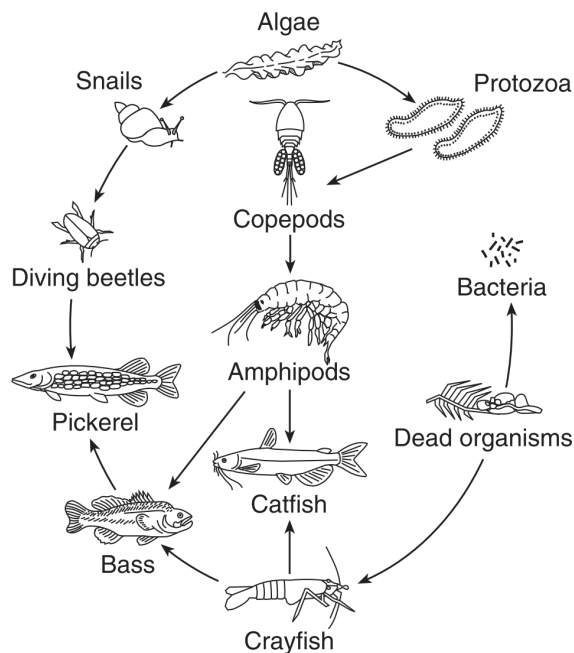


Name: _____

Date: _____

- The greatest number of relationships between the organisms in an ecosystem is best shown in
 - a food chain
 - an energy pyramid
 - a food web
 - an ecological succession diagram

2. Base your answer(s) to following question(s) on the diagram below, which represents a pond food web, and on your knowledge of biology.



Which statement best describes what will most likely happen if the amphipod population is removed from this food web?

- Population sizes of species at feeding levels both before and after amphipods will decrease.
- Population sizes of species at feeding levels both before and after amphipods will increase.
- Population sizes of species at feeding levels after amphipods will increase and before amphipods will decrease.
- Population sizes of species at feeding levels after amphipods will decrease and before amphipods will increase.

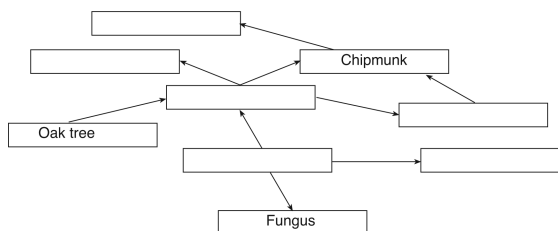
3. Base your answer(s) to the following question(s) on the information below and on your knowledge of biology.

An ecologist made some observations in a forest ecosystem over a period of several days. Some of the data collected are shown in the table below.

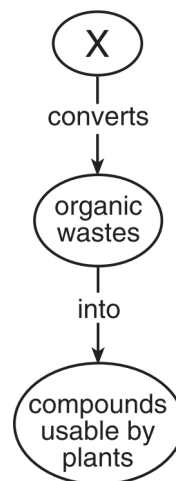
Observations in a Forest Environment

Date	Observed Feeding Relationships	Ecosystem Observations
6/2	<ul style="list-style-type: none"> white-tailed deer feeding on maple tree leaves woodpecker feeding on insects salamander feeding on insects 	<ul style="list-style-type: none"> 2 cm of rain in 24 hours
6/5	<ul style="list-style-type: none"> fungus growing on a maple tree insects feeding on oak trees 	<ul style="list-style-type: none"> several types of sedimentary rock are in the forest
6/8	<ul style="list-style-type: none"> woodpecker feeding on insects red-tailed hawk feeding on chipmunk 	<ul style="list-style-type: none"> air contains 20.9% oxygen
6/11	<ul style="list-style-type: none"> chipmunk feeding on insects insect feeding on maple tree leaves chipmunk feeding on a small salamander 	<ul style="list-style-type: none"> soil contains phosphorous

On the diagram below, complete the food web by placing the names of all the organisms in the correct locations.



4. The process illustrated in the sequence below occurs constantly in the biosphere.

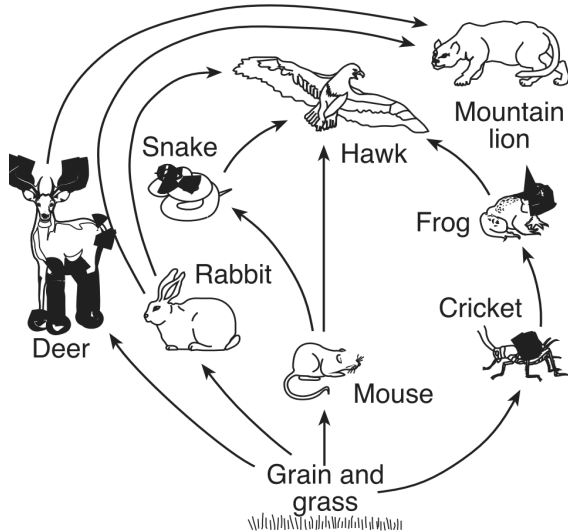


Which type of organism is most likely represented by X?

- decomposer
- producer
- herbivore
- carnivore

5. Base your answer(s) to the following question(s) on the information and food web below and on your knowledge of biology.

The organisms in the food web below live near large cattle ranches. Over many years, mountain lions occasionally killed a few cattle. One year, a few ranchers hunted and killed many mountain lions to prevent future loss of their cattle. Later, ranchers noticed that animals from this food web were eating large amounts of grain from their fields.



Identify *two* specific populations that most likely increased in number after the mountain lion population *decreased*. Support your answer.

6. Base your answer(s) to the following question(s) on the data table below and on your knowledge of biology. The data table shows the number of breeding pairs of bald eagles in New York State from 1991 to 2003.

Number of Breeding Pairs of Bald Eagles in New York State from 1991 to 2003

Year	Number of Breeding pairs
1991	15
1993	20
1995	25
1997	35
1999	45
2001	65
2003	75

State *one* possible reason for the increase in the number of breeding pairs of bald eagles in New York State.

7. Base your answer(s) to the following question(s) on the information below and on your knowledge of biology.

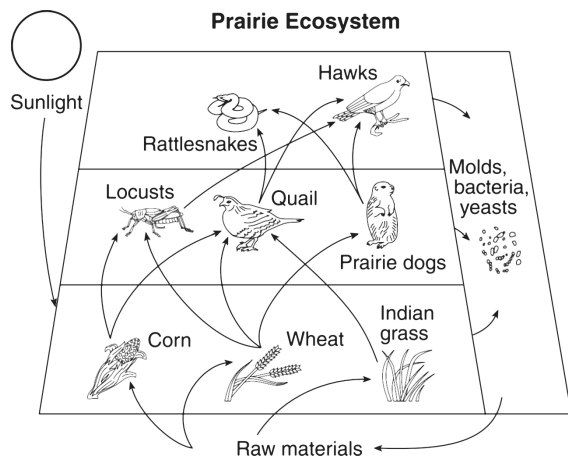
The chart describes the beaks of various types of birds that live in a small island ecosystem containing flowering land plants, aquatic plants, many small mammals, amphibians, and several species of trees.

Beak Shape	Beak Type	Adaptation and Use
	Cracker	Seed eaters like sparrows and cardinals have short, thick beaks for cracking seeds.
	Shredder	Birds of prey like hawks and owls have sharp, curved beaks for tearing meat.
	Chisel	Woodpeckers have beaks that are long and chisel-like for boring into wood to eat insects.
	Probe	Hummingbirds have beaks that are long and thin for probing flowers for nectar.
	Strainer	Some ducks have long, flat beaks that strain small plants and animals from the water.

Identify *one* kind of bird that would show an immediate *decrease* in number if the flowering land plants were destroyed by an environmental change. Support your answer.

