



**NSF GK-12 Graduate Fellows Program**  
**Award # DGE-0139171**  
*University of North Carolina at Wilmington*

# **Adaptation and Natural Selection**

## Activity Instructions

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## Adaptation and Natural Selection (Goal 3)

### Objectives covered:

3.02—Evaluate evolutionary theories and processes: biological

### Purpose:

To give the students a better understanding of the forces that affect populations of species.

To give students and understanding of how conditions in an environment can effect an evolutionary change in a population.

To increase the students vocabulary of evolutionary terms.

### Materials:

PowerPoint presentation on the adaptation of giraffe's long necks.

Two rolls of paper: one black, one white

Scissors or a moth hole puncher

Paper clips

### Procedure:

1. Before class cut strips of the long paper and attach them around the classroom to simulate trees. There should be all white trees at the beginning of class. Have black trees already cut to size. If you have a hole puncher punch out enough moths for the class (depends on class size).
2. Go through the power point, detailing how the giraffe evolved its long neck. Give the students time to fill out the front of their worksheet while you are talking.
3. Stop when you reach the slide with the moths on it.
4. Have each student choose a color: either white or black.
5. Each student will get a cut out of a moth in the color that you chose. Tell them to mark it somehow so they know it is theirs.
6. Have the student attach their moth to a "tree" of their choice with a paper clip.
7. Have them sit down. The teacher (and fellow) will act as birds, and go around and "eat" (take down) some of the moths. Of course, they should take the ones that stand out the most (i.e. white moths on black trees and visa versa), but don't eat all of one color!
8. On the board, write the number of each color of moth there were at the beginning, and the number of moths of each color left.
9. Student should answer the first question (see PowerPoint). The number of black moths eaten should be greater than the number of white.
10. Next the students that have moths still alive should retrieve them from the trees. Each one of the moths not eaten lives to reproduce. Have each person with a live moth gets one more moth of the SAME color. Put them on the trees (let the people whose moths were eaten clip up some of the offspring so no one is sitting around doing nothing). Go through and eat the moths again. (The birds should



- eat less moths this time. The student should have caught on that they need to put their moths on trees of the same color so that they won't be eaten. If they are camouflaged, the birds can't see them as well!) Write the numbers eaten on the board.
11. Use the PowerPoint slides and explain briefly what happened during the Industrial Revolution in Britain. Change all of the trees from white to black by switching the paper. There should be only black trees now.
  12. Tell the people with living moths to go through another reproductive cycle and attach their moths to a tree. (You should have worked it out so that there are still a few black moths in the class! Otherwise this will not work.)
  13. Go through another reproduction cycle. The "birds" feed again (taking mostly white moths, b/c they are most visible).
  14. Write the numbers on the board.
  15. Go through another reproduction cycle, clip moths up and have birds eat them. Record numbers on the board.
  16. Students should now make a bar graph showing the number of moths of each color surviving after each bird eating round. They should easily see the switch in PHENOTYPE after the industrial revolution begins.
  17. Have them calculate percentages of white and black moths after each feeding time.
  18. Make sure they have answered all the questions on the PowerPoint and have their graphs and percentages on the back of the worksheet.

\*\*\* If you have a long class period, you can continue with the reproduction/ feeding cycle to get more dramatic results.

\*\*\*With enough moths reproducing in the class, there should be enough moths and moth babies for everyone in the class to be able to clip up a moth every round. This should help by not having students that have to keep track of 10 moths and not having students sitting around doing nothing.



## Adaptation and Natural Selection

Name: \_\_\_\_\_

From Power Point presentation-

1. Name some real life examples of adaptation.
2. Hypothesize about how you think the giraffe's neck got long enough to reach the leaves on the high trees.
3. How is the African plain different from North Carolina? Think about the food, water, and climate in the two places. Imagine that you are an herbivore. Where would you rather live?
4. What is a mutation?
5. Explain how mutations can help increase reproductive success.

