

Name:

1. Anoles are a group of lizards consisting of approximately 400 species. A scientist studying them on an island observed two species that live in different habitats and display different behaviors. His observations are listed in the table below.

Observations of Two Species of Anoles

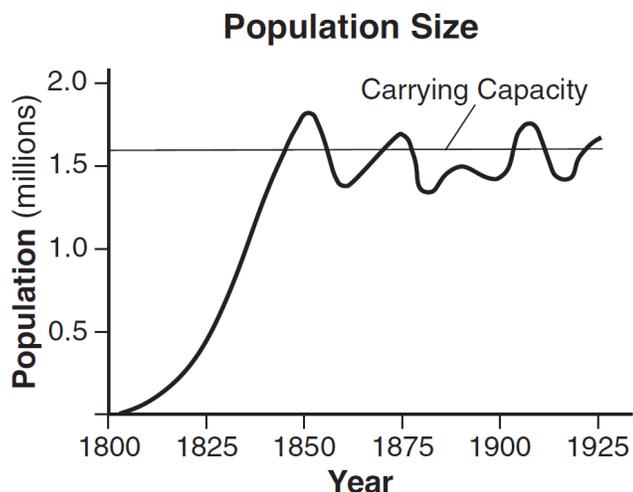
Characteristics	Species A	Species B
length	130 – 191 mm	55 – 79 mm
toepad size	large	intermediate
color	usually green	brown
tail length	long	long

Based on the scientist's observations, which statement best describes these two species of anoles?

- A) Both species evolved through the process of ecological succession.
 B) Each species is adapted to a different niche.
 C) The two species can interbreed.
 D) Species *A* is an herbivore and species *B* is a decomposer.
2. When two different bird species temporarily occupy the same niche, they would most likely
- A) change their nesting behaviors
 B) not affect one another
 C) interbreed to form a new species
 D) compete with one another
3. In a pine forest, there are different species of birds known as warblers that are able to coexist on the same pine trees. The Cape May warblers feed on insects located on the tips of the highest pine branches. The yellow-rumped warblers feed on insects on lower branches of the same trees. The different feeding locations for these two species of warblers indicate that they have different
- A) niches
 B) ecosystems
 C) methods of asexual reproduction
 D) methods of selective breeding
4. Two organisms of different species are *not* likely to compete for the same
- A) food B) mate C) space D) water

5. Many biotic factors affect individuals in a population. An example of an organism being directly affected by a biotic factor is
- A) a squirrel cannot find a mate
 B) a flood washes away a maple tree
 C) a plant is in a dark room
 D) a chipmunk finds a rock pile to use for a home
6. A finite resource in the environment that keeps a population from steadily increasing is known as
- A) dynamic equilibrium
 B) a limiting factor
 C) a reproductive enzyme
 D) ecological succession
7. Members of a bird-watching club observed the activities of three species of birds for an entire spring and summer. They noticed that the different species fed at different heights in the same pine tree. Which ecological concept is supported by this observation?
- A) Organisms that feed on different foods in the same area of an ecosystem fill the same niche.
 B) Organisms that live in the same ecosystem can occupy different niches in the ecosystem.
 C) Different species feeding in the same ecosystem will eventually compete with each other, eliminating all the species except one.
 D) Different species living in the same area of an ecosystem usually have the same physical characteristics.
8. A scientist was studying a population of fish in a pond over a period of 10 years. He observed that the population increased each year for 3 years, and then remained nearly constant for the rest of the study. The best explanation for this observation is that the population had
- A) stopped reproducing
 B) reached carrying capacity
 C) mutated into a different species
 D) run out of food and migrated to a different pond

