



# Genetic Variation and Observation

## ***Engage***

This activity is designed to have your students sharpen their observational skills and apply their observations to the concept of genetic variation.

### **How can you tell different animals of the same species apart?**

1. Begin the lesson by telling students that they will be investigating the differences between individual animals of the same species due to genetic variation.
2. Have students brainstorm possible ways to distinguish among multiple animals of the same species. They do not need to be limited to any type of animal. (Answers may include: height, weight, horn shape, tone, markings/patterns, ear shape, etc.)

## ***Explore***

3. Have students work in pairs, if possible, and have them visit the Zoo's Online Resource Library at [resourcelibrary.clemet zoo.com](http://resourcelibrary.clemet zoo.com).
4. Have students search for photos that show multiple animals of the same species.

## ***Explain***

5. Biologists use specific observational techniques to help identify individual animals. Biologists observe animals in both zoos and in the wild and record their observations.
6. Genetic variation is created through heredity, or the passing of characteristics or traits from parents to their offspring. This variation of genes may begin as two siblings having different physical appearances and end with two very distinguishable subspecies. For example, all tigers are the same species, but 5 subspecies of tigers exist in different parts of Asia and look very different from each other.
7. Using the Zoo's Online Resource Library or other popular websites, students should be tasked with finding a video to observe. The video should be at least 3-5 minutes in length, and include multiple animals of the same species. Recommended searches include looking for videos specific to the type of animal they would like to observe.
8. When students have selected their videos, it is important to remind them that they will be looking for signs of genetic variation between each animal. The ultimate goal should be for each group to have a list of distinguishing features that will help them to identify each animal in the video as an individual.

### **Expand**

9. After the students have viewed their videos, ask them what the pros and cons are for scientists to use this method of observation? Different sampling methods all have strong and weak points. Any time a biologist makes an observation, they are recording a sample. A biologist must determine a few things before taking a sample. Which animals are going to be observed and when? And how will they record their observations? These questions help them determine what sampling style is appropriate.
10. Ask students how this type of observation could be potentially beneficial in both a zoo and the wild.
11. Ask these questions to your students: Why is it important to be able to identify individual animals while recording behavior? Why is it important for zoos to keep track of heredity of their animals? After allowing them to come up with their own ideas, share the following information with them.
12. Heredity and genetic variation are important to record in both a zoo and in the wild. Heredity in a zoo population, for example, allows us to make sure we are creating a genetically diverse population of animals in zoos. Why would this be important?
13. Genetic variation among individuals not only allows animal keepers to identify the animals in their care, but it could also aid in them providing better care for their animals. Each animal may have a different personality, and some individual animals may require different types of care. Being able to identify them allows animal keepers to provide the best care possible.

### **Assess**

14. Verify that the students' data forms are recorded properly and include a list of distinguishing traits between animals.
15. Ask students specifically why it would be beneficial for animal keepers at a zoo to be able to identify genetic variation in their animals?
16. Have students answer one or more of the following questions: What did you learn about heredity today? What did you learn about genetic variation? Can you describe or give examples of heredity and genetic variation? How can your methods used today be beneficial to biologist studying animal behavior?

**Standards**

<b>Ohio Academic Content Standards</b>
<b>Grades 5-8</b>
Life Science Topic: Species and Reproduction Diversity of species occurs through gradual processes over many generations. The characteristics of an organism are a result of inherited traits received from parent(s).

<b>National Science Education Standards</b>
<b>Grades 5-8</b>
Science as Inquiry Abilities necessary to do scientific inquiry Understanding about scientific inquiry Life Science Structure and function in living systems Regulation and behavior Populations and ecosystems Diversity and adaptations of organisms

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

## Research Plan – Genetic Variation and Observation

**1. Questioning**  
State the problem.  
Make a hypothesis.



How could you tell different animals of the same species apart?

**2. Planning**  
Make a plan by asking  
these questions  
(think, talk, write)



**3. Implementing**  
Gather the materials.  
Follow the  
procedures.  
Observe and  
record the results.



**4. Concluding**  
Draw a conclusion.



**5. Reporting**  
Share my results  
(informal)  
Produce a report  
(formal)

