

2008 ECOLOGY (C) – Sample Tournament
By Karen L. Lancour

Part A: Food Web

- 1. - 5. Use the information on the chart to create a Desert Food Web and Select one Food Chain from your food web to make an Energy Pyramid.**

Producers – Cactus, Sage Brush, Annual Flowers, Thorn Acacias

First Order Consumers (Herbivores) – Insects, Lizards, Rodents, Kangaroo Rats

Second Order Consumers – Tarantulas, Scorpions, Lizards, Snakes

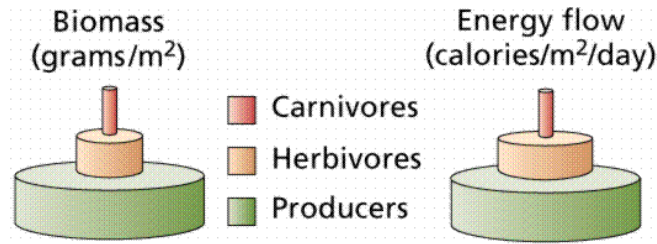
Third Order Consumers – Hawk, Kit Fox

Desert Food Web

Desert Energy Pyramid

Part B: Ecological Pyramids

Examine the following ecological pyramids and answer the questions.



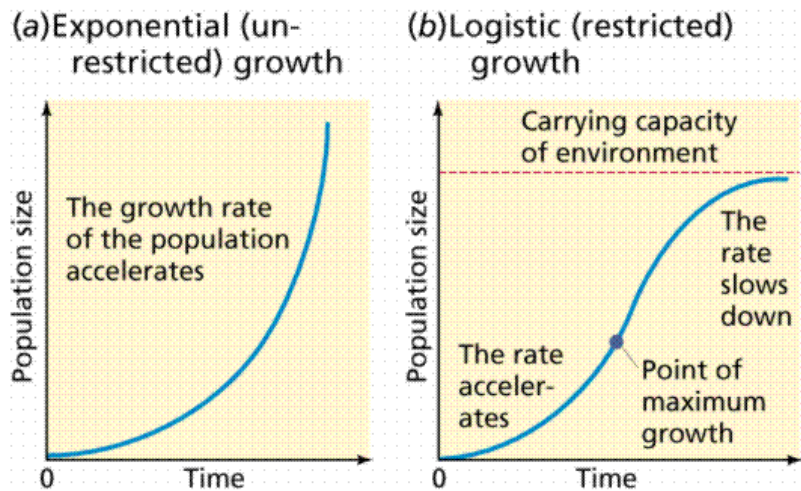
6. Explain the differences between the two pyramids?

7. If the Energy Flow Pyramid had 8700 kcal/m²/yr available for the producers, how many would be available for the Carnivores? Show your work.

8. In a society where the food supply for humans is a problem, how can more energy be made available for human consumption?

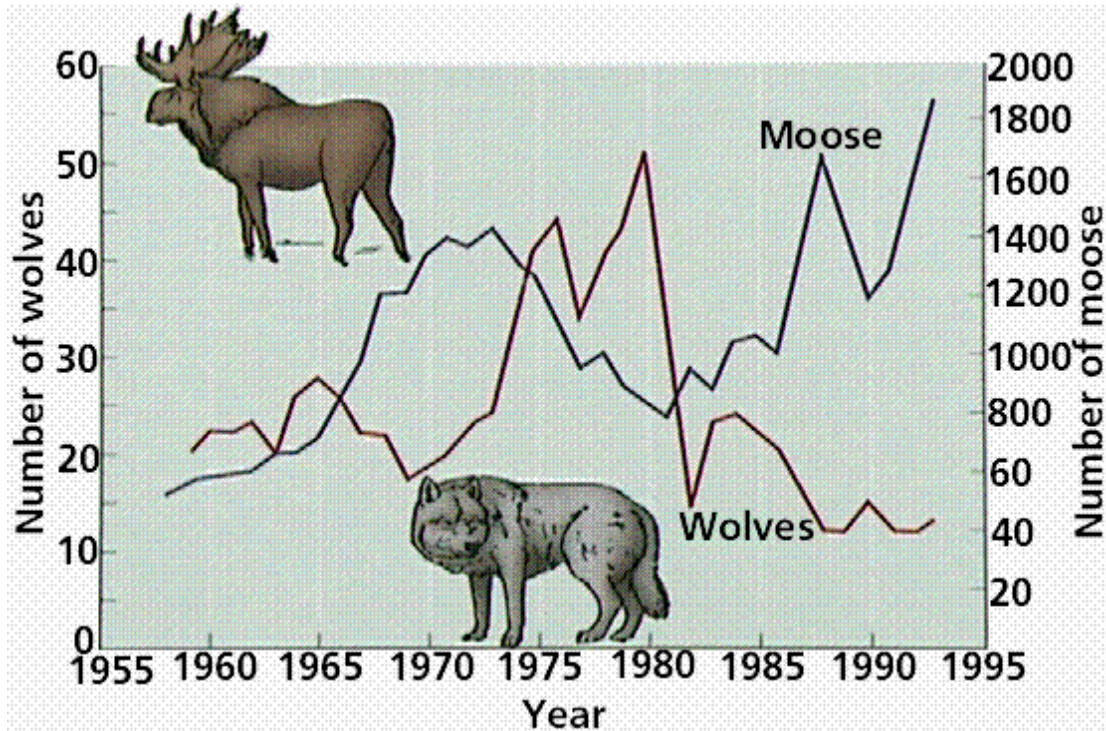
Part C: Growth Curves

Examine the two growth curves.



