**Science in a Bag – Student Page**

**Generation of Traits**

**Grade Level:**

5th Grade Heredity

**Standards**

*GLE 0507.4.1* Describe how genetic information is passed from parents to offspring during reproduction.

*SPI 0507.4.1*Recognize that information is passed from parent to offspring during reproduction.

**Task Objective**

Students will be able to recognize and understand that traits are passed from parent to offspring and each child/sibling can receive a different mixture of traits from their parents.

**Materials Needed**

* Twenty-four Colored Pom-Poms (6 each of four different colors)
* Crayons (brown, green, yellow, & red)
* Sharpie Marker
* Six Small Cups
* Student worksheet

**Procedures**

1. Take all objects out of the bag.
2. Separate all objects by type.
3. Make sure each person in your group has the Generations of Trait Worksheet.
4. [](http://www.google.com/imgres?sa=X&biw=1348&bih=665&tbm=isch&tbnid=Y4D1takblv6o0M:&imgrefurl=http://www.mycutegraphics.com/graphics/cups/black-white-drinking-glass.html&docid=kJg-QkJF7FUByM&imgurl=http://content.mycutegraphics.com/graphics/household/drinking-glass-black-white.png&w=374&h=500&ei=UXM2UuuuCIia9gT3w4GoDg&zoom=1&ved=1t:3588,r:29,s:0,i:177&iact=rc&page=2&tbnh=184&tbnw=137&start=18&ndsp=28&tx=63&ty=48)Begin by labeling each cup as shown.

[](http://www.google.com/imgres?sa=X&biw=1348&bih=665&tbm=isch&tbnid=Y4D1takblv6o0M:&imgrefurl=http://www.mycutegraphics.com/graphics/cups/black-white-drinking-glass.html&docid=kJg-QkJF7FUByM&imgurl=http://content.mycutegraphics.com/graphics/household/drinking-glass-black-white.png&w=374&h=500&ei=UXM2UuuuCIia9gT3w4GoDg&zoom=1&ved=1t:3588,r:29,s:0,i:177&iact=rc&page=2&tbnh=184&tbnw=137&start=18&ndsp=28&tx=63&ty=48)

Grandfather Grandmother Grandfather Grandmother

A A B B

[](http://www.google.com/imgres?sa=X&biw=1348&bih=665&tbm=isch&tbnid=Y4D1takblv6o0M:&imgrefurl=http://www.mycutegraphics.com/graphics/cups/black-white-drinking-glass.html&docid=kJg-QkJF7FUByM&imgurl=http://content.mycutegraphics.com/graphics/household/drinking-glass-black-white.png&w=374&h=500&ei=UXM2UuuuCIia9gT3w4GoDg&zoom=1&ved=1t:3588,r:29,s:0,i:177&iact=rc&page=2&tbnh=184&tbnw=137&start=18&ndsp=28&tx=63&ty=48)

Mother Father

1. After you have labeled each cup, arrange the cups as shown above.
2. Then place six red pom-poms in Grandfather A. Six brown pom-poms in Grandmother A. Six yellow pom-poms in Grandfather B. Six green pom-poms in Grandmother B. (The pom-poms are your traits, which will represent what each grandparent have).
3. Color the pom-pom picture on the Generations of Trait Worksheet to show the traits of each grandparent.
4. One you have finished coloring the grandparents pom-pom on worksheet take three pom-poms (traits) from Grandfather’s A cup and three pom-poms (traits)

from Grandmother’s A cup and place them in the cup labeled Mother, making sure pom-poms are mixed. (These are the traits that Mother will inherit from her parents).

1. Color the pom-pom picture on the Generations of Trait Worksheet to show the traits of the Mother.
2. Once you have finished coloring the mother’s pom-poms on worksheet take three pom-poms (traits) from Grandfather’s B cup and three pom-poms (traits) from Grandmother’s B cup and place them in the cup labeled Father, making sure pom-poms are mixed. (These are the traits that Father will inherit from his parents).
3. Color the pom-pom picture on the Generations of Trait Worksheet to show the traits of the Father.
4. Now we are going to determine the traits of Mother and Father’s four children: Mary, George, Elizabeth and Carl. Beginning with Mary, close your eyes, and select three pom-poms (traits) from Mother and three pom-poms (traits) from Father. Color the traits that Mary inherited on your Generation of Traits worksheet.
5. Return the pom-poms (traits) that you took from Mother and Father (Look back at your worksheet, if you forget). Mix well and then close your eyes and take three pom-poms (traits) from Mother and three pom-poms (traits) from Father. These are the traits that George will inherit. Color the traits that George inherited on your Generations of Traits worksheet.
6. Return the traits you took from Mother and Father, remembering to mix the pom-poms (traits) and repeat the process to find the traits for Elizabeth and Carl. Once you have found their traits, color the traits on your Generations of Traits worksheet.
7. Answer the questions found under Assessment