberate and sometimes accidental. In the United States, humans have altered ecosystems by introducing invasive species that outcompete native species. Which activity resulted in the accidental introduction of an invasive species?

A) importing Japanese knotweed because it has an attractive flower
B) transporting zebra mussels to the Great Lakes by discharging water taken on in European ports to stabilize large ships
C) releasing Chinese mitten crabs in the Hudson River to establish them as a food source
D) planting purple loosestrife that was brought here from Europe as a source of medicine

Base your answers to questions 22 and 23 on the diagram below, which shows the sequence of plant communities that have occupied land that was left barren 300 years ago, and on your knowledge of biology.

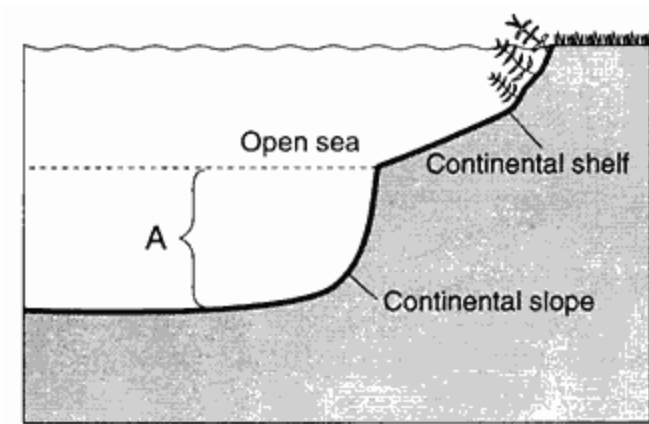


22. Dominant plant species in the climax community include
- A) pine trees **B) hickory trees** C) mosses D) lichens
23. Which plant species represent pioneer organisms?
- A) broomsedge and pine seedlings B) ragweed and aster
C) crabgrass and horseweed D) oak and hickory trees

24. Which type of biome occupies the largest area of Earth?

A) marine
B) grassland
C) tropical rain forest
D) temperate deciduous forest

25. Base your answer to the following question on "the diagram below of a biome and on your knowledge of biology.

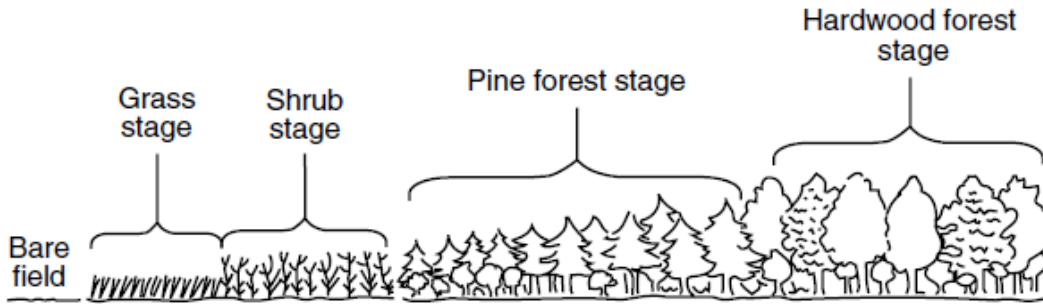


"

Why are most of the organisms that live in region A heterotrophs?

