

Predator–Prey Interactions Lab
Pre-Lab Exercise

Name _____

1. What are each of the three different feeding characteristics found in the predator species in today's lab.
2. Describe each of the three different physical characteristics of the prey species in today's lab.
3. Which characteristic assigned to the predator species is most likely to be advantageous for survival? Why?
4. Which characteristic found in the prey species is most likely to be advantageous for survival? Why? What environmental factors might influence this?
5. Predict what will happen to individuals with a particular feeding characteristic if they do not capture a minimum amount of prey? How do you think this will affect the make-up of the population?

Predator–Prey Interactions Lab

This exercise illustrates how different populations interact within a community, and how this interaction can influence the process of **evolution** in both species. The relationship between a predator (you) and a prey species (beans) will be used as an example. It should help you to understand how certain physical characteristics that confer an advantage to survival can come to predominate in a population. These advantageous characteristics are called **adaptations**. An adaptation aids survival by either decreasing a prey's chance of being eaten, or by increasing a predator's chance of obtaining food to survive and reproduce.

Summary of Activities

1. Hunt for prey, using the available foraging tool.
2. Count up your individual kills and add them to the class totals.
3. Calculate reproduction of the next generation.
4. Repeat foraging process for up to four generations.

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Each student in our class will be a member of the predator population. You will have one of three different physical characteristics for capturing prey. One group will hunt with one hand, one group will hunt with clothes pins, and one group with forks. This is the foraging equipment you were "born" with. You all have the same mouth, which is a paper cup in your other hand.

The prey population, consisting of three different types of dried beans, will be scattered in an area outside.

The biological success of the predator species will depend on your ability to collect energy resources, or food. This will be measured by counting the number of beans you are able to pick up during the foraging period. The survivability of the prey species will depend on how many beans survive and escape capture.

Materials:

- Black beans, white beans, pinto beans
- Clothes pins
- Plastic forks
- Paper cups

Procedure:

1. Help the instructor count and scatter 100 of each type of beans onto the ground.
2. Begin hunting when you are given the signal. The prey must be picked up with the hand, clothes pin, or fork and placed in the cup. No scraping or pushing of the prey into the mouth is allowed. You may, however, dash in and pick up any prey being pursued by another predator. Don't hesitate to intrude; any hungry natural predator must compete for survival.
3. When the end of the feeding period is signaled, stop the hunt and count up the number of your "kills". Only those prey in your cup can be counted. If you are in the process of capturing one when time is called, you must drop it. Report the number of your kills to your group "accountant".
4. After each hunting session, we will calculate the number of surviving predators based on the total kills for the class as a whole. Those that captured the most prey and were in the top half will survive and reproduce, while those in the lower half will starve to death. Those who died will be given the feeding mechanisms of the more successful predators, representing their offspring. The new number of predators will be the new number of starting predators in Generation 2.
5. The number of surviving prey will be doubled to represent reproduction. These numbers will be the number of starting prey in Generation 2.
6. We will repeat the above procedure until we have completed 3 generations.

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Data Sheet

YOUR INDIVIDUAL DATA

	Predator Type	Pinto Beans	White Beans	Black Beans
Generation 1				
Generation 2				
Generation 3				

GROUP DATA

GENERATION 1

	Starting No. of Predators	Pinto Beans	White Beans	Black Beans	Total Kills
Starting No. of Prey		100	100	100	
Clothespins					
Hand					
Fork					
Total Prey Deaths					
No. Surviving Prey					

GENERATION 2

	Starting No. of Predators	Pinto Beans	White Beans	Black Beans	Total Kills
Starting No. of Prey					
Clothespins					
Hand					
Fork					
Total Prey Deaths					
No. Surviving Prey					

GENERATION 3

	Starting No. of Predators	Pinto Beans	White Beans	Black Beans	Total Kills
Starting No. of Prey					
Clothespins					
Hand					
Fork					
Total Prey Deaths					
No. Surviving Prey					

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Lab Report

Name _____

1. Which characteristic was the most successful for each of the predator and the prey populations? What was the **selective pressure** that allowed this characteristic to be successful? Remember that selective pressures are external factors, either environmental or from a different population.

Predator Characteristic:

Prey Characteristic:

2. For both predator and prey populations, which characteristic was the least successful? What was the selective pressure?

Predator Characteristic:

Prey Characteristic:

3. In our hunt today, what factors besides the interactions between predator and prey, such as weather or surrounding environment, were affecting the population size of each species? Use specific examples.

4. Use your imagination to create an environment that would allow the least successful trait to become the most successful trait, and vice versa.

5. Predict what could eventually happen to both the predator and the prey populations after many generations (100 generations, for example), based on the results of our four generations.