

Name: _____

Populations – PreAP

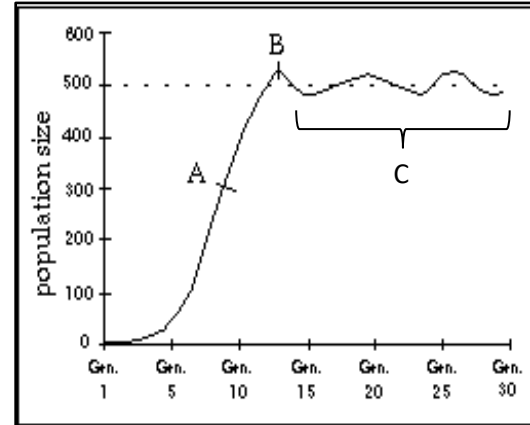
Worksheet

What happened to these populations? Read each passage #1 and #2 and answer the questions that follow.

#1. The Introduction of Rabbits to Tasmania



The very first rabbits to arrive in Tasmania (an island off the coast of southern Australia) at the turn of the 18th century found a vast land rich in edible plants, protective habitats, and without any natural predators. The rabbit population grew rapidly as they spread across the island, consuming native grasses. Though the grasses could grow fairly quickly (in roughly 12 months), the rabbits were able to reproduce much faster (every 6 months). The rabbit population continued to grow exponentially for nearly 15 generations until the supply of food on the island was exhausted – causing many rabbits to starve to death. This decline continued until some grasses on the island were able to re-grow, and could once again sustain more rabbits. Between grass that was new and grass which was re-growing, there was always enough grass for roughly half-a-million rabbits. The population continued to oscillate (increase and decrease) slightly over time, but remained fairly constant around 500,000 individuals.



1. What is the maximum number of rabbits this ecosystem can stably support? _____

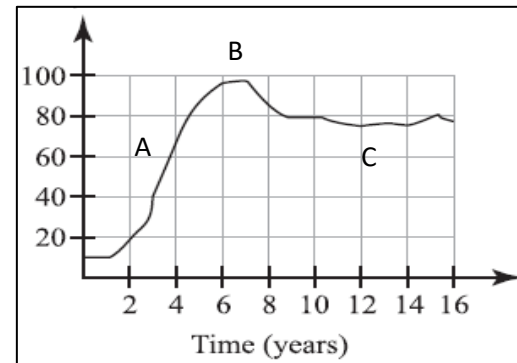
2. What factor limited how large the rabbit population could get? _____

3. What is the carrying capacity of this population? _____ What type of growth occurred at point A on the graph? _____

#2. Wolverines & Territory Size



Wolverines are small carnivorous animal related to weasels. Wolverines are known to be able to eat many different animals, and usually do not have difficulty finding food. However, they are fiercely territorial and require large tracts of land for their territories. If they do not maintain these large territories, they risk competing over living-space, food, mates, or water. A large earthquake in northern Canada isolated a population of roughly 15 wolverines in a large forest. The wolverine population grew very rapidly until they had exceeded the number that could live in the space of the forest. At that point, competition between wolverines whose territories overlapped caused the wolverine population to decline. This increased the amount of available space, and the wolverine population was able to rebound. This cycle continued, with the population stabilizing around 80 wolverines.



1. What is the carrying capacity for wolverines in this ecosystem? _____

2. What factor limited how large the wolverine population could get? _____

Was this a density dependent or density independent factor? _____

In the examples above, both species were said to have reached the “carrying capacity” of their environments after some time. Using the information contained in both passages, as well as the population graphs provided, brainstorm a definition for the term “carrying capacity”.

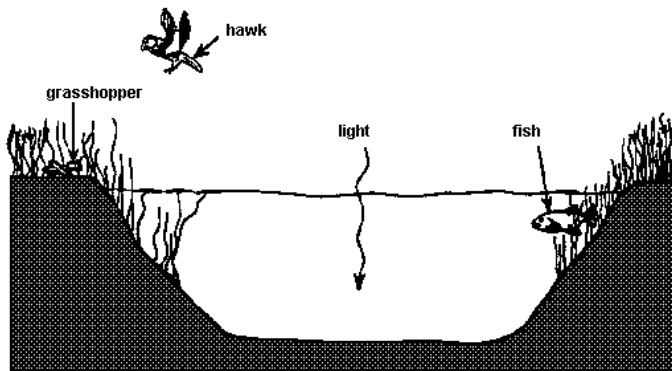
Limiting Factors:

A limiting factor is one that prevents the population from increasing. There are two types.

A density dependent limiting factor “depends” on the population itself. In other words, it would not occur if the population did not exist. Examples are starvation, predation, disease and hunting. All of these “limit” the population number.

A density independent limiting factor will occur whether or not a population exists. Examples are flooding, tornado, pollution and fire. If these occur where a population is, the numbers in the population will likely decrease.

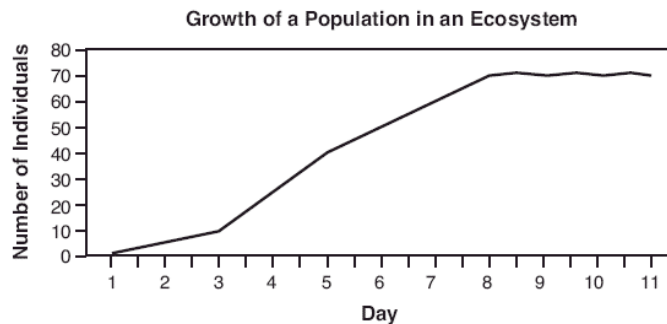
Use the diagram below to answer question 6. The diagram represents a pond in New York State.



7. Identify one abiotic factor in the diagram that functions as a limiting factor for the autotrophs in this ecosystem, and explain why it would be considered a limiting factor and what kind of limiting factor it is.

8. Ten breeding pairs of rabbits are introduced onto an island with no natural predators and a good supply of water and food. Describe what will most likely happen to the rabbit population over the next 100 years, assuming no natural disasters occur on the island. What will some of the limiting factors be?

9. The diagram below represents the growth of the population of wolves in an ecosystem.



On which day did the population represented in the graph above reach the carrying capacity of the ecosystem? How do you know?

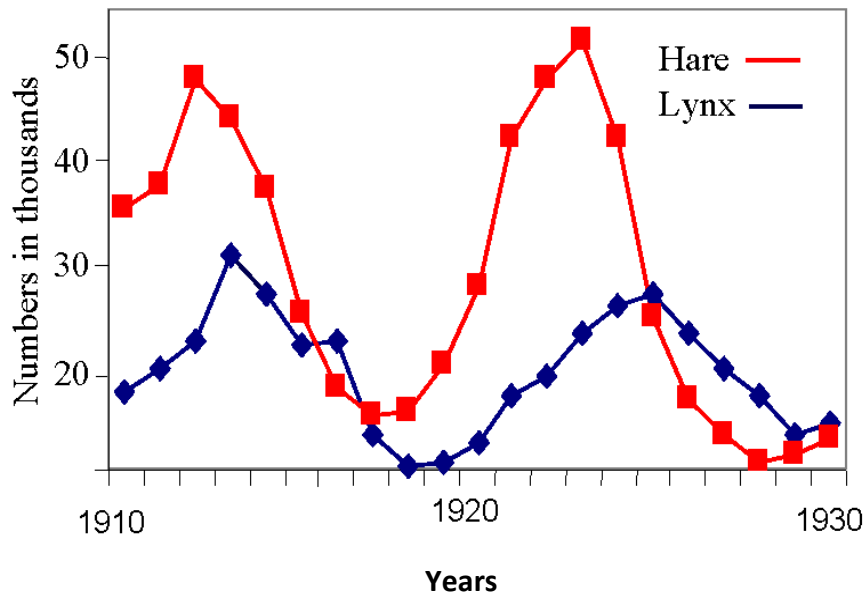
10. What is one density independent limiting factor that could affect the wolf population? _____

11. What is one density dependent limiting factor that could affect the wolf population? _____

Predator Prey Relationships:

Below is a graph showing the relationship between a predator, the Lynx (a wild cat), and its prey, the hare (a wild rabbit). Study the graph then answer the questions that follow.

Effect of Lynx Predation on Hares



1. What is the dependent variable? _____
2. What is the independent variable? _____
3. What can you infer about predator – prey relationships from this graph?
