Name_____

ADAPTATIONS

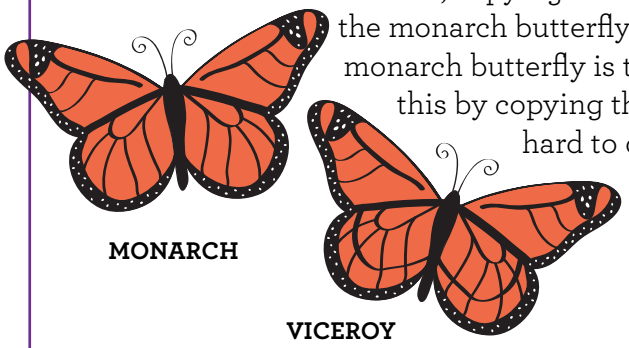
Directions: Read the information below.

Examining Adaptive Changes Through Generations

You may have learned about a famous biologist named Charles Darwin and his discovery of natural selection on the Galápagos Islands. Darwin's encounter with the tortoises on the islands led to one of the most important discoveries in science: animals adapt to their environment to ensure their survival. On one island, tortoises had their food source low to the ground and were able to easily eat the vegetation; however, on a neighboring island, the vegetation was higher up off the ground. Tortoises that could raise their heads high and reach the food were those that succeeded in reproducing. This led to an adaptation for tortoises to develop a high dome on their shell near the neck; this allowed them to crane their heads high and reach food. Eventually, the two islands developed two distinct types of tortoises based on the adaptation.

Adaptations are changes in species that allow them to increase chances of survival in their habitat. Natural selection is one way that adaptations can emerge. Examples of this include the red-eyed tree frog that uses the bright red coloring of its eyes to deter predators and the chameleon that can change colors to blend into its environment.

Mimicry is a special type of adaptation some animals use. Mimicry is where an animal will adapt to look like a different animal, copying its advantageous traits that protect it from predators. In nature, the monarch butterfly deters predators by the color and pattern on its wings. The monarch butterfly is toxic to other animals. The viceroy butterfly has adapted to this by copying the monarch. If you look closely at the two butterflies, it is hard to distinguish one from the other. It's beneficial to the viceroy to possess this color and pattern because predators will assume it is a toxic monarch and ultimately stay away.



MONARCH

VICEROY

The data set below shows a fictional example of how adaptation moves slowly through generations. Recall the Galápagos tortoises from the beginning of the text. Assume that before one island adapted to reaching high vegetation, there was a mix of all types of tortoises. Every five generations, a sample of 10 tortoises had the height of their shells (near the neck) measured. For each data set, compute the mean and examine the variation among the data. Using a bar graph to plot the data may lead to better insights into the distribution of the data. What observations do you notice about how changes move through a species over generations?

Generation 1	
Sample Number	Height of shell in Inches
1	10
2	8
3	7
4	9
5	8
6	1
7	0
8	0
9	10
10	4

Generation 5	
Sample Number	Height of shell in Inches
1	4
2	6
3	10
4	1
5	7
6	8
7	8
8	7
9	4
10	9

Generation 10	
Sample Number	Height of shell in Inches
1	7
2	9
3	3
4	7
5	7
6	8
7	6
8	5
9	8
10	6

Generation 15	
Sample Number	Height of shell in Inches
1	7
2	6
3	8
4	7
5	8
6	6
7	7
8	8
9	6
10	7

Directions: Answer the questions below using the passage.

1. For each generation of turtles, record the mean height of the shell:

Generation 1:_____

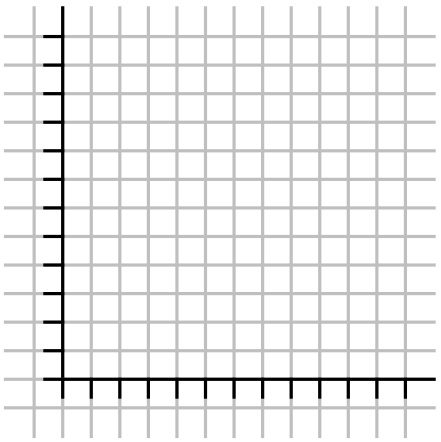
Generation 5:_____

Generation 10:_____

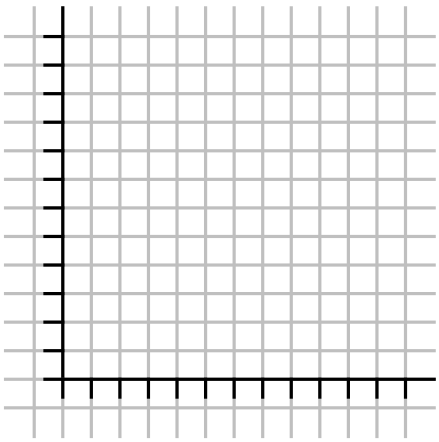
Generation 15:_____

2. Create a histogram of each generation below:

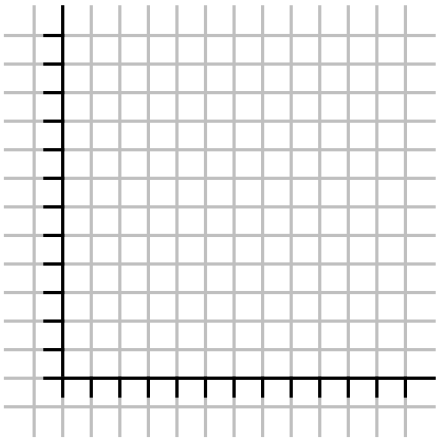
Generation 1



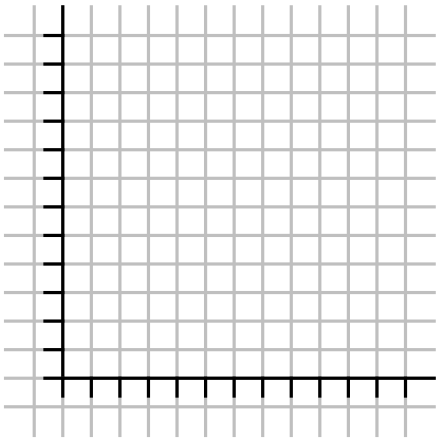
Generation 5



Generation 10



Generation 15



3. What observations can you make about how the population is changing over time?

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