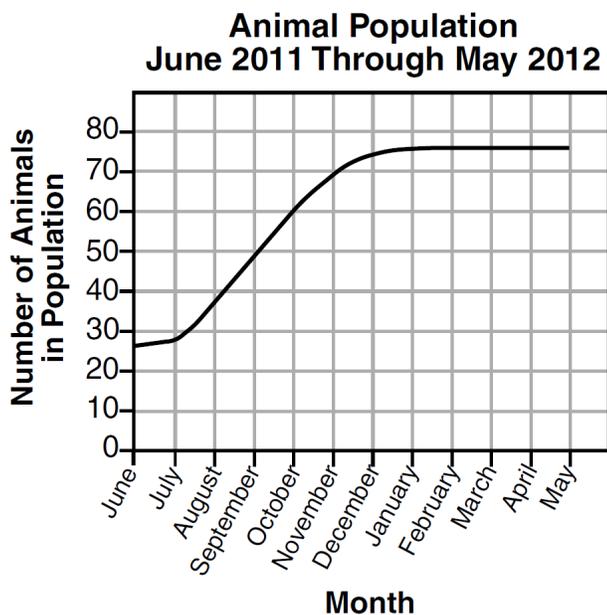
9. The graph below shows the size of a population of foxes over a period of years.



If the line did not stay around the carrying capacity, but continued to rise, which concept would this graph best illustrate?

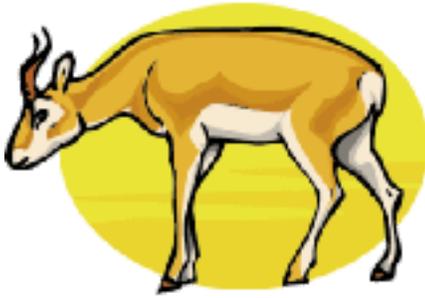
- A) environmental stability
- B) genetic variety
- C) behavioral change
- D) overproduction

10. Base your answer to the following question on the information and graph below and on your knowledge of biology. The graph shows the number of animals in a population throughout the course of a year. The population migrated into the area at the beginning of 2011.



The graph can best be used to illustrate

- A) a food chain
- B) ecological succession
- C) natural selection
- D) carrying capacity



The Lesson of the Kaibab

Introduction: The environment may be altered by forces within the biotic community, as well as by relationships between organisms and the physical environment. The **carrying capacity** of an ecosystem is the maximum number of organisms that an area can support on a sustained basis. The density of a population may produce such profound changes in the environment that the environment becomes unsuitable for the survival of that species. For instance, overgrazing of land may make the land unable to support the grazing of animals that lived there.

Objectives:

- Graph data on the Kaibab deer population of Arizona from 1905 to 1939
- Determine factors responsible for the changing populations
- Determine the carrying capacity of the Kaibab Plateau

Background

Before 1905, the deer on the Kaibab Plateau were estimated to number about 4000. The average carrying capacity of the range was then estimated to be about 30,000 deer. On November 28th, 1906, President Theodore Roosevelt created the Grand Canyon National Game Preserve to protect the "finest deer herd in America."

Unfortunately, by this time the Kaibab forest area had already been overgrazed by sheep, cattle, and horses. Most of the tall grasses had been eliminated. The first step to protect the deer was to ban all hunting. In addition, in 1907, The Forest Service tried to exterminate the predators of the deer. Between 1907 and 1939, 816 mountain lions, 20 wolves, 7388 coyotes and more than 500 bobcats were killed.

