Mutations, Variations & Adaptations Lab

Goal:

To learn about the advantages and disadvantages of variations, by simulating organisms with different mutations competing for foods.

Background Information:

Darwin was amazed by the variation in the characteristics of plants and animals he encountered on his journey. In any habitat, food is limited and the types of foods available may vary. Animals that have variations that enable them to take advantage of available foods will be more likely to survive. We call beneficial inherited variations adaptations. Adaptations are inherited characteristics that increase an organism's chance of survival. Those with the most helpful adaptations will be the most likely to live long enough to pass on their genes to the next generation. This process ensures that beneficial adaptations will continue in future generations, while disadvantageous characteristics will not.

Pre- Data:

Write a sentence or two about what you already know about mutations, adaptations, and/or evolution.

Predict:

Which mutation will lead to being the most successful animal to collect and eat 5 tootsie rolls in the shortest amount of time?

Gather Data:

What is the mutation you have been assigned?

Team Member	Total Time to eat all 5 "Rolls"
1	
2	
3	
Total Average Time	

Group Data:

Team	Avg Time
A: Long fingernails	
B: No Fingers	
C: Blind	
D: Hands fused together in front of body	
E: Short strides (ankles tied)	
F: No arms (fused to side)	
G: No arms (fused together in back)	

Experiment Synopsis:
Write a short summary of the procedure you used to complete this activity.

Questions: Answer the questions posed in complete sentences.

a. Which mutation was best adapted to eat the food?

Which mutation was least adapted to eat the food?

b. Would you change your feeding strategy if you had another opportunity to "feed?" Explain.

c. What would happen if all of the animals with these mutation types in this activity moved to an island where no one had been before and the only food available was oranges? Which mutations would be most successful? Which mutations would be least successful?

d. If you came back to this island (from c) in 50 years, what should you expect to see? (What type of mutated individuals will live on the island?)

e. How does this lab simulation provide support for the theory of evolution?

What I Learned: Write a summary that describes what you learned from completing this activity. Remember to refer to the learning goal and to include examples from your data.

Mutations, Variations and Adaptations Lab (Tootsie Roll)
Teacher Directions

The goals of the group are to:
1. Gather the food (3 pistachios per group member).
2. Store the food for later use (place the group's pistachios in your letter-designated container.
3. Retrieve the food at a later time (remove the nine pistachios from the container and return with the pistachios to the home location).
4. Process and consume the food (remove the pistachios from the shells or can

- Split students into groups of 3 (each group needs a timer)
- There are 7 stations, so some stations will have 2 groups (must have 2 sets of cups and mutations ready)
- Allow each group to select a popsicle stick with a letter on it. This letter will be associated with the mutations they will have.

Letter	Characteristic produced by mutation
A	Long fingernails (produced by plastic knives taped to fingers)
B	No fingers (produced by placing a sock over each hand and taping hand closed)
C	Blind (place tape over goggles or use blindfold)
D	Hands fused together in front of body (produced by placing hands together in front of body and taping/tying them together)
E	Feet and ankles fused together (produced by taping the ankles tightly together with duct tape/cravats)
F	No arms (produced by securing arms down to the side of the body)
G	Arms fused together behind the back at the wrists (produced by placing arms behind the back and securing tightly at the wrists)

3. The teacher spreads the tootsie rolls on the blanket in the center of the room or field. Containers marked with letters for each group are set in another part of the room.
4. Each group positions itself at its specified home location, away from the lettered containers.
5. At the start of the stopwatch:
• Group members will proceed to the blanket and gather three tootsie rolls each. One student will collect at a time.
• The food is then put in the container marked with the letter of the group.
• The group member should return to their home base and sit for 5 seconds.
• The group member returns to their plastic container to retrieve their food and return to their home base. Each group member must retrieve his/her own food.
• At the home location, each group member will consume the contents of the food.
• When the member has eaten their tootsie rolls, the group will stop the timer and record the time. They will then get the next participant ready.