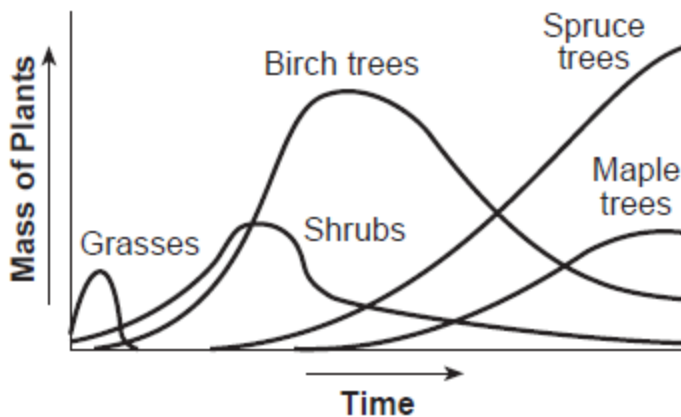
- A) Large quantities of salt are dissolved at this depth
 - B) Oxygen does not dissolve in the water at this depth
 - C) Water temperature varies greatly at this depth
 - D) Sunlight cannot penetrate to this depth**
26. Which organisms would most likely be the pioneer organisms on a newly formed volcanic island?
- A) conifers
 - B) lichens**
 - C) deciduous trees
 - D) tall grasses
27. Which is a characteristic of a stable climax community?
- A) The number of pioneer organisms is increasing.
 - B) Shrubs are replacing climax trees.
 - C) Populations have reached equilibrium.**
 - D) Lichens are usually the dominant form of life.

28. The diagram below represents the changes over time in an area.



Which example is *not* a natural process that could return a hardwood forest to the grass stage once again?

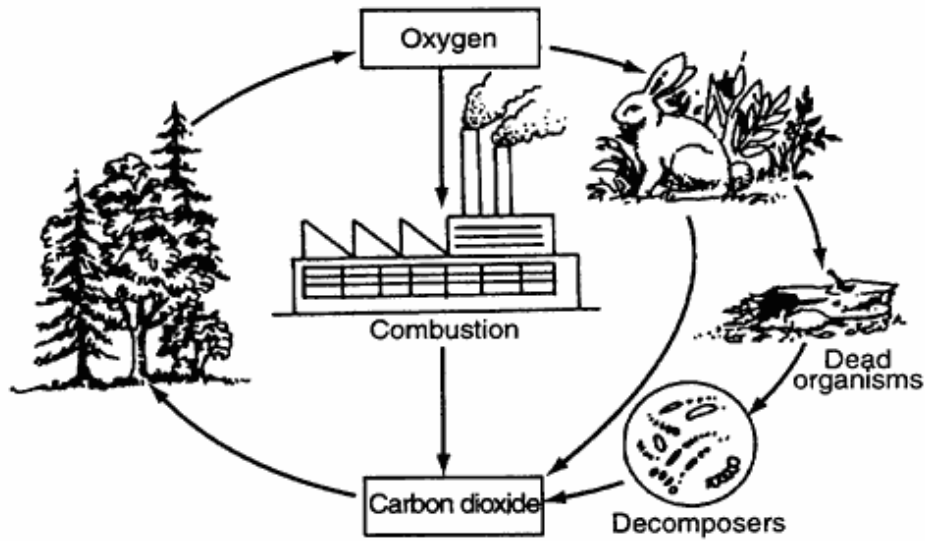
- A) a forest fire caused by a lightning strike B) the aging and falling of trees
C) **clearing the land for agriculture** D) a hurricane or tornado
29. Base your answer to the following question on the graph below and on your knowledge of biology. The graph shows the masses of different types of plants found in an area of the Adirondack Mountains after a forest fire occurred.



Based on the information provided in the graph, the process that is occurring is

- A) **ecological succession** B) biological evolution
C) selective breeding D) genetic engineering

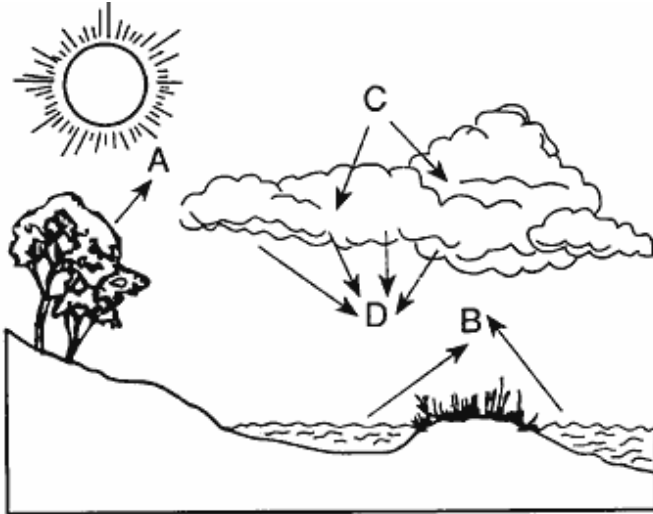
30. The diagram below shows some pathways in the cycling of materials in the environment.



