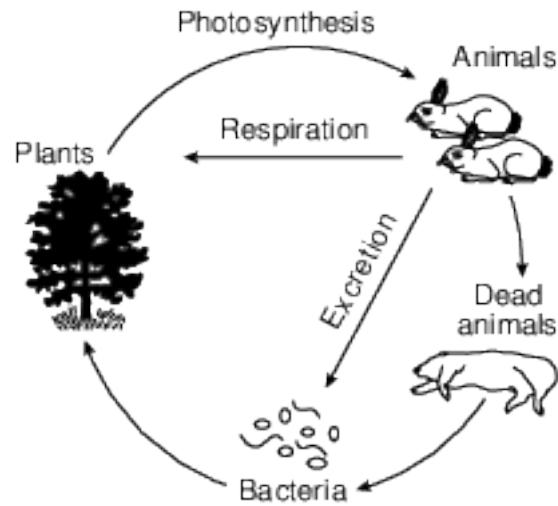


Organization Of Ecosystems

- 1 Scientists have found that although plants require light to carry on photosynthesis, very high levels of sunlight can kill some plants. This illustrates that many biochemical processes may occur
- more rapidly when temperatures are very high
 - within a specific range of conditions
 - best in the absence of abiotic factors
 - even if homeostasis is disrupted
- 2 Wildflowers grow and reproduce during the spring snowmelt in the desert region of Death Valley, California. Which environmental factor would most likely have the greatest influence on these activities?
- percentage of nitrogen in the atmosphere
 - number of plant species in the area
 - variety of scavengers in the ecosystem
 - amount of time that water is present

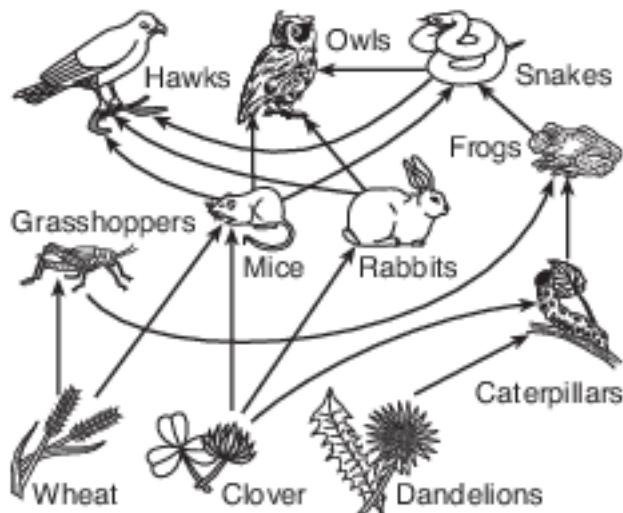
- 3 The diagram below represents various factors in an area.



The diagram best represents

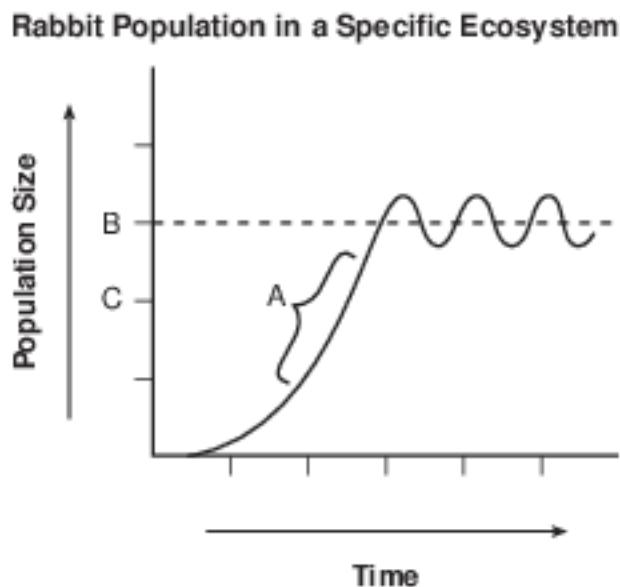
- the recycling of energy in a forest community
- ecological succession after climatic changes
- competition for limited resources in a population
- the flow of materials in a forest community

Base your answers to questions 4 on the diagram below and on your knowledge of biology. The diagram represents a food web in an ecosystem.



- 4 Missing from the diagram of this ecosystem are the
- (1) biotic factors and decomposers
 - (2) abiotic factors and decomposers
 - (3) autotrophs, only
 - (4) heterotrophs, only

Base your answers to questions 5 on the graph below and on your knowledge of biology. The graph shows the growth of a population of rabbits in a specific ecosystem.

