

# LAB—Variation Affects Survival

NAME \_\_\_\_\_ HR \_\_\_\_\_ /25

Moths are active at night and spend their days resting on tree trunks. Birds feed on moths during the day. This activity is a simulation of how moth populations change as a result of predation by birds.

**SCIENTIFIC QUESTION:** Can the environment affect the traits in an animal population?

**HYPOTHESIS:** *I think* \_\_\_\_\_

**MATERIALS:**

- Black and white squares (moths)
- Black sheet of paper (black tree trunk)
- White sheet of paper (white tree trunk)
- Cup (bird nest)
- Timer
- Tweezers (bird beak)

**PROCEDURE:**

1. Drop 40 "moths" half white, and half black onto the white paper. Spread them out evenly.
2. Place the cup at one end of the table and the paper at the other end.
3. Have a partner time you for 30 seconds as you "catch" as many moths as possible to feed to your babies in your "nest."
  - You may not scoop up more than one moth at a time.
  - You must pick up the FIRST moth you see
  - Your partner must shuffle the moths between scoops (simulates the natural reshuffling of moths)  
This can be done by spinning the "tree trunk" 90 degrees in between each scoop.
4. Record the number of white "moths" and the number of black "moths" in your chart
5. Have a different partner in your group do the same thing.
6. Repeat until you have done this 4 times with the white paper.
7. Repeat steps 1-6 with the black paper.
8. Total your columns, then find the average.

DATA:

	White tree trunk	
trial	White moths "eaten"	Black moths "eaten"
1		
2		
3		
4		
Average		

1. What variation (color) has the best adaptation for this environment? \_\_\_\_\_
2. What variation (color) is selected against? \_\_\_\_\_
3. After a few generations what color variation would make up most of the population? \_\_\_\_\_
4. Predict what will happen if the environment/background color changed to black. \_\_\_\_\_

	Black tree trunk	
trial	White moths "eaten"	Black moths "eaten"
1		
2		
3		
4		
Average		

5. What variation (color) has the adaptations for this environment? \_\_\_\_\_
6. What variations (colors) are selected against? \_\_\_\_\_
7. After a few generations what color variation would make up most of the population? \_\_\_\_\_
8. What is the selecting agent (determines what lives or dies) in this experiment? \_\_\_\_\_

**Going Further:**

In a population of finches, there are 10 birds that prefer to eat worms (normal phenotype), 3 that prefer fruit (extreme phenotype), and 3 that prefer seeds (extreme phenotype).

9. Which phenotype(s) will be selected against (die) if the environment has a low number of fruits and seeds due to a drought?
10. Which Phenotype(s) will be selected for (live) if there are a lot of earthworms but not a lot of fruit or seeds?
11. What is the selecting agent (determines what lives or dies) in this experiment?

In a population of snow shoe hares there are 10 hares that change pure white by November 1st (normal phenotype), 3 hares that change white by October 15 (extreme phenotype), and 3 hares that change white by November 15 (extreme phenotype).

12. Is being white in a brown environment or being brown in a white environment a good thing for a prey animal?
13. Which phenotype(s) will be selected against if it does not snow until Nov 1?
14. Which phenotype(s) will be selected for if it does not snow until Nov 14?
15. What is the selecting agent in this experiment?

In a population of hen pheasants, there are 10 brown ones (normal phenotype), 3 rust colored ones (extreme phenotype), and 3 gray colored ones (extreme phenotype).

16. Is being gray or rust in a brown environment or being rust or brown colored in a gray environment or being brown or gray in a rust colored environment a good thing for a prey animal?
17. Which phenotype(s) will be selected against if the environment is brown?
18. Which phenotype(s) will be selected for if the environment turns gray?
19. What is the selecting agent in this experiment?
20. **ARGUMENT WITH EVIDENCE:** Write a conclusion for the moth experiments. Look back at the scientific question in order to make your claim. Be sure to include evidence from the lab to prove your point. (2points)

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