Which two processes are involved in the cycling shown in the diagram?

- A) succession and transpiration
- B) photosynthesis and cellular respiration**
- C) artificial selection and deamination
- D) enzymatic hydrolysis and regeneration

31. Processes involved in the water cycle are represented by letters in the diagram below.



In which group are these processes correctly identified?

- A) *A*-deamination; *B*-transpiration; *C*-condensation; *D* evaporation
 - B) *A*-transpiration; *B*-evaporation; *C*-condensation; *D*-precipitation**
 - C) *A*-condensation; *B*-precipitation; *C*-transpiration; *D* evaporation
 - D) *A*-transpiration; *B*-deamination; *C*-condensation; *D*-precipitation
32. Which statement best describes the role of decomposers?
- A) They convert carbon dioxide and water to glucose.
 - B) They break down organic compounds into products used by other organisms.**
 - C) They release oxygen to the atmosphere.
 - D) They provide energy for the synthesis of proteins.

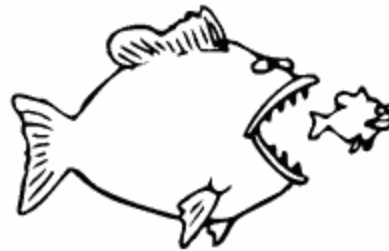
33. Two food chains are represented below.

Food chain A: aquatic plant → insect → frog → hawk

Food chain B: grass → rabbit → hawk

Decomposers are important for supplying energy for

- A) food chain *A*, only
 - B) food chain *B*, only
 - C) both food chain *A* and food chain *B*
 - D) neither food chain *A* nor food chain *B***
34. Which group contains terms that are *all* directly associated with one of the organisms shown in the diagram below?



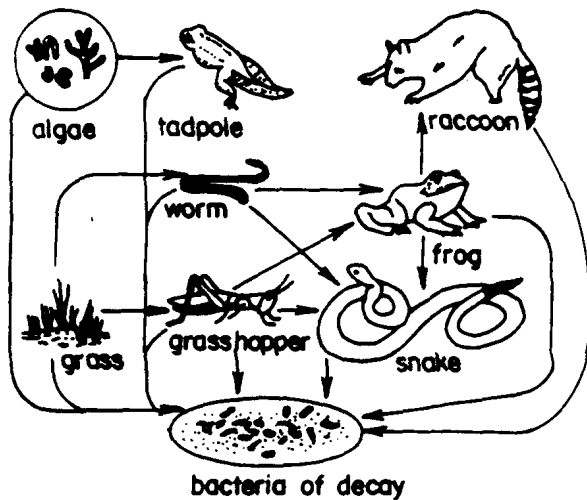
- A) herbivore, prey, autotroph, host
 - B) predator, scavenger, decomposer, consumer
 - C) carnivore, predator, heterotroph, multicellular**
 - D) producer, parasite, fungus, fish
35. The number of white-tailed deer in certain areas of Long Island, NY has increased significantly. Homeowners and farmers have put up tall fencing to protect their gardens and crops from the deer. One reason why the white tailed-deer might have increased significantly in certain areas of Long Island is
- A) the lack of natural predators**
 - B) an increase in deer pathogens
 - C) a shortage of biotic resources needed by the deer
 - D) that carrying capacity has no effect on deer populations
36. *Rafflesia arnoldii* is a bright red and yellow flowering plant that has no leaves, roots, or stems. *Rafflesia* do not carry out photosynthesis. They take nutrients from the cells of grapevines. *Rafflesia arnoldii* is an example of a
- A) producer
 - B) omnivore
 - C) carnivore
 - D) parasite**

Unit 6 - Evolution

37. Which statement is an example of the interdependence of organisms?

- A) Owls hunt at night.
- B) Ants get food from insects and protect insects from predators.**
- C) Ticks feed on the blood of animals and the ticks grow larger.
- D) Crows feed on dead mice.

