

NAME \_\_\_\_\_

PERIOD \_\_\_\_\_  
DUE DATE \_\_\_\_\_

## ADAPTATIONS

Variations are differences in traits that occur among members of the same species. Those variations in structure, function, or behavior that make organisms better suited to survive in their environments are called adaptations.

According to Darwin's Theory of Natural Selection, organisms overproduce and among those organisms are variations (i.e. differences in color, height, eyesight, running speed, etc.). Those organisms with helpful variations (adaptations) will be better equipped to compete for resources and will survive. This idea has often been called "Survival of the Fittest." Organisms that survive will pass their traits on to their offspring. These variations may accumulate over time and lead to speciation.



### OBJECTIVES:

- Observe variations in traits of organisms
- Measure the variations
- Relate adaptations to survival

### MATERIALS:

5 Grapes  
5 Peanuts  
Electronic gram scale

Metric ruler  
Deck of cards



### PROCEDURE:

#### PART I: VARIATION IN GRAPES

- 1) Randomly select one of the grapes and make 4 observations about it (other than mass):

_____	_____
_____	_____

- 2) Mass out the 5 grapes and record the mass to the nearest tenth of a gram in the table below.

GRAPE #	Mass (g)
1	
2	
3	
4	
5	

What is the average mass of the grapes in grams? \_\_\_\_\_

What is the mass of the heaviest grape? \_\_\_\_\_ The lightest? \_\_\_\_\_

How many grams is the range of grape masses (heaviest minus lightest)? \_\_\_\_\_

## PART II: VARIATIONS IN PEANUTS

- 4) Randomly select one of the *PEANUTS* and make 4 observations about it (other than mass or length).  
 \_\_\_\_\_  
 \_\_\_\_\_

- 5) Mass out the 5 peanuts and record the mass to the nearest tenth of a gram below. Also measure the length of the peanut in millimeters and record it below.

PEANUT #	MASS (g)	LENGTH (mm)
1		
2		
3		
4		
5		

Did you see variation in *PEANUT* mass? \_\_\_\_\_ In length? \_\_\_\_\_

6) Observe your lab partner. Give 6 traits that vary between your partner and you.

_____	_____
_____	_____
_____	_____

Describe how one of these traits could be an adaptation in humans:

\_\_\_\_\_

\_\_\_\_\_

### PART III: ADAPTATIONS AND SURVIVAL

7) Cheetahs are fast running cats that prey on gazelles. Fast gazelles can escape the cheetahs and therefore do not get eaten.

You will simulate the adaptation of speed in gazelles, and its effect on survival, using a deck of playing cards. Use the following procedure:

A. Remove the jokers and face cards (jack, queen, king) from the deck.  
Do not use these in the simulation.

B. Separate the red cards from the black cards.

RED = CHEETAH (Predator)  
BLACK = GAZELLE (Prey)

One partner should take the predator (red) deck and the other should take the prey (black) deck.

C. Shuffle each deck then play "war" by each partner flipping over one card at the same time. The number on the card represents the animals' speed. (Aces count as "ones.") A cheetah (red) captures and eats the gazelle (black) if the red card is higher than, or equal to, the gazelle card.

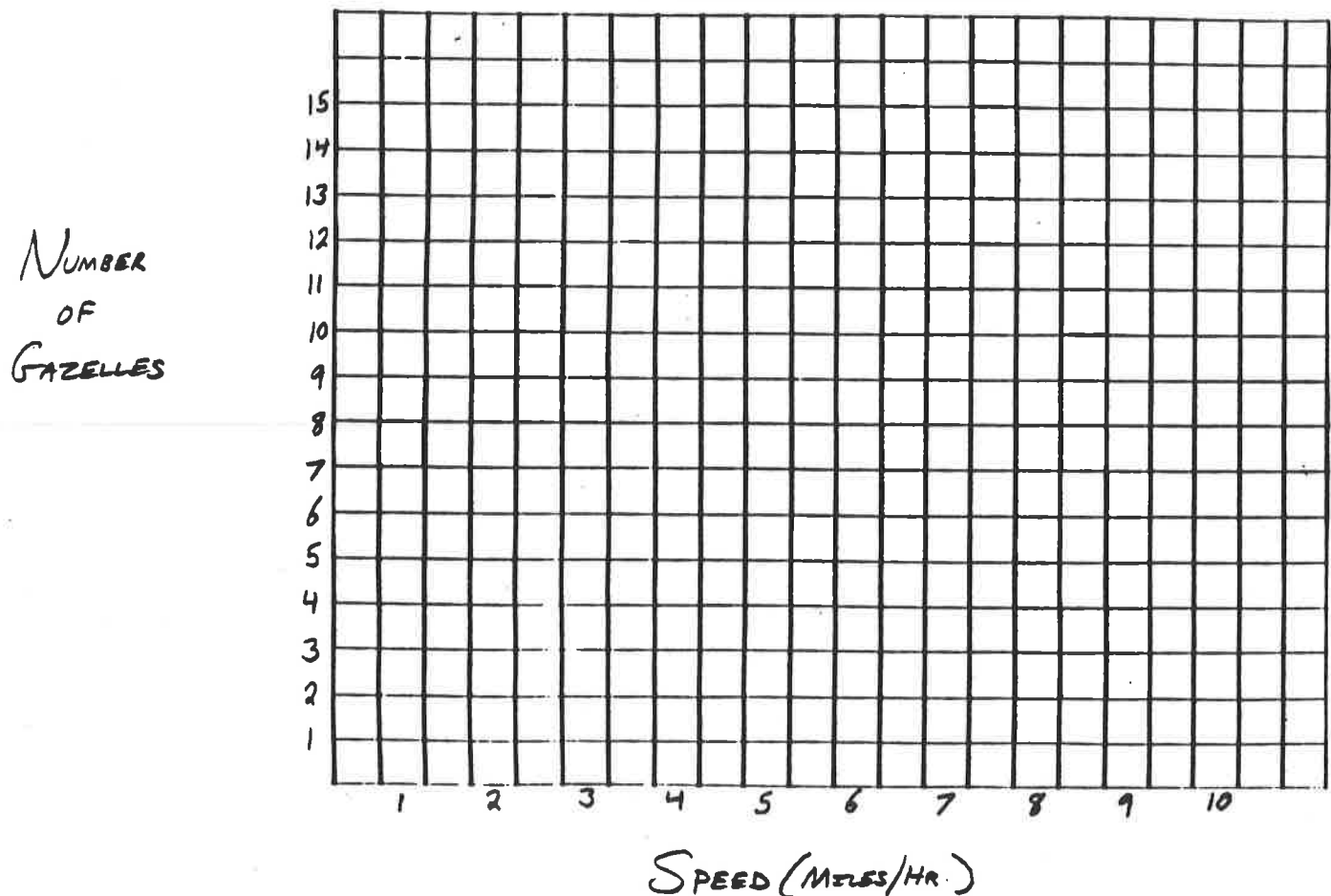
D. Make a pile of the gazelles that were captured and eaten. Tally the speeds of these gazelles on the table below.

