

Natural Selection: Predators vs. Prey

Background:

Predators get pretty hungry throughout the day. When hunger strikes it's time to go hunting for some prey. Over many, many years predators have adapted new and more effective ways to capture prey. At the same time, prey is becoming sneakier and harder to capture. The prey that survive are able to reproduce, while those "easy to find" prey will eventually die out.

In this activity you will experience how certain adaptations of predators can make it easier to capture food, and therefore easier to live. As prey is eaten, they disappear while their better-adapted counterparts are able to then reproduce and survive.

Problem:

How does natural selection work in a predator-prey relationship?

Materials (per group of four):

Small cup of red beans

Small cup of white beans

Small cup of split peas

One pair of chop sticks

One spoon

One straw

One pair of forceps

Procedure:

1. Place 30 red beans prey, 30 white beans prey, and 30 split pea prey into the designated lab area.
2. Choose your tool! The chopsticks, spoon, straw, and forceps are the four different types of predators. The one you choose is the one you are stuck with for the entire lab.
3. When all of your bean prey have been placed and each group member has their tool, you will have 45 seconds to "kill," or pick up, as many bacteria as possible WITHOUT USING ANYTHING BUT YOUR TOOL! It does not matter what types, they are all food. We will time this as a class.
4. Count how many of each type of prey are left. Record these numbers in the data table.
5. Count how many each predator killed total (you don't have to say which types were killed). Record these numbers in the data table.
6. The left over prey have reproduced! For each bean, you need to add two more of the same kind! (For example, if you have eight split peas left, you need to add 16 more!)
7. Repeat steps 3 through 6 three more times, for a total of four runs.

Data:

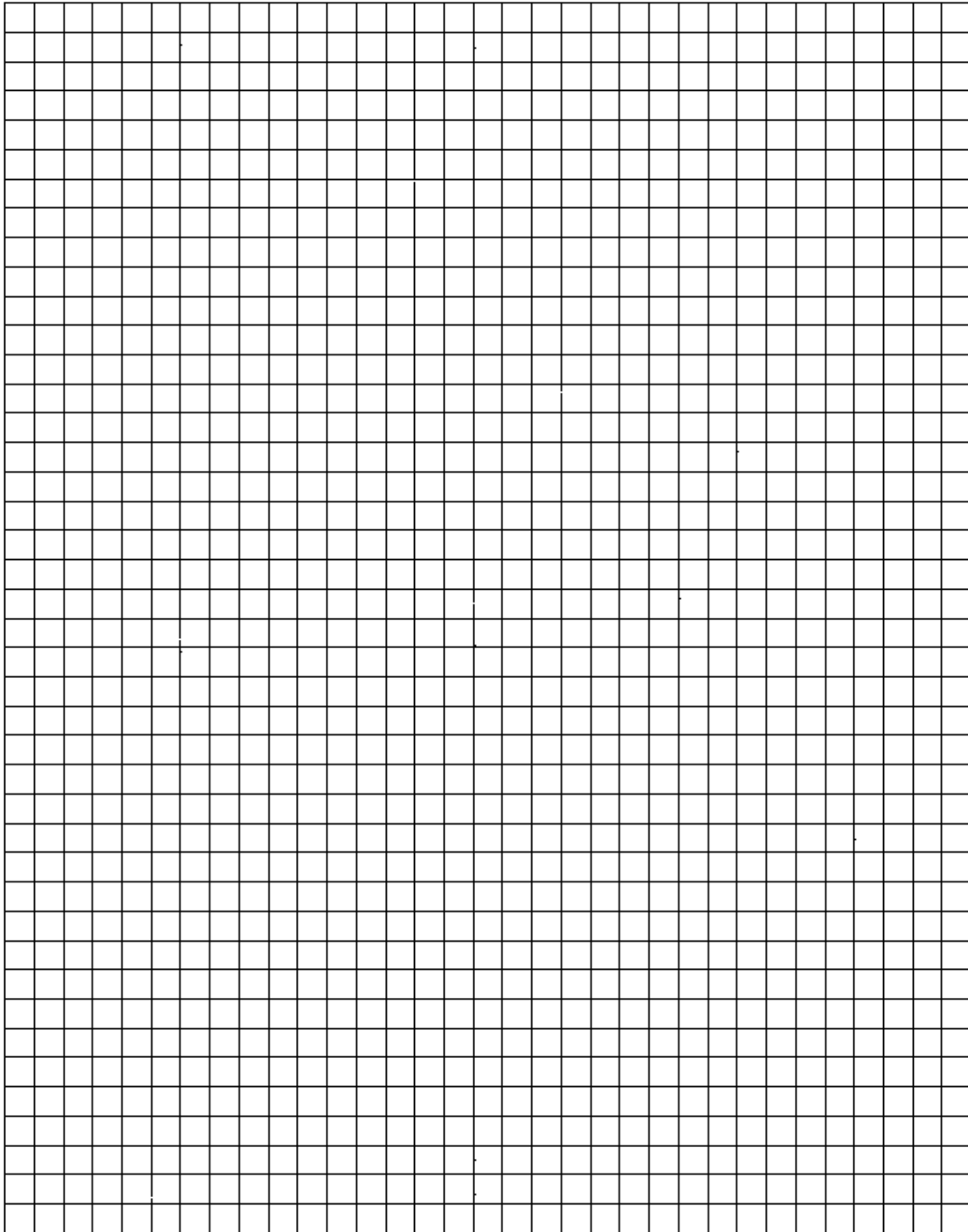
	Bean Prey Remaining				
	Starting	1 st Generation	2 nd Generation	3 rd Generation	4 th Generation
Red Bean Prey	30	7	3	0	0
White Bean Prey	30	2	0	0	0
Split Pea Prey	30	12	26	42	120

