

Name: _____ Date: _____ Period: _____

Fox and Rabbit Lab: Limits to Population Growth

Objective: This activity will illustrate how a population is dependent on limiting factors. A *limiting factor* is factor that causes the growth of a population to decrease. In this lab we will be simulating a meadow in which there is a population of rabbits and a population of foxes. The rabbits feed on the grass while the foxes prey on the rabbits. The meadow can only support a maximum of 100 rabbits. This is due to the carrying capacity of the meadow. *Carrying capacity* is the number of individuals who can be supported in a given area within the natural resources limits.

Materials: Fox and Rabbit cards, table top (the meadow), data table and graph.

Instructions: READ ALL INSTRUCTIONS BEFORE YOU BEGIN!!

1. STEP 1:

- a. Create a meadow. Tape off a 61 cm square section on your table top.
- b. Start with 3 rabbits in the first generation. Place them in the meadow.
- c. Start with 1 fox in the first generation.
- d. Standing 2 feet from the desk, toss the fox into the meadow.
- e. If the fox touches the rabbit they are considered "captured" and must be removed from the meadow.
- f. For a fox to survive it must capture 3 rabbits, if not, it dies of starvation and must be removed from the meadow.

2. STEP 2:

- a. Repeat Step 1 going through a maximum of 15 generations.

3. STEP 3:

- a. Create a line graph using the graph paper provided.
- b. Make sure to label according to the directions.

4. Additional Rules:

- a. For every 3 rabbits that the foxes capture, the fox reproduces 1 pup. This pup is added to the next generation.
- b. Each fox must be tossed one at a time into the meadow.
- c. A rabbit cannot be shared by 2 foxes.
- d. Each time there are no foxes left for the next generation, 1 new fox immigrates into the meadow.
- e. To calculate the next generation of foxes: (number of old foxes + pups = new generation). If no foxes left see letter d above.
- f. To calculate the next generation of rabbits: (multiple remaining rabbits by 2). The meadow can only support a MAX of 100 rabbits, any beyond that will starve.
- g. If all the rabbits are captured then 3 new ones will immigrate into the meadow.

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RABBITS

A	B	C	D	E	F	G
Generation	Start (must be < than 100)	Captured	Remaining (B-C)	Total for next generation (D x 2)	Starved = # > than 100	Next generation (E-F)
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						

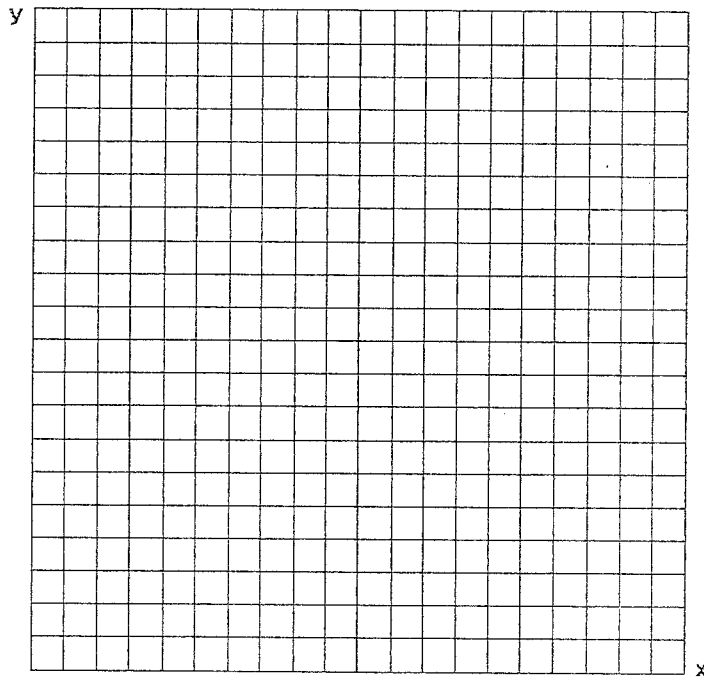
FOXES

H	I	J	K	L
Start	Starved (If eat <2 rabbits)	Alive (H-I)	New Pups Born	Next Generation or Immigration (old + new pups)
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				

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Graph your results- use the number at the **START** of each generation for box **FOXES** and **RABBITS**. USE A **LINE GRAPH**.

- Label the y-axis: number of animals
- Label the x-axis: generations
- Use one color line for rabbits and one color for foxes and include a key
- Put a **TITLE** on your graph



Lab Analysis

1. In this activity, which animal is the predator? _____
2. In this activity, which animal is the prey? _____
3. Which animal population increased first? _____
4. What is a limiting factor (define)? _____
5. What was the limiting factor for the fox population? _____
6. What was the limiting factor for the rabbit population? _____
7. As the rabbit population increased, what happened to the fox population?

8. Define carrying capacity.

9. What is the carrying capacity for rabbits in the meadow? _____