8. Due to overfishing, the number of fish in the ocean could drastically decrease. This will cause
- an increase in the stability of the oceans
 - an increase in the salt content of the oceans
 - a decrease in the stability of the oceans
 - a decrease in the oxygen available in the oceans

9. Base your answers to the following question(s) on the diagram below and on your knowledge of biology. The diagram represents various levels of interaction between organisms in a prairie ecosystem.



Which statement best describes a function of the molds, bacteria, and yeasts in this ecosystem?

- A. They convert light energy into chemical energy.
- B. They carry out a food-making process, using inorganic raw materials.
- C. They break down dead organisms, releasing raw materials to the environment.
- D. They act as catalysts to speed up the energy flow between organisms.

10. A biologist collected the data shown in the table below.

Data Table

Type of Organism	Number of Organisms in a Field		
	May	July	September
grasshoppers	100	500	150
birds	25	100	10
spiders	75	200	50

Which statement is supported by the data in the table?

- A. Populations do not vary from month to month.
- B. The populations are highest in September.
- C. The grasshoppers increased in length in July.
- D. Seasonal variations may affect populations.

11. Base your answer(s) to the following question(s) on the information below and on your knowledge of biology.

Invasion of the Giant Rodents

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

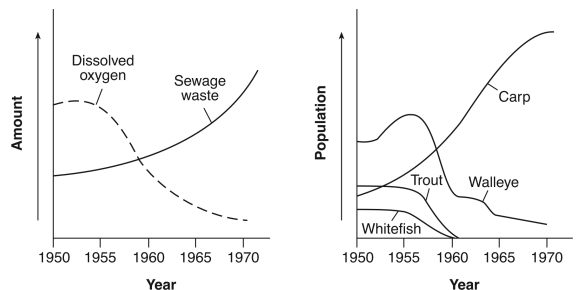
The nutria were brought in and raised in the southern United States for their fur. Nutria escaped and started a wild population.

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.

State *one* reason why the removal of plant life by the nutria can harm marshland ecosystems.

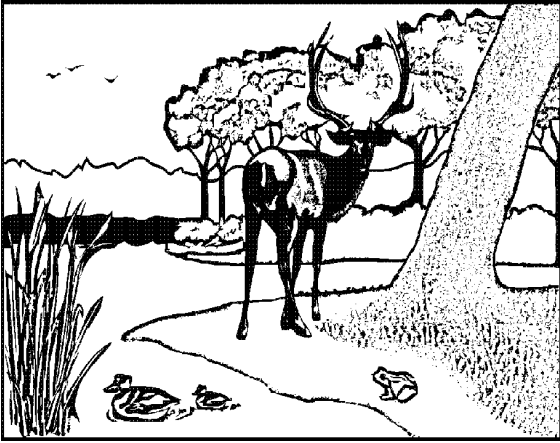
- 12. A wildlife manager in New Jersey wants to use poisons to destroy the nutria. State *one* problem that might result from this action.
- 13. The graphs below show dissolved oxygen content, sewage waste content, and fish populations in a lake between 1950 and 1970.



State what happened to the amount of dissolved oxygen and the number of fish species as the amount of sewage waste increased.

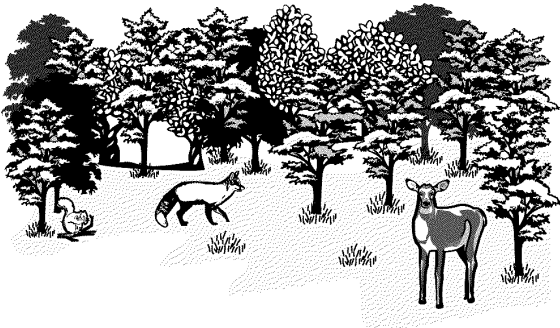
- 14. A fire burns an oak forest down to bare ground. Over the next 150 years, if the climate remains constant, this area will most likely
 - A. remain bare ground
 - B. return to an oak forest
 - C. become a rain forest
 - D. become a wetland