Base your answers to questions 38 through 40 on the diagram below and on your knowledge of biology



38. Which two organisms are classified as producers?

- A) tadpole and worm
- B) algae and grass**
- C) grass and tadpole
- D) raccoon and algae

39. Carnivores are represented by the

- A) tadpole and worm
- B) grasshopper and frog
- C) frog and snake**
- D) raccoon and bacteria of decay

40. Decomposers are represented by the

- A) algae
- B) tadpole
- C) bacteria of decay**
- D) snake

41. Which group would most likely be represented in a food chain?

- A) biotic factors**
- B) abiotic factors
- C) inorganic compounds
- D) finite resources

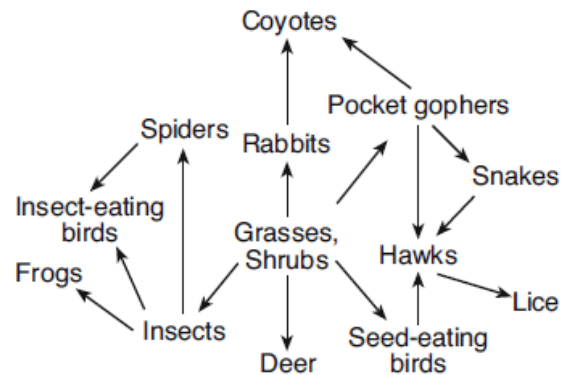
42. An incomplete food chain is shown below.

algae → minnow → lake trout → X

Which organism could be represented by the letter X?

- A) lobster
- B) jellyfish
- C) human**
- D) robin

43. The diagram below represents a food web.



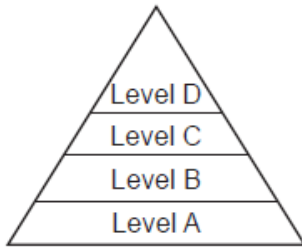
Which statement regarding organisms in this food web is correct?

- A) There would be more snakes than pocket gophers.
- B) There would be more coyotes than rabbits.
- C) There would be more insects than insect eating birds.**
- D) There would be more hawks than seed eating birds.

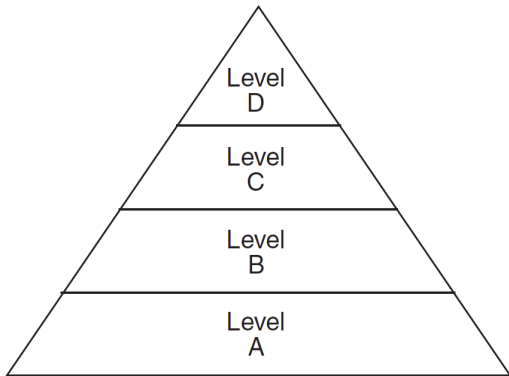
44. In 1859, a small colony of 24 rabbits was brought to Australia. By 1928, it was estimated that there were 500 million rabbits in a 1 million square mile section of Australia. Which statement describes a condition that probably contributed to the increase in the rabbit population?

- A) The rabbits were affected by many limiting factors.
- B) The rabbits reproduced by asexual reproduction.
- C) The rabbits were unable to adapt to the environment.
- D) The rabbits had no natural predators in Australia.**

45. Which level of the pyramid below is correctly paired with the type of organism that would most likely be found at that level in an ecosystem?



