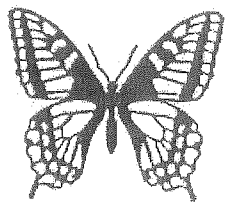
Biology 11



Evolution in Action

Mini-Lab

Name: _____

Date: _____

Block: _____

Total: /20

The physical traits and behaviours that enable organisms to survive and reproduce in their environment are what Darwin called **fitness**. Some adaptations enable organisms to become better suited to their environment, hence, making them more "fit" or better able to survive and pass on their genes. Darwin observed this process in nature and called it **Natural Selection**.

Purpose: In this lab, you will be examining how melanism (a darker pigmentation or colouring) can affect the fitness of a butterfly.

Procedure:

SET UP: 1. You must work with a partner on this activity. One student must be the **scorekeeper** and the other student will be the **predator**. You may switch roles when you begin PART B.

2. First of all, cut out the light and dark butterflies as instructed. As well, you must also obtain at least 5 light and 5 dark circles.

PART A:

1. The predator must turn around while the scorekeeper chooses one background and places the black and white butterflies on the background randomly.

2. Once this has been set up, the time keeper counts 3 seconds for the predator to grab as many butterflies as possible.

3. Record the type of background used and the number of white and black butterflies caught in the data table provided. Repeat steps 1-2 three times and record results.

4. Repeat steps 1-3 with the other background three times and record your results

PART B:

1. Repeat the same procedure but now, use 5 dark and 5 light circles instead of butterflies.

2. **IMPORTANT:** At the end of each "hunt" the remaining prey will live on and reproduce another generation. Therefore, for each "prey" that was not caught add another dot of the same colour (an "offspring") to the group,

3. Record your results and repeat for three trials.

Results: (5 marks)

PART A- using butterflies

Table 1: Butterfilies Caught in the Dark Background

Hunt Number	# of **dark** butterflies caught	# of light butterflies caught
1)		
2)		
3)		

Table 2: Butterfilies Caught in the Light Background

Hunt Number	# of **dark** butterflies caught	# of light butterflies caught
1)		
2)		
3)		

PART B- using dots

Table 3: Number of Dots Caught on Dark Background

Hunt Number	# of dark dots caught	# of light dots caught	# of dark survivors	# of light survivors
1)				
2)				
3)				

Table 4: Number of Dots Caught on Light Background

Hunt Number	# of **dark** dots caught	# of light dots caught	# of dark survivors	# of light survivors
1)				
2)				
3)				

Discussion: (10 marks total)

Read pages 296-298 in your text to help answer the following questions

1. What patterns emerged from the data you collected (in your results)? (2 marks)

_____

_____

_____

2. Explain your results using Darwin's theory of Natural Selection. (3 marks)

3. In your own words, what do you think is meant by "industrial melanism"? (2 marks)

4. Did your results reinforce Kettlewell's experiment? Explain. (2 marks)

5. Would you expect to find a higher frequency of the light or dark allele in an area where snow was found year round? Explain. (1 mark)

Conclusion: Summarize the main ideas shown in this lab. Discuss possible sources of error. Discuss how the concepts of natural selection and survival of the fittest are related. (5 marks)