

Survival of The Fittest Lab

Purpose: To provide you with an opportunity to see how varying adaptations effect the fitness of a particular organism.

Materials: Predators (Uta ensiles)

Knife
Fork
Spoon
Mutant

Prey (Auto trophs)

Green pea (6 points)
Rice (5 points)
Lentil (4 points)
Pinto bean (3 points)
Kidney bean (2 points)
Black bean (1 point)

Procedure: You will be given one implement of predation and a small cup (stomach). When instructed you will begin to hunt for the prey (seeds) within a well defined area.

But first a few rules about hunting:

1. Whatever predation tool you have can only be used in your opposite hand from normal.
2. When you place a seed in your cup in has to be on the ground.

Data: Individual

	Total Eaten
Green pea	_____ x 6 = _____
Rice	_____ x 5 = _____
Lentil	_____ x 4 = _____
Pinto bean	_____ x 3 = _____
Kidney bean	_____ x 2 = _____
Black bean	_____ x 1 = _____

Predator Type
Predator Number

_____ is my total score

Data: Whole Population

- Success from predator's point of view (score including nutritional value) – data for graph A

	Knife	Fork	Spoon	Mutant
1	_____	_____	_____	_____
2	_____	_____	_____	_____
3	_____	_____	_____	_____
4	_____	_____	_____	_____
5	_____	_____	_____	_____
6	_____	_____	_____	_____
7	_____	_____	_____	_____
TOTAL	_____	_____	_____	_____

- Success from the prey's point of view (# of each seed taken) – data for graph B

	Green Pea	Rice	Lentil	Pinto Bean	Kidney Bean	Black Bean
Knife	_____	_____	_____	_____	_____	_____
Fork	_____	_____	_____	_____	_____	_____
Spoon	_____	_____	_____	_____	_____	_____
Mutant	_____	_____	_____	_____	_____	_____
Total Consumed	_____	_____	_____	_____	_____	_____
% consumed	_____	_____	_____	_____	_____	_____
% surviving	_____	_____	_____	_____	_____	_____

Analysis of Data:

Graph A On a piece of graph paper make the following **line graph**:

The horizontal (X) axis should show the predator individuals (# 1-7)

The vertical (Y) axis should show the **total score** for each individual.

Your graph should have **4 different colored lines** (knife, fork, spoon, tweezers) each representing the success of the individual predators.

Graph B: On graph paper make the following **bar graph**:

The horizontal (X) axis should be for the **type of seed** (green peas, lentil....)

The vertical (Y) axis should be for the **% surviving**

Your graph should have **6 different colored bars**.

Chart C: Use the data you have collected we are going to calculate the population numbers of the prey for four generations. Here are the rules:

Assume the prey generally **have a 50% reproductive success**. (only those that survive can reproduce)

1. List the population of each variation after predation and one breeding season (see success from prey point of view data). **You will need to use the % surviving number divide that number in half. Add that "half" to the original %. This is the 1st generation number.** (ex. If 25 survived, divide that number in half and then add it to 25)
2. Follow the same steps to calculate the 2nd – 5th generation numbers.

VARIETIES	Initial population	1 st generation	2 nd generation	3 rd generation	4 th generation	5 th generation
Green pea	100					
Rice	100					
Lentil	100					
Pinto bean	100					
Kidney bean	100					
Black bean	100					

Graph C: Make a **line graph** show the population numbers of the initial population through the 5th generation. The horizontal (X) axis should have the generations and the vertical (Y) axis should have the number of the populations.

Analysis Questions:

1. Describe each "variation" in the prey population (Auto trophs) and explain how those variations influenced each individual's ability to survive.
2. Which of these variations within the predators was the most successful? Which was the least successful? Give a possible explanation as to why there are differences among predators of the same species.
3. From the data derived about this population of prey, what is the most successful variation? What is the least successful seed variation? How does this affect the population of the next generation?
4. If the lentil variation of the prey increases drastically, which predatory will probably benefit the most and which will probably benefit the least? Explain.