- A) **Level A - producers**
 - B) Level B - carnivores
 - C) Level C - herbivores
 - D) Level D - decomposers
46. An energy pyramid is represented below.



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

- A) producers
 - B) the Sun**
 - C) level B
 - D) level D
47. Water pollution as a result of fertilizer runoff from farms is harmful because it initially
- A) changes the chemical composition of nearby streams and lakes**
 - B) adds ozone to the atmosphere, increasing global temperatures
 - C) decreases the water temperature of streams and lakes
 - D) decreases the amount of nutrient recycling in lakes

48. A growing mass of plastic garbage is collecting in an area of the Pacific Ocean. This is caused by plastic garbage that is discarded by people, and it ends up in rivers that carry it to the ocean. Over time, ocean currents cause it to accumulate in this area of the Pacific. Currently, the mass is estimated to cover an area of ocean twice the size of Texas. As these plastics slowly break down, chemicals enter the water, and can enter ocean organisms that we might eventually use for food. This sequence of events illustrates that

- A) **humans modify ecosystems as a result of population growth, consumption, and technology**
- B) human activities that degrade ecosystems result in an increase in diversity of ecosystems
- C) when humans alter ecosystems by adding specific organisms, serious consequences could result
- D) industrialization brings a reduced demand for fossil and nuclear fuels

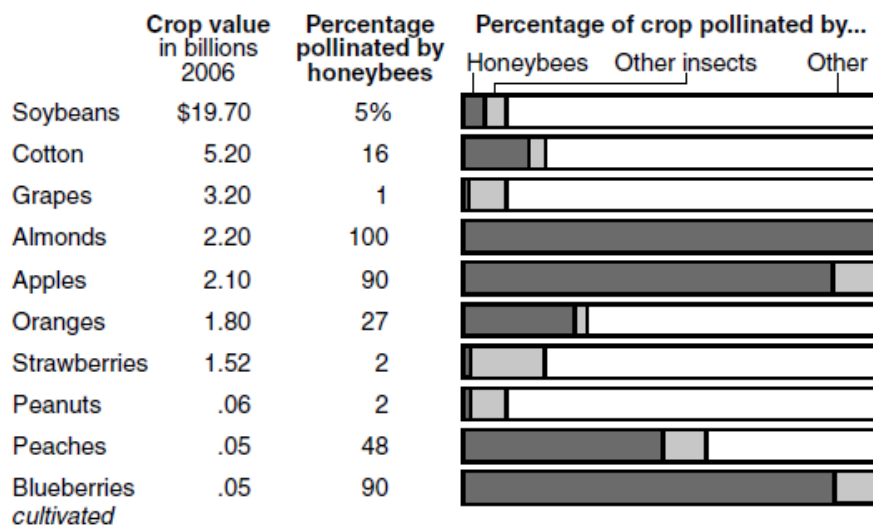
Unit 6 - Evolution

Base your answers to questions 49 and 50 on the information and chart below and on your knowledge of biology.

In recent years, biologists have noticed that honeybees responsible for pollinating food crops across the United States are dying at an alarming rate. Farmers, economists, and biologists are very worried about the impact that the loss of honeybees might have on the food supply.

Relying on Bees

Some of the most valuable fruits, vegetables, nuts and field crops depend on insect pollinators, particularly honeybees. Besides insects, other means of pollination include birds, wind and rainwater.



Adapted from: United States Department of Agriculture:
Roger A. Morse and Nicholas W. Calderone, Cornell University

49. Peach blossom pollinations could be at risk if there is a total loss of honeybee populations in areas where peaches are grown. Which action would be most likely to help peach growers stay in business and be able to produce good-sized crops of peaches?
- A) Hire scientists to find a way to kill other pollinating insects in the area so there are more peach blossoms for the honeybees to pollinate.
 - B) Hire researchers to identify which other native insects are able to pollinate peach blossoms and find a way to increase their populations.**
 - C) Encourage the peach growers to plant other kinds of fruit instead of peaches.
 - D) Genetically engineer peach trees to be able to reproduce without producing any fruit (peaches) or seeds.
50. Based on this information and the graph provided, which crops are most at risk if honeybees continue to decline?
- A) strawberries, peanuts, and grapes
 - B) almonds, apples, and blueberries**
 - C) almonds, oranges, and soybeans
 - D) peaches, cotton, and grapes

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51. Base your answer to the following question on the information below and on your knowledge of biology .