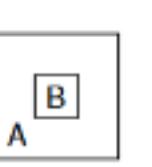


- 5 Which environmental factor could have caused the change indicated at A?
- (1) increased predation by herbivores
 - (2) increased availability of food
 - (3) increased number of decomposers
 - (4) increased competition among carnivores
- 6 Scientists have recently discovered a community of bacteria and clams living under an ice shelf in Antarctica. These organisms live under 600 feet of ice, in the absence of sunlight, and in temperatures considered too cold for most living organisms. The location where these organisms live is unusual because
- (1) only biotic factors control the size of the populations
 - (2) bacteria and clams are found in the same area
 - (3) of the abiotic factors found in their environment
 - (4) green plants make energy-rich compounds available

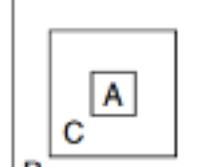
- 7 The chart below shows three ecological terms used to describe levels of organization on Earth.

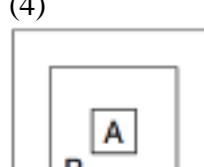
A	ecosystem
B	population
C	biosphere

Which diagram best represents the relationship of these ecological terms?

- (1)  A large square contains a smaller square labeled B, which contains a letter A.

(2)  A large square contains a smaller square labeled C, which contains a letter A.

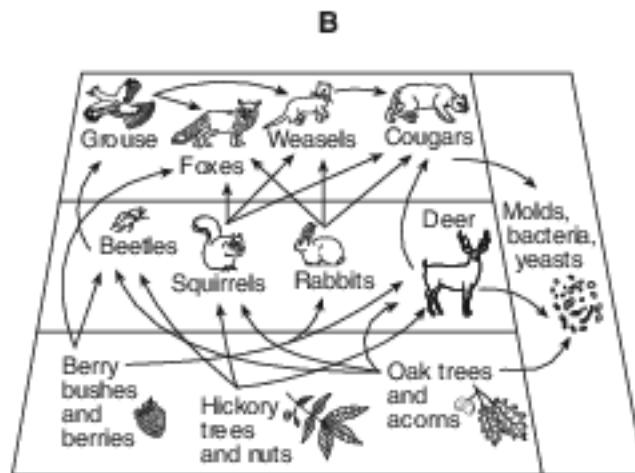
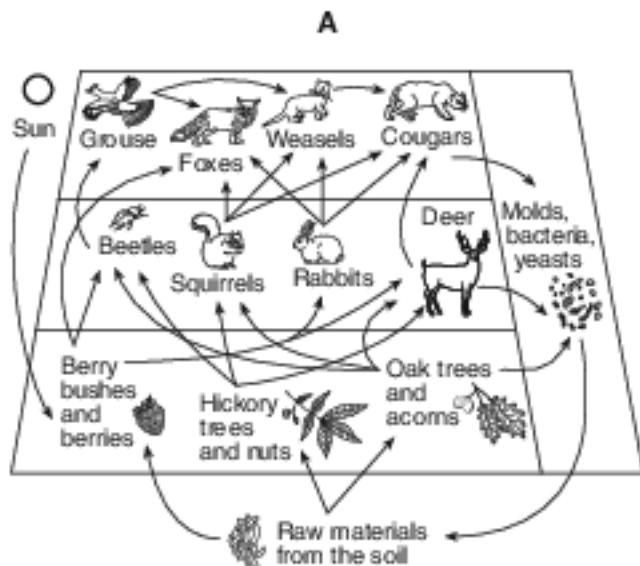
(3)  A large square contains a smaller square labeled A, which contains a letter C.

(4)  A large square contains a smaller square labeled A, which contains a letter B.

- 8 The organisms in a pond and the physical factors influencing them best describe