15. Which ecological term includes everything represented in the illustration?



- A. ecosystem B. community
C. population D. species

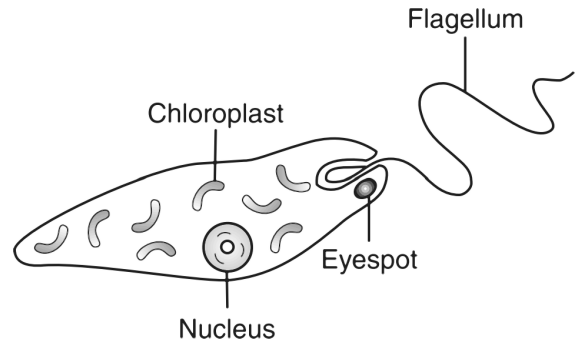
16. Which statement describes the ecosystem represented in the diagram below?



- A. This ecosystem would be the first stage in ecological succession.
B. This ecosystem would most likely lack decomposers.
C. All of the organisms in this ecosystem are producers.
D. All of the organisms in this ecosystem depend on the activities of biological catalysts.

17. Base your answers to the following question(s) on the information below and on your knowledge of biology.

Euglena are single-celled organisms that live in ponds. All euglena have chloroplasts and can make their own food. They can also take in food from the environment. The diagram below represents a euglena.



An experiment was set up to determine the effect of nitrates, a pollutant, on the number of chloroplasts present in euglena. Five tanks were set up, each with euglena and a different concentration of nitrate solution: 0%, 5%, 1.0%, 1.5%, and 2.0%. The tanks were placed in a sunny location where each tank received the same amount of light.

Euglena can be classified as both

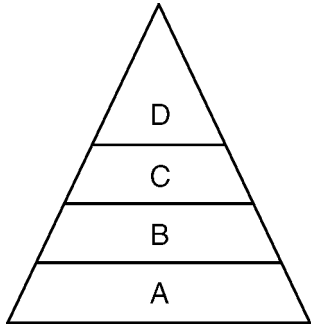
- A. an autotroph and a parasite
B. a decomposer and a heterotroph
C. a producer and a parasite
D. an autotroph and a heterotroph

18. Base your answer(s) to following question(s) on the information below and on your knowledge of biology.

In the abyssal zones (deepest zones) of oceans, organisms live in an ecosystem that lacks sunlight. Other environmental conditions include temperatures of 4°C and extremely high water pressure. Dead material from upper ocean zones sinks and settles in the abyssal zone.

State *one* possible way that some organisms living permanently in the abyssal zone could obtain energy.

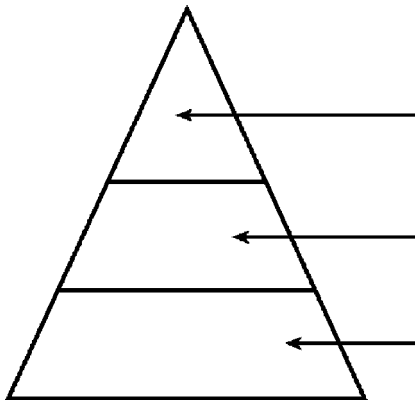
19. Which process provides the initial energy to support all the levels in the energy pyramid shown below?



- A. circulation B. photosynthesis
 C. active transport D. digestion
20. Base your answer(s) to the following question(s) on the information below and on your knowledge of biology.

Thirty grams of hay (dried grasses) were boiled in 500 milliliters of water, placed in a culture dish, and allowed to stand. The next day, a small sample of pond water was added to the mixture of boiled hay and water. The dish was then covered and its contents observed regularly. Bacteria fed on the nutrients from the boiled hay. As the populations of bacteria increased rapidly, the clear mixture soon became cloudy. One week later, microscopic examination of samples from the culture showed various types of protozoa (single-celled organisms) eating the bacteria.

Label each level of the energy pyramid below with an organism mentioned in the paragraph that belongs at that level.