... Unless actions are taken to slow the decline of domesticated honeybees and augment [increase] their populations with wild bees, many fruits and vegetables may disappear from the food supply said Claire Kremen, a conservation biologist at Princeton University in New Jersey

• • • •

The honeybee decline, which is affecting domesticated and wild bee populations around the world, is mostly the result of diseases spread as a result of mites and other parasites as well as the spraying of crops with pesticides, scientists say

Source: "Bee Declines May Spell End of Some Fruits, Vegetables,"

National Geographic News, October 5, 2005

The decrease in the honeybee population is partly due to

- A) the use of pesticides
B) a decrease in prey
C) the use of fertilizers
D) a decrease in fruits and vegetables

52. Global warming has been linked to a *decrease* in the

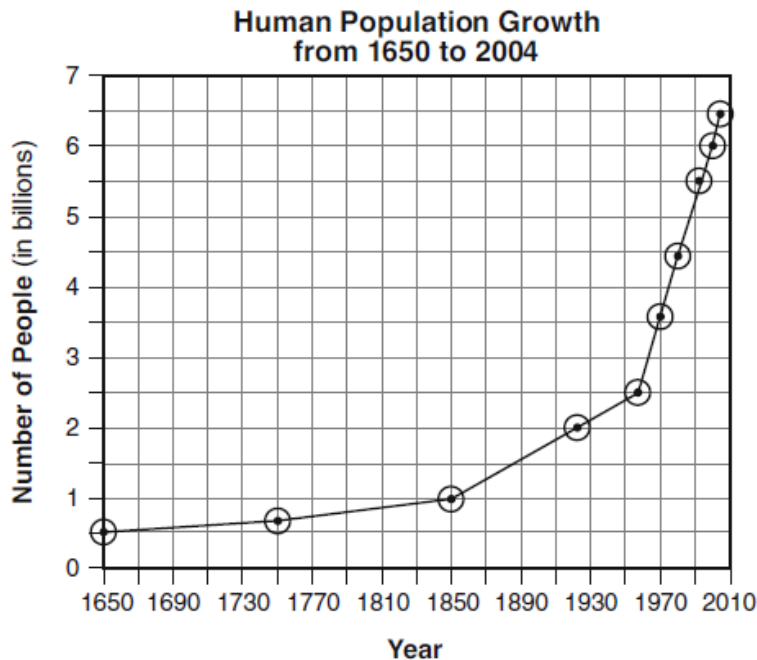
- A) size of the polar ice caps
B) temperature of the Earth
C) rate of species extinction
D) rate of carbon dioxide production

53. In which row in the chart below is a human action correctly paired with its environmental impact?

Row	Human Action	Environmental Impact
(1)	deforestation	increased biodiversity
(2)	population growth	increased number of species
(3)	industrialization	increased global temperature
(4)	overharvesting	increased mineral resources

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

54. The graph below shows data on human population growth.



The trend shown on the graph would most likely result in

- A) a decreased demand for deforestation
- B) an increase in available freshwater
- C) a decrease in air pollution
- D) an increased demand for land us**

Base your answers to questions 55 and 56 on the information below and on your knowledge of biology.

The emerald ash borer is an insect that was introduced into North America sometime in the 1990s. It probably arrived in the United States in wooden packing material carried in cargo ships or on airplanes coming from Asia. The ash borer was first reported killing ash trees in Michigan in 2002. Since then, it has spread to Pennsylvania and New York.