E. Put all the number cards back together and repeat steps B, C, and D again two more times.

SPEED OF CAPTURED GAZELLE (Miles/hr.)	TALLY
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

8) Make a bar graph of the captured gazelles on the graph paper below:

### GAZELLES CAPTURED AND EATEN



1. Based on your graph, how might running speed in gazelles be an adaptation?

Base your answer to the following question on the passage below and on your knowledge of biology.

Dandelions are weeds that are very common in many grassy areas of New York State. Dandelion flowers first open up in a bright-yellow stage, and later turn a fluffy white when they are ready to release their seeds. The seeds are carried by the wind, and can sometimes travel great distances before landing and growing into new plants. The stems of dandelions are usually very long, typically about 20–30 centimeters (cm), and stand high above the surrounding grass.

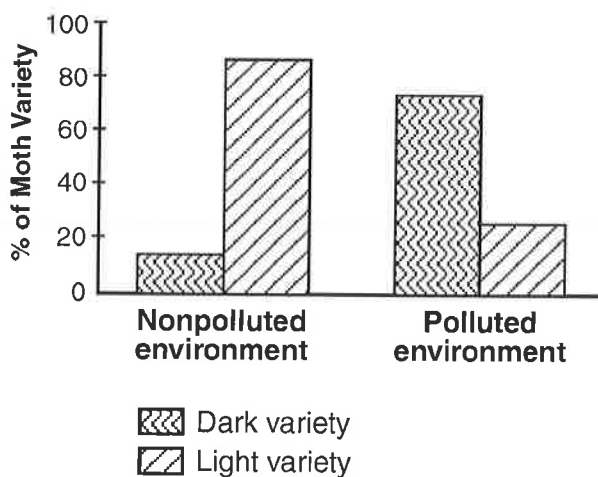
A science teacher in Niagara County discovered an area in her lawn where nearly every dandelion had a stem less than 1 cm long. These short dandelions were replacing large amounts of grass in the lawn surrounding her house. They were growing much more thickly than the taller dandelions in other nearby areas. The short dandelions appeared to be growing very successfully in one area of her lawn, but did not appear to have spread to other areas of her lawn. The science teacher noticed that every time she mowed her lawn, the short dandelions were left untouched by the mower blades, and that their numbers were steadily increasing.

2. State *one* possible reason why the amount of grass was decreasing, while the number of short dandelions was increasing in the lawn of the science teacher.

Base your answer to the following question on the information below and on your knowledge of biology.

Color in peppered moths is controlled by genes. A light-colored variety and a dark-colored variety of a peppered moth species exist in nature. The moths often rest on tree trunks, and several different species of birds are predators of this moth.

Before industrialization in England, the light-colored variety was much more abundant than the dark-colored variety and evidence indicates that many tree trunks at that time were covered with light-colored lichens. Later, industrialization developed and brought pollution, which killed the lichens, leaving the tree trunks covered with dark-colored soot. The results of a study made in England are shown below.



3. Which conclusion can best be drawn from the information given?

- A) The trait for dark coloration better suits the peppered moth for survival in non-polluted environments.
- B) The trait for light coloration better suits the peppered moth for survival in polluted environments.
- C) The variation of color in the peppered moth has no influence on survival of the moth.
- D) A given trait may be a favorable adaptation in one environment, but not in another environment.



When the dust had settled, a lone figure was revealed standing on the small knoll. Yes, he, too, was a herd animal—but he was *through* runnin'.