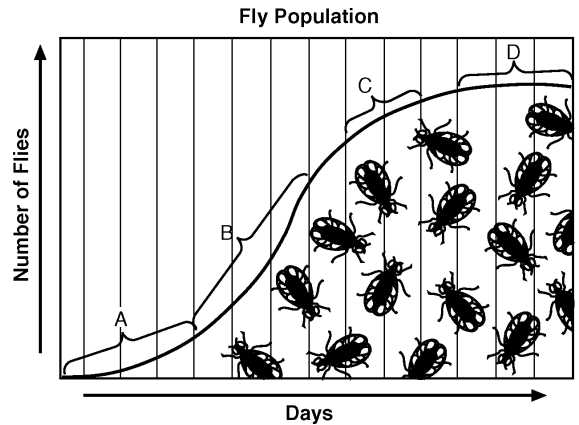


21. Three days after an organism eats some meat, many of the organic molecules originally contained in the meat would be found in newly formed molecules of

- A. glucose B. protein
 C. starch D. oxygen

22. A farmer has been growing only corn in his fields for several years. Each year the corn stalks were cut off near the ground and processed to be used as food for cattle. The farmer observed that with each passing year, corn production in his fields decreased. Explain why removing the dead corn stalks reduced corn production in these fields.

23. The graph below represents the growth of a population of flies in a jar.

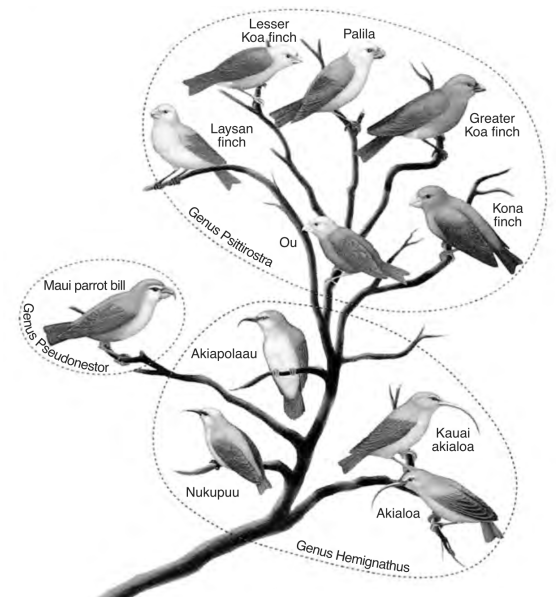


Which letter indicates the part of the graph that represents the carrying capacity of the environment in the jar?

- A. A B. B C. C D. D

24. Base your answer(s) to the following question(s) on the information and diagram below and on your knowledge of biology.

The circled areas in the diagram represent bird species that are in the same genus, a classification group that includes closely related species. These birds are found on the Hawaiian Islands.



Source: *Biology, 9th Edition*, Mader, McGraw-Hill, Boston, MA, 2007, p.313

If the Akialoa migrated to an ecosystem occupied by a Greater Koa finch, could both species survive? Support your answer.

25. 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?

- A. Rabbits have a high metabolic rate.
- B. There are few native predators of rabbits.
- C. Additional rabbit species have been introduced.
- D. There is an increase in rabbit competitors.

26. Base your answer(s) to the following question(s) on the information below and on your knowledge of biology.

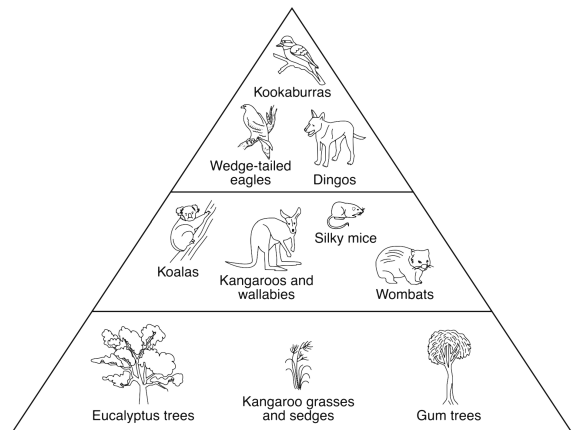
The last known wolf native to the Adirondack Mountains of New York State was killed over a century ago. Several environmental groups have recently proposed reintroducing the wolf to the Adirondacks. These groups claim there is sufficient prey to support a wolf population in this area. These prey include beaver, deer, and moose. Opponents of this proposal state that the Adirondacks already have a dominant predator, the Eastern coyote.