Since its arrival, the insect has destroyed tens of millions of trees. One of the ways the ash borer has been able to spread so quickly is through the transport of wood that is infested with their larvae. The USDA has proposed the introduction of Asian wasps to control the ash borer population.

55. One action that individuals can take to control the spread of the emerald ash borer is to

- A) spray all the oak trees at one time with a variety of pesticides
- B) plant only trees from Asia in yards and parks
- C) plant more ash trees to replace those that are infected
- D) use wood from only local sources for heating and for campfires**

56. The best explanation for the fact the emerald ash borer is not as great a problem in Asia as it is in the United States is that
- A) **there are few natural predators of the ash borer in the United States, while there are many in Asia**
 - B) the same pesticides that work in Asia do not work on controlling the ash borer in the United States
 - C) only healthy ash borers arrived in the United States, while many unhealthy ash borers are present in the population in Asia
 - D) the ash borers are not as adapted to the climate in the United States as they are to the one in Asia
-
57. In the California Mojave Desert, an energy company is building a large solar-power facility. It is expected to produce enough power for 140,000 homes and also cut carbon dioxide emissions by 500,000 tons a year. The facility will be built on 4,050 acres of wildlife habitat, which is near a protected refuge for a species of desert tortoise. The decision to build this power plant is most likely based on
- A) proving that positive atmospheric changes are less important than preserving wildlife
 - B) **a trade-off, weighing the need for a cleaner energy source versus the protection of a natural resource**
 - C) the fact that building these solar-power energy plants disrupts wildlife habitats
 - D) providing evidence that technological advances always produce positive environmental impacts
58. A serious threat to biodiversity is
- A) **habitat destruction**
 - B) maintenance of food chains
 - C) competition within a species
 - D) a stable population size
59. Modern methods of agriculture have contributed to the problem of soil depletion because many of these methods
- A) require smaller amounts of trace minerals
 - B) **interfere with natural cycles of elements**
 - C) use many varieties of grafted plants
 - D) depend on the practice of strip cropping

Answer Key
Unit 7 - Ecology

- | | |
|---------------------|---------------------|
| 1. <u>B</u> | 37. <u>B</u> |
| 2. <u>B</u> | 38. <u>B</u> |
| 3. <u>D</u> | 39. <u>C</u> |
| 4. <u>D</u> | 40. <u>C</u> |
| 5. <u>A</u> | 41. <u>A</u> |
| 6. <u>B</u> | 42. <u>C</u> |
| 7. <u>D</u> | 43. <u>C</u> |
| 8. <u>B</u> | 44. <u>D</u> |
| 9. <u>B</u> | 45. <u>A</u> |
| 10. <u>C</u> | 46. <u>B</u> |
| 11. <u>A</u> | 47. <u>A</u> |
| 12. <u>C</u> | 48. <u>A</u> |
| 13. <u>D</u> | 49. <u>B</u> |
| 14. <u>C</u> | 50. <u>B</u> |
| 15. <u>C</u> | 51. <u>A</u> |
| 16. <u>D</u> | 52. <u>A</u> |
| 17. <u>C</u> | 53. <u>C</u> |
| 18. <u>D</u> | 54. <u>D</u> |
| 19. <u>B</u> | 55. <u>D</u> |
| 20. <u>D</u> | 56. <u>A</u> |
| 21. <u>B</u> | 57. <u>B</u> |
| 22. <u>B</u> | 58. <u>A</u> |
| 23. <u>C</u> | 59. <u>B</u> |
| 24. <u>A</u> | |
| 25. <u>D</u> | |
| 26. <u>B</u> | |
| 27. <u>C</u> | |
| 28. <u>C</u> | |
| 29. <u>A</u> | |
| 30. <u>B</u> | |
| 31. <u>B</u> | |
| 32. <u>B</u> | |
| 33. <u>D</u> | |
| 34. <u>C</u> | |
| 35. <u>A</u> | |
| 36. <u>D</u> | |
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