	Bacteria Killed				
	1 st Generation	2 nd Generation	3 rd Generation	4 th Generation	Total
Chop Stick Antibiotic	7	4	2	3	
Spoon Antibiotic	17	10	7	8	
Straw Antibiotic	24	19	17	12	
Forceps Antibiotic	18	25	23	19	

Graph:

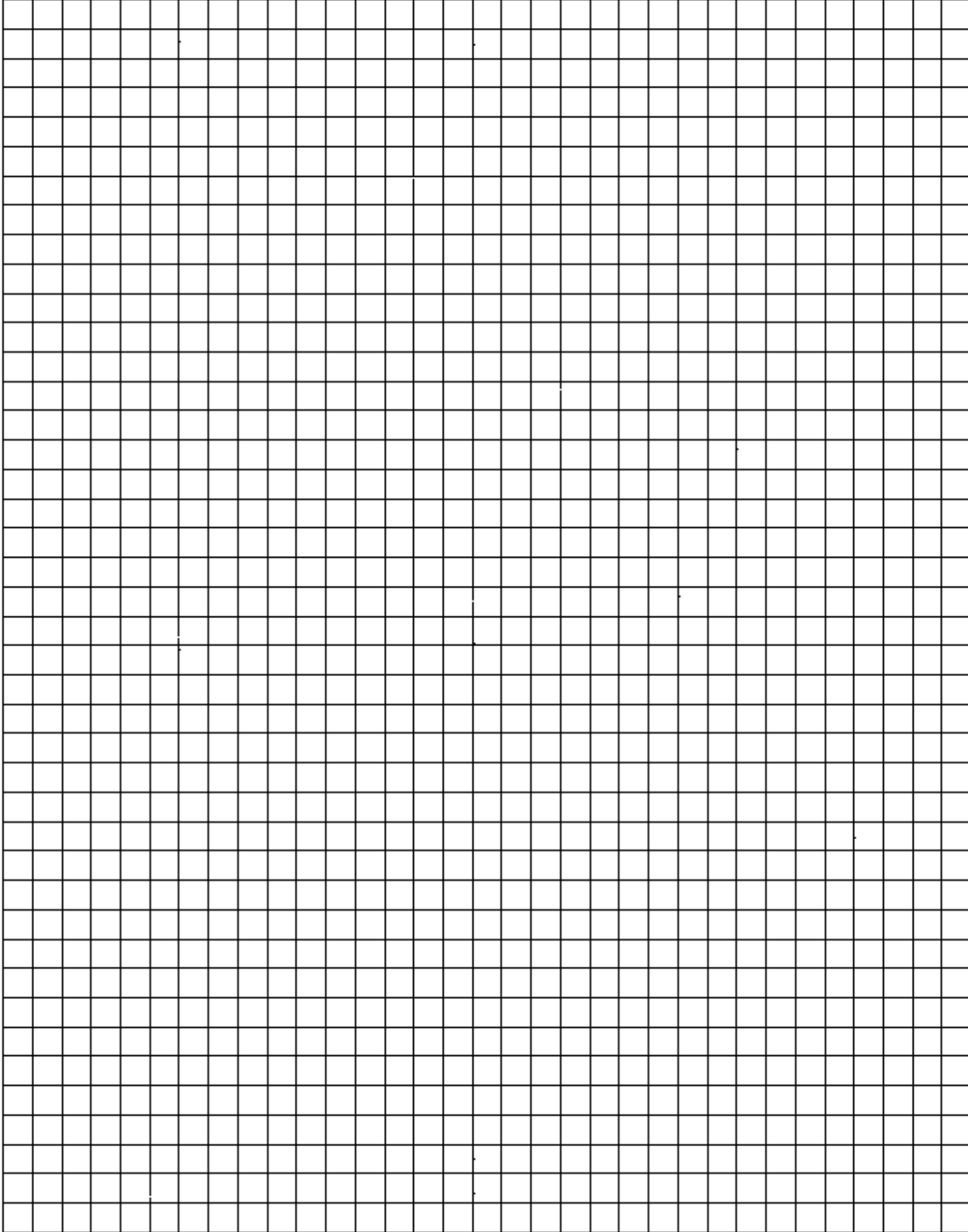
1. Create a graph showing the population of bacteria over the four runs

Graph Title: _____



2. Create a graph showing the total amount of bacteria each antibiotic killed.

Graph Title: _____



Questions:

1. Define the following:
 - a. natural selection:

- b. fitness

2. What predator was the best at killing prey? Why?

3. What prey was the easiest killed? Why?

4. Which prey had the highest *fitness*?

5. What happened to the populations of prey over the four runs?

6. What would happen if predators were no longer able to kill prey?

7. Write a **complete paragraph** explaining the process of natural selection as it was shown in this activity. Be sure to define natural selection and use examples from this activity that demonstrate the process of natural selection.