Explain why the coyote is considered a limiting factor in the Adirondack Mountains.

27. State *one* effect the reintroduction of the wolf may have on the coyote population within the Adirondacks. Explain why it would have this effect.

28. 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.

29. Base your answer(s) to the following question(s) on the diagram below and on your knowledge of biology. The diagram represents an energy pyramid for an ecosystem in the Australian outback.



Which two organisms could have a predator-prey relationship?

- A. kookaburras and gum trees
- B. kangaroos and silky mice
- C. dingos and kangaroo grasses
- D. wedge-tailed eagles and wombats

30. Base your answer(s) to the following question(s) on the information below and on your knowledge of biology.

Every population is linked, directly or indirectly, with many others in an ecosystem. The table below shows the size of the moose and wolf populations that live on an island in Lake Superior.

Moose and Wolf Populations

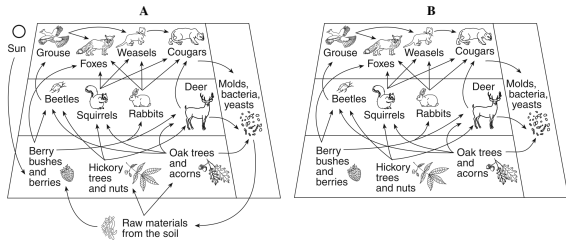
Year	Population Size	
	Moose	Wolves
1960	610	22
1965	733	28
1970	1295	18
1975	1355	41
1980	910	50
1985	1115	22
1990	1216	15
1995	2422	16
2000	850	29

Identify *two* limiting factors that keep the wolf population size from growing any larger.

31. State *one* possible ecological reason, other than human activity, for the change in the moose population between 1975 and 1980.

32. State how the information in the table can be used to determine that the wolves are the predators.

33. Base your answer(s) to the following question(s) on the diagrams below and on your knowledge of biology. The diagrams represent how various populations interact in a forest environment.



State what would most likely happen to *one* other population in this food web if all the squirrels and rabbits were suddenly killed by a viral disease. Support your answer.

34. Which diagram, *A* or *B*, most accurately represents interactions between biotic and abiotic factors in a forest environment? Support your answer.

35. Years after the lava from an erupting volcano destroyed an area, grasses started to grow in that area. The grasses were gradually replaced by shrubs, evergreen trees, and finally, by a forest that remained for several hundred years. This entire process is an example of

- A. feedback
- B. ecological succession
- C. plant preservation
- D. deforestation

36. Base your answer(s) to the following question(s) 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.”

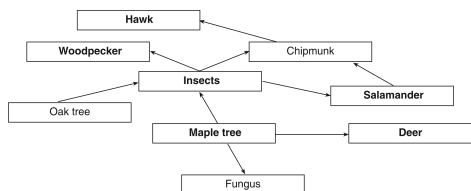
Explain the importance of biodiversity to an ecosystem. In your answer, be sure to:

- state *one* effect of a loss of biodiversity in an ecosystem
- identify a source of variation within a species that leads to biodiversity
- 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
- identify *one* human activity, other than setting up protected wildlife areas, that has helped to preserve biodiversity

1.
Answer: C

2.
Answer: D

3.
Answer:



4.
Answer: A

5.
Answer: rabbit and deer—They have fewer predators.

6.
Answer:

- decreased pesticide use
- decreased human impact on their environment
- more food available
- They were protected by laws.
- Breeding programs were established.

7.
Answer:

- hummingbirds-no flowers available to obtain nectar from
- sparrows-no seeds available for food
- birds with cracker beaks-no seeds available for food

8.
Answer: C

9.
Answer: C

10.
Answer: D

11.
Answer:

- Plants provide food for native consumers.
- Fish hide among plants to avoid predators.
- The marshland food web might be altered.
- Decreased biodiversity.

12.
Answer:

- Other animals might be poisoned.
- Beneficial organisms might be destroyed.
- The poisons might be harmful to people.

13.
Answer: both decreased

14.
Answer: B

15.
Answer: A

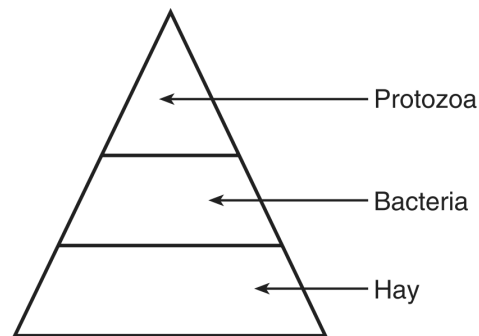
16.
Answer: D

17.
Answer: D

18.
Answer: From living or dead organisms that descend from the upper levels; wastes from above

19.
Answer: B

20.
Answer:



21.
Answer: B

22.
Answer: Materials are not recycled or Soil minerals decrease.

23.
Answer: D

24.
Answer:

- Yes, but only if there is food that the Akialoa can eat, since it has a very different beak.
- No, because the environment might not contain the type of food the Akialoa can eat.
- Yes, because they won't compete for food.
- Yes, if they have different niches.
- No, it is not the habitat that the Akialoa are adapted to.
- Yes, because based on beak shape, they eat different foods.

25.
Answer: B

26.
Answer: The coyotes control the growth of certain prey populations.

27.
Answer: The coyote population will decrease, as the wolf will be a competitor for the same prey as the coyote. OR The coyote population will be unaffected because there is sufficient prey for both the wolf and the coyote.

28.
Answer:

- abundant food supply
- no natural predators in the new environment
- There is a more favorable climate.
- fewer competitors

29.
Answer: D

30.
Answer: – number of moose – living space on the island – diseases – competition with other predators – weather conditions – hunting
31.
Answer: – There were more wolves, so the moose were being killed off. – There may have been less food available for the moose, since the moose population had been growing for 20 years. – Disease may have affected the moose population. – There may have been really bad winters.
32.
Answer: – There are fewer predators than there are prey, so the wolf is the predator. – In a food chain/food pyramid, there are more prey animals than there are predators.
33.
Answer: – The fox/weasel/cougar population would decrease because of less food.
– The oak trees would increase because there would be more acorns.
– The deer population might increase due to less competition for available food.
– The deer population might decrease due to greater predation by cougars.
– There would be more competition among foxes/weasels/cougars because of a decrease in food.
34.
Answer: – The diagram shows the Sun and living things.
– There are both biotic and abiotic factors shown in diagram A.
– Diagram A includes the Sun and raw materials.
– There are no abiotic factors in food web B.
– Diagram B does not show the original source of energy.
– Diagram B is missing an energy source and raw materials from the soil.
35.
Answer: B
36.
Answer: – the less biodiversity there is in an ecosystem, the less stable the ecosystem will be; a loss of biodiversity would make it harder for the ecosystem to maintain stability; it would reduce resources/food/shelter that are used by the organisms in the ecosystem; a species might become extinct
– a tropical rain forest: deforestation; Lake Erie: agricultural runoff/overfishing/introduction of non-native species; Gulf of Mexico: oil spill; lakes in Adirondack Mountains: acid rain; arctic seas: global warming
– establishing endangered species lists and laws that protect endangered species and their habitats; setting up laws that regulate the release of pollutants; enacting hunting or fishing regulations that protect endangered species; recycling of metals and plastics; replanting trees; stopping/slowing deforestation; breeding programs; regulating what chemicals can be used on farms