

Friends of the Island Fox

a Program of the Channel Islands Park Foundation, a 501 (c) (3) public benefit org.

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Grade Level: 4 - 7

Time: One 60 min. class period.

Objective: Students will 1) identify food, water and shelter as necessary resources in a habitat, 2) understand factors that influence normal population size and carrying capacity, 3) describe "limiting factors," natural and human influenced, 4) compare natural population fluctuations and unnatural declines.

Method: Students create a population study playing the roles of island foxes and habitat resources in a physical activity.

Materials: An indoor or outdoor area large enough for students to move around. A board or chart to track data and writing implements.

CA Standards:

Science: 4 2b,3a,b,; 6 5b,e; 7 3e;

Math: 4 Measurement and Geometry 2.0, Statistics 1.0; 5 Statistics 1.1; 6 Statistics 1.1, 2.5;

EEL:

Principle III, Concepts A,C

Give Paws!

The Channel Island fox evolved to live in an island habitat without any predators to influence its population size. The amount of resources available in the habitat directly influence the carrying capacity or number of island foxes that can survive and reproduce each year.

Background: Natural "limiting factors" control populations and prevent them from reproducing beyond what the habitat can support. Disease, reduction of food resources, impacts from weather, fire, and occasional predator appearance are all natural limiting factors for island foxes on the Channel Islands. Human introduced limiting factors can be automobile traffic, habitat destruction, disease, fire, and unnatural predators. For an island population, or any population in a small area, too many limiting factors can quickly lead to a species becoming endangered or even extinct.

This activity will involve students in experiencing how wildlife depends on a habitat that can provide the essentials for survival - food, water and shelter to raise young. It also provides a powerful demonstration of how a population fluctuates naturally because of limiting factors.

The following activity is adapted from *Project WILD's* "Oh Deer!"

Procedure:

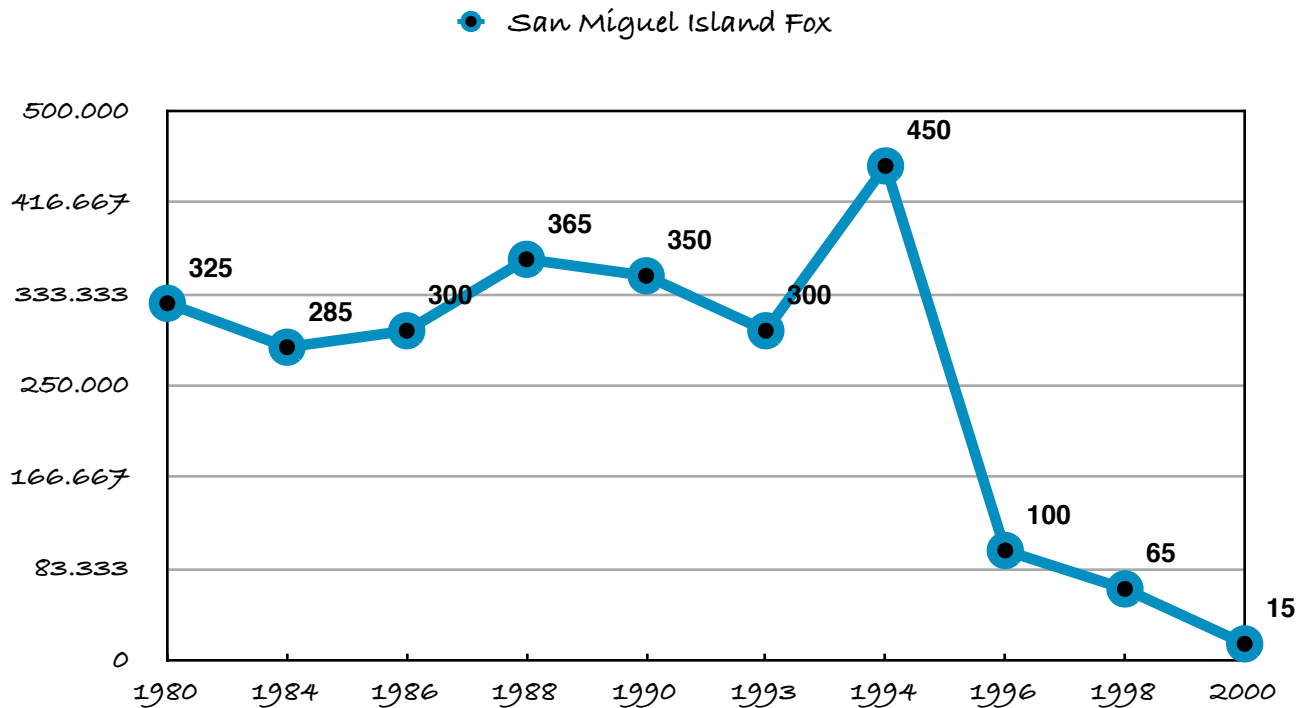
1. Discuss with students the important resources animals need to survive. Review the basics of food, water, shelter and living space. On the Channel Islands the island fox has a confined living space, because it can not leave the island. The island fox must adapt to changes in its island habitat or it will not survive.
2. Establish on a board or chart a place to record data either as numbers to be graphed later or as a graph as you proceed.

3. Explain to students that they will be participating in an experiment and everyone will have a role to play. Have students count off in fours. Mark two parallel lines on the floor or ground a minimum of 5 yards apart.
4. Have all of the ones stand behind one line and all of the other students stand behind the other line. Island foxes need a healthy habitat to survive. Ask students again for the important elements of a habitat (food, water, shelter, and space). The area the players are standing in is an island. Ones become "island foxes." Record the beginning population size of island foxes.
5. The island foxes will have to find everything they need to survive in this space. They need to find food - fruit and small animals, water, and shelter to raise their pups in - a den. When an island fox player is looking for food, it puts its "paws" on its stomach. When it is looking for water, it puts its "paws" on its mouth. When it is looking for shelter, a den, it puts its "paws" over its head. An island fox can choose to search for any of these needs during each round for collecting data, but it can not change its mind. Once it decides it is looking for food, it must stay with that choice. It can change what it is looking for in the next round, if it survives.
6. The other students are the resources in the habitat: food, water, and shelter. Each student chooses which resource it will be at the beginning of each round. They show which resource they are by using the same gestures as the island foxes (ie. hands on stomach for food, etc.)
7. To start the first round, have all of the players line up behind their respective lines. The island foxes are behind one line and the resources are behind the other line. Have all of the players turn around so their backs are to each other. Have them all decide which resource they are looking for or representing and make the sign for that resource.
8. When everyone is ready say "Give Paws" and have them turn around. All players should be clearly making their resource sign.
9. When you say, "Foxes Find," island foxes go to a player representing the resource - food, water or shelter - that they are looking for and "claim" it. Foxes must continue to make the sign of the resource until they have secured the resource. The first fox to reach a resource claims it. Claiming a resource represents finding and eating food, water or locating a den site. The island fox takes its resource back to the fox line. A fox that fails to find its required resource does not survive. It dies and is reabsorbed into the habitat to become a resource in the next round. Resources that are not used remain in the habitat to be resources in the next round.
10. All of the resources represented by the players taken back to the island fox line have helped the foxes be successful. The surviving island foxes have used those resources successfully and the resource players now become additional island foxes. Record the new number of island foxes for the first round or graph it.
11. Continue the activity for 5 - 15 rounds. Each round equates to an annual season for the island fox population. The more rounds completed, the greater the reliability of the data;

just like data collected on actual wildlife populations. As you go along, note rounds with little water which equal a drought. Pose questions, such as: What might have caused a season with little food? What could cause a reduction in shelter sites? Between the “Give Paws” and the “Foxes Find,” toss in a variable, like fire, and reduce the food resource by half before the “Foxes Find.” Note any variables in the data record.

Assessment:

12. Discuss what the students learned from this activity. What do animals need to survive? Did the number of island foxes change? Were there any patterns in how the number of foxes changed? What are some of the limiting factors for wildlife populations? If carrying capacity is the number of living things that can survive in one place, what factors that affect carrying capacity? What happens when there are not enough resources for all of the animals in one place?
13. If the data has not been graphed, have the students create a line graph of the data. Look for patterns on the graph. Is it natural for wildlife population sizes to change? Use the numerical figures to calculate mean and median population size. Discuss which mathematical representation of the data gives the most information
14. Compare your island fox data to the actual data from San Miguel Island in 1980 and between 1993 and 2000. Does this look like a natural population change? What could be causing such a dramatic decline?



Figures for 1984 - 1990 are estimates, as no scientific population data were collected during that time.

15. Human impacts on the Channel Island ecosystem resulted in a habitat imbalance and a new predator was introduced in the ecosystem. This predator, the golden eagle, began hunting the island fox toward extinction. For more graphing and population study activities see *The Number Game* activity with island fox population numbers from across the islands.

Reference:

Council for Environmental Education. (2006). *Project WILD; K-12 curriculum & activity guide*. Houston, TX: author.

1/26/12