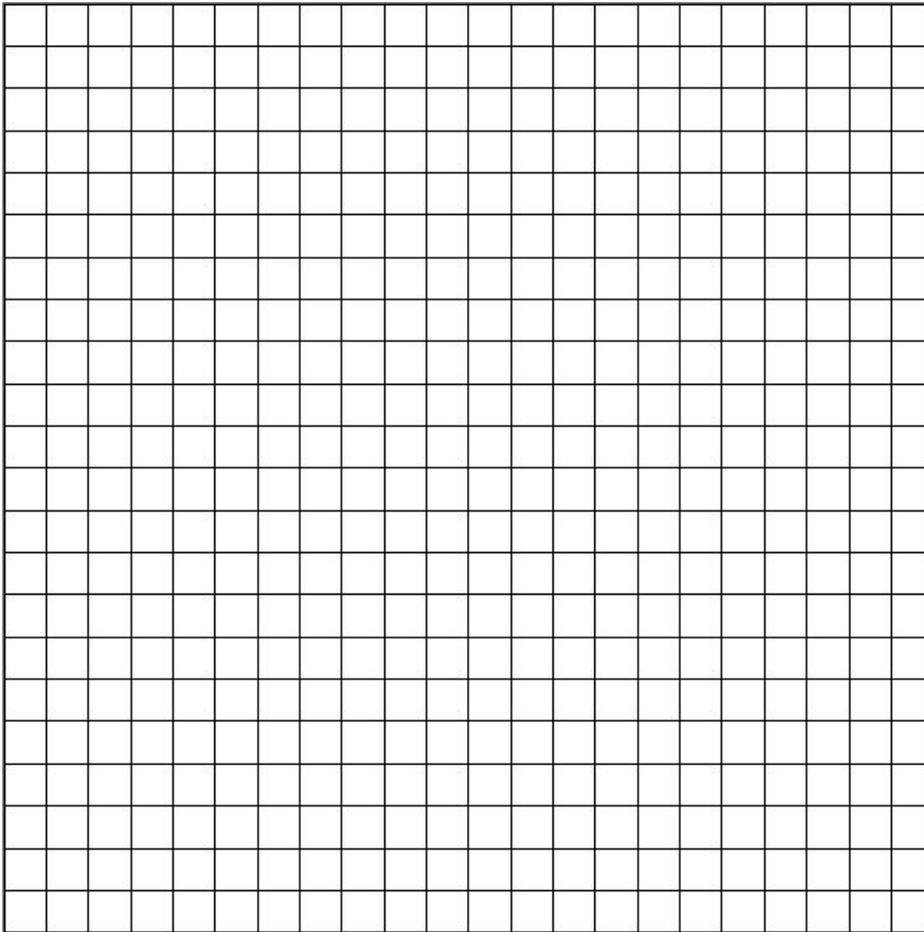
Signs that the deer population was out of control began to appear as early as 1920 - the range was beginning to deteriorate rapidly. The Forest Service reduced the number of livestock grazing permits. By 1923, the deer were reported to be on the verge of starvation and the range conditions were described as "deplorable."

The Kaibab Deer Investigating Committee recommended that all livestock not owned by local residents be removed immediately from the range and that the number of deer be cut in half as quickly as possible. Hunting was reopened, and during the fall of 1924, 675 deer were killed by hunters. However, these deer represented only one-tenth the number of deer that had been born that spring. Over the next two winters, it is estimated that 60,000 deer starved to death.

Today, the Arizona Game Commission carefully manages the Kaibab area with regulations geared to specific local needs. Hunting permits are issued to keep the deer in balance with their range. Predators are protected to help keep herds in balance with food supplies. Tragic winter losses can be checked by keeping the number of deer near the carrying capacity of the range.

DATA

1. Graph the deer population data. Place time on the X axis and "number of deer" on the Y axis. Make a **LINE GRAPH!**



Data Table	
Year	Deer Population
1905	4,000
1910	9,000
1915	25,000
1920	65,000
1924	100,000
1925	60,000
1926	40,000
1927	37,000
1928	35,000
1929	30,000
1930	25,000
1931	20,000
1935	18,000
1939	10,000

Analysis

1. During 1906 and 1907, what two methods did the Forest Service use to protect the Kaibab deer?
2. Were these methods successful? Use the data from your graph to support your answer.
3. Why did the population of deer decline in 1925?
4. Why do you think the deer population size in 1900 was 4,000 when it is estimated that the plateau has a carrying capacity of 30,000?
5. Based on these lessons, suggest what YOU would have done in the following years to manage deer herds.

1915:

1923: