Activity 1-2C   Predator Prey Simulation

In this activity, you will simulate predator-prey relationships and graph your findings.

Materials
• 100 pennies (each represents a prey animal)
• 10 playing cards (each represents a predator)
• data table
• graph paper
• coloured pencils

What to Do

1. Working in a group of three, decide who will control the prey animals, who will control the predators, and who will be the data recorder. Your teacher will give you a data table.
2. Clear all other materials off your table. Construct a forest habitat as instructed by your teacher.
3. Read the following **rules**. You will need to refer back to them as you do the simulation.
   • Controllers of prey animals and predators must stand 0.5 m from the habitat entrance when tossing the squares.
   • When one half or more of a prey animal square is covered by a predator square, the prey animal has been captured and is removed from the habitat.
   • In each round, each predator that captures at least three prey animals survives. If fewer than three prey animals are captured, the predator dies and is removed from the habitat.
   • In each round, each predator that captures at least three prey animals survives and reproduces (producing a new generation). Therefore, one additional predator will be tossed into the habitat for every three prey animals caught.
   • If all predators die, then a new predator is tossed into the habitat.
   • The prey population doubles each generation, so if 10 prey animals survive, the next generation (round) starts with 20 prey animals.
   • The maximum carrying capacity of this forest habitat is 100 prey animals. (Carrying capacity is the ability of an ecosystem to supply enough resources such as food, water, and shelter for continued survival.)
4. Begin the simulation. The prey animal controller tosses three prey animals into the habitat. The predator controller then tosses one predator into the habitat at these prey animals.
5. Continue the simulation for 20 generations or until all the prey animals are captured. The data controller records all data for each generation in the data table provided by your teacher.

Data Table for Predator Prey Simulation

Generation	A Number of Prey at Start of generation	B Number of Prey Caught	C Total Prey Animals surviving	D Number of Predators at Start of Generation	E Number of Predators Removed due to Starvation	F Number of Predators Added (Killed 3 Prey and reproduced)	G Total Predators (D–E+F)
1.							
2.							
3.							
4.							
5.							
6.							
7.							
8.							
9.							
10.							
11.							
12.							
13.							
14.							
15.							
16.							
17.							
18.							
19.							
20.							

6.   Construct a graph with two lines using the data from the "Total Prey Animals" and "Total Predators" columns for each generation. Label the x-axis from generations 1 through 20. Label the y-axis "Population Numbers." Determine the intervals you will use to plot the population numbers.

7.   Use one colour of pencil to plot the points for the total prey animals. Use another colour of pencil to plot the points for the total predators for each generation.

8.   Connect the points to form the prey animals' graph line. Use another colour of pencil to connect the points for the predators' graph line.

Predator Prey Simulation Graph
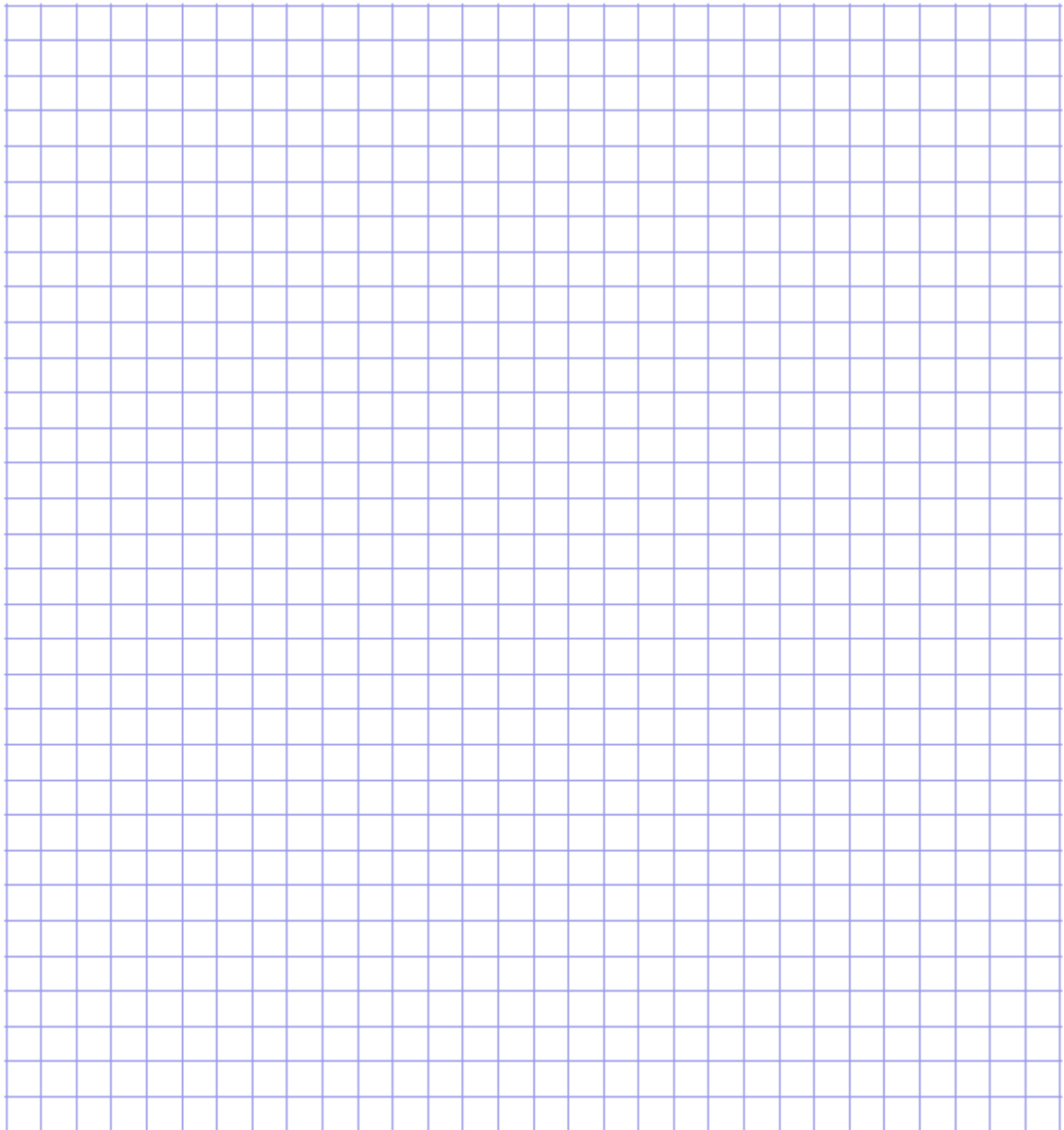
What Did You Find Out?

1. Describe the relationship between the prey and predator lines on your graph.

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   _____

   _____

   _____

2. Predict what the graph would look like after 12 generations if all the predators were lost to a disease. Sketch this graph.

   _____

   _____

3. Predict what the graph would look like after 12 generations if all the prey animals were lost to a disease. Sketch this graph.

   _____

   _____

4 Predict what would happen to the predator and prey populations if half of the prey animals' habitat were destroyed by the construction of a shopping mall.

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