9. Explain the factors in the two populations which would account for the two types of growth curves.

Part D: Predator/Prey Relations



10. What is the independent variable for this graph? How is it measured?
11. What is the dependent variable for this graph? How is it measured?
12. When was the wolf population at its greatest? How many wolves were alive that year?
13. When was the moose population the greatest? How many moose were alive that year?
14. During what period did the wolf population have its most rapid decline? What may have caused this decline?
15. What should be done to bring this predator-prey relationship into balance again?

Part E: Types of Symbiotic Relationships

16. Compare the following types of symbiosis and give an example of each:
A. Mutualism B. Commensalism C. Parasitism

Part F: Adaptations

Deserts have less than 25 cm (10 inches) of rainfall per year.

17. What are some of the plant adaptations which allow survival in deserts?
18. What are some of the animal adaptations which allow survival in deserts?
19. How has the increase of human populations affected the desert ecosystem?

Part G: Ecological Problem

Acid rain is a major problem in the industrialized northeastern US.

20. Explain how acid rain affects the forest ecosystems and the general environment in this area.

2008 Ecology – Sample Tournament – Answer Key
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Part A: Food Web

1. – 5. Use the information from the chart to produce a Desert Food Web
The food webs will vary but the usually have producers on the bottom and top consumers on the top. Arrows will flow from the producers to each of the consumers at each level. The Energy Pyramids should reflect the 10% energy principle.

Part B: Ecological Pyramids

6. Explain the differences between the two pyramids?
Bio-mass Pyramid is calculated by multiplying the average weight for organisms times the number of organisms at the trophic level and the Energy Pyramid shows the amount of energy available at each trophic level. Only about 10% of the energy available at a trophic level is incorporated into the tissues of the organism at the next level.
7. If the Energy Flow Pyramid had 8700 kcal/m²/yr available for the producers, how many would be available for the Carnivores? Show your work. **87 kcal/m²/yr for carnivores**
8700 kcal/m²/yr for producers = 1/10 of 8700 kcal/m²/yr or 870 kcal/m²/yr for herbivores = 1/10 of 870 kcal/m²/yr or 87 kcal/m²/yr for carnivores.
8. In a society where the food supply for humans is a problem, how can more energy be made available for human consumption? **Humans become vegetarians instead of meat eaters so more energy is available to them. They will then have 10 times more energy available.**

Part C: Growth Curves

9. Explain the factors in the two populations which would account for the two types of growth curves. **The exponential curve (J-curve) occurs when there is no limit to population size but the logistic curve (S curve) shows the effect of a limiting factor.**

Part D: Predator/Prey Relations

10. What is the independent variable for this graph? How is it measured?
Time in years
11. What is the dependent variable for this graph? How is it measured?
Organisms (wolves, moose) by number
12. When was the wolf population at its greatest? How many wolves were alive that year?
1980 53 wolves
13. When was the moose population the greatest? How many moose were alive that year?
1993 about 1700 moose
14. During what period did the wolf population have its most rapid decline? What may have caused this decline?
1980-1982 excess hunting of wolves by man and lower moose population
15. What should be done to bring this predator-prey relationship into balance again?
Protect wolves from excess hunting and allow more hunting of moose

Part E: Types of Symbiosis

16. Compare the following types of symbiosis and give an example of each:
- A. Mutualism - both organisms benefit (algae in a hydra)**
 - B. Commensalism - one organism benefits but the other is not hurt or harmed (green algae on a turtle shell)**
 - C. Parasitism - one organism benefits while the other is harmed but not killed (fleas on a dog)**

Part F: Adaptations

17. **Adaptations of Desert Plants** - many small with spines, ground hugging shrubs and short woody trees. Leaves have water conserving characteristics as small, thick and covered with thick cuticles. Some have stomates only open at night when evaporation is lowest. Cacti have photosynthesis in stems (leaves are spines). Annuals flower during rainy periods.
18. **Adaptations of Desert Animals** – many are small nocturnal carnivores. Burrowers to protect from daytime heat and dry conditions. Insects, arachnids, reptiles are cold-blooded ectotherms.
19. **Impact of Man on Desert Biomes** – competition of man for water, expansion of deserts due to human land use practices.

Part G: Ecological Problem

Acid rain is a major problem in the industrialized northeastern US.

20. Explain how acid rain affects the ecosystems in this area.
- It lowers the pH of the surface water in the area. It contributes to damage of trees at high elevations (for example, red spruce trees above 2,000 feet) and many sensitive forest soils. It also accelerates the decay of building materials and paints, including irreplaceable buildings, statues, and sculptures.**