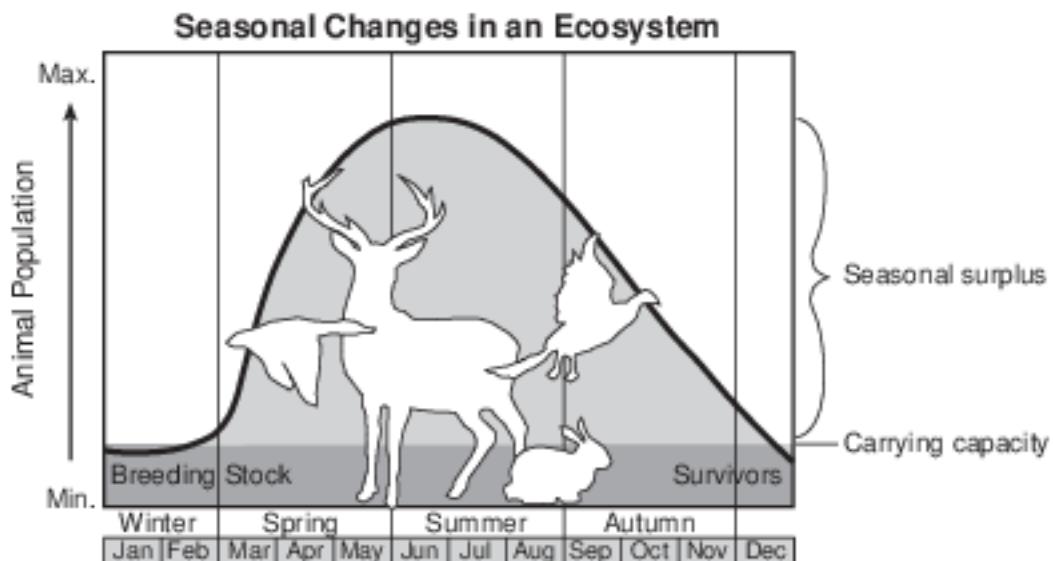
(1) a population (3) a biosphere
(2) an ecosystem (4) a food chain

Base your answers to questions 9 on the diagrams below and on your knowledge of biology. The diagrams represent how various populations interact in a forest environment.



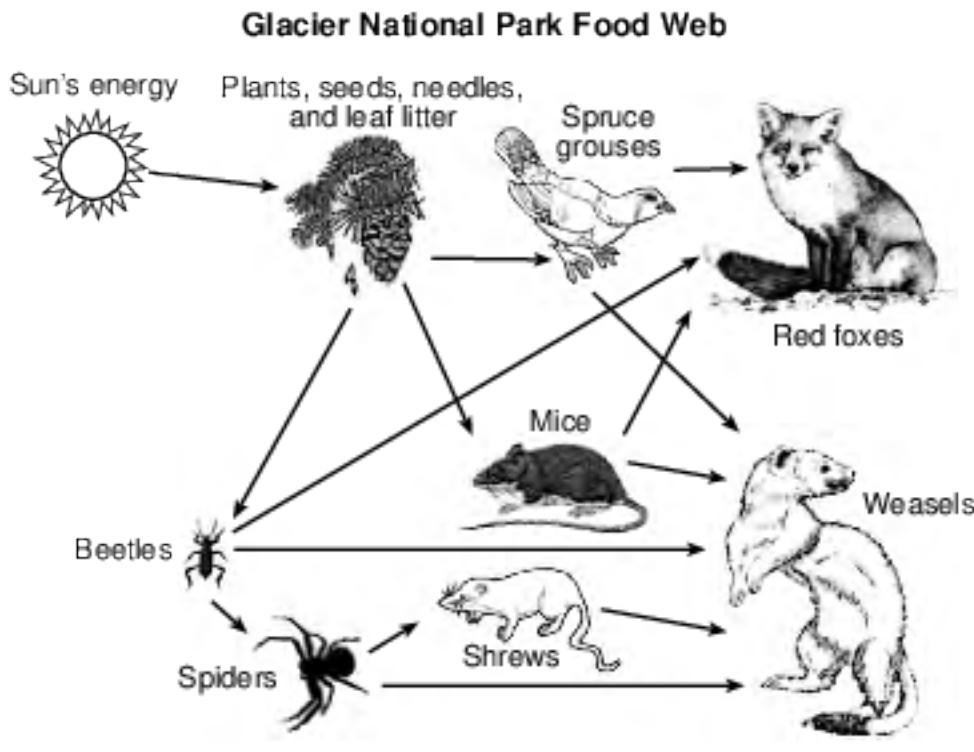
- 9 If this forest community experienced a severe lack of rain throughout the spring and summer seasons, state what effect this drought could have on the grouse population. Support your answer. [1]

Base your answers to questions 10 on the chart below and on your knowledge of biology. The chart shows seasonal changes in an ecosystem and the overall carrying capacity of the ecosystem.



- 10 State why the populations decrease between July and December. [1]

Base your answers to questions 11 on the food web represented below and on your knowledge of biology. The food web contains some of the organisms found in Glacier National Park.



Source: www.nps.gov

- 11 Explain why a major increase in the number of cloudy days that extends over a period of years would be expected to affect the populations of both plants and animals in this ecosystem. [1]
- 12 Recently, the bison population in Yellowstone National Park declined significantly. This was due in part to a particularly harsh winter. State one reason why a harsh winter would have this negative effect on the bison population. [1]

Base your answers to questions 13 on the information and photograph below and on your knowledge of biology. The photograph shows a grasshopper mouse howling after eating a scorpion.



Source: Michael and Patricia Fogden/Minden/NGS

Grasshopper Mice

In the Sonoran Desert in the southwestern United States, the grasshopper mouse is active at night, searching for crickets, rodents, tarantulas, and even scorpions. The mouse ignores the venom of the scorpion, kills it, and consumes its flesh. The ability of the mouse to ignore the pain normally associated with the venom of the scorpion is due to the presence of a mutated protein. This protein prevents the pain signal from reaching the brain.

These mice are born killers, capable of taking down prey that are much larger than themselves. They are also aggressive neighbors and take over nests by displacing other desert inhabitants rather than making their own. Under difficult environmental conditions, they may even eat members of their own species.

- 13 Identify one advantage to grasshopper mice of being active during the night rather than daylight. [1]

Base your answers to questions 14 on the information below and on your knowledge of biology.

Found: A Plant-Eating Spider

Spiders are meat-eaters. Until recently, scientists thought that was true for the roughly 40,000 spider species in the world. Now, researchers have discovered a spider that eats mostly plants.

Bagheera kiplingi, a jumping spider, lives in Central America and Mexico. It nests in the leaves of acacia shrubs. Scientists have long known that ants live in these plants. The ants eat the plants' little yellow vegetables. But scientists had no idea that the spiders eat the vegetables too.

Christopher Meehan was a college student when he found the plant nibbling spiders. "I thought I was hallucinating," he told TFK (Time for Kids). "But by the end of the day, I had seen about 100 more spiders eating plants."

Source: Time for Kids World Report,

Edition 10/23/09 Vol. 15, #7 p.3

- 14 Identify one abiotic factor that most likely affects the size of the acacia shrub population. [1]

Base your answers to questions 15 on the information below and on your knowledge of biology.

Hydrothermal Vent Communities

Scientists discovered a unique hydrothermal ecosystem on the sea floor at hot-water vents thousands of feet below the ocean surface. Organisms in these deep-sea regions have no access to sunlight, so they depend on the heat, methane, and high levels of sulfur-bearing minerals found in the heated fluids in which they live. Scientists were amazed to discover vent communities able to sustain vast amounts of life. The vent organisms depend on bacteria that can use the sulfur-bearing minerals to produce organic materials. These bacteria live on rock surfaces and as free-floating blobs. Some bacteria live within and provide nutrients for an unusual species of giant tubeworms that lacks a digestive system. Snails, shrimp, and clams are among the animals that feed directly on the bacteria. Crabs feed directly on other animals in the vent community.

- 15 Identify one abiotic factor that makes the hydrothermal vent ecosystem different from other ocean ecosystems. [1]

Answer Keys

1 2

2 4

3 4

4 2

5 2

6 3

7 1

8 2

9 Allow 1 credit for stating what effect this drought could have on the grouse population and for

- supporting the answer. Acceptable responses include, but are not limited to:
 - — Lack of rain could cause plants to die off, decreasing the food available for the beetles, which would die off, causing the grouse population to also decrease.

10 Allow 1 credit. Acceptable responses include, but are not limited to:

- — There is not enough food, so some die of starvation.
- — disease
- — Predators kill them.
- — hunting
- — colder weather
- — They are over the carrying capacity.
- — increased competition
- — They migrate.

11 Allow 1 credit. Acceptable responses include, but are not limited to:

- — Both the plants and animals would be negatively affected, since the rate of photosynthesis would slow down with less light from the Sun available, and less food would be available for animals to eat.
- — The plant and animal populations would both decrease with less energy available for them because of less light for the plants.
- — These organisms would have less food because of less photosynthesis occurring, so there would be fewer of them.
- — It would affect both plants and animals negatively, because the plants would receive less light to make food.

12 Allow 1 credit. Acceptable responses include, but are not limited to:

- — The young and old bison are more likely to perish during a harsh winter.
- — More energy is used by the bison to keep warm.
- — Less food is available.

13 Allow 1 credit. Acceptable responses include, but are not limited to:

- — Their hunting is not affected by the extreme heat during the day.
- — They are better able to sneak up on prey in the dark.
- — They are not as likely to be dehydrated by the hot Sun and will need less water.
- — Their prey are active at night.
- — They are less visible to predators/prey.

14 Allow 1 credit. Acceptable responses include, but are not limited to:

- — light
- — minerals/nutrients
- — water/rainfall
- — temperature

15 Allow 1 credit. Acceptable responses include, but are not limited to:

- — absence of light
- — sulfur-bearing minerals/methane
- — high temperatures/heat
- — The pressure is very high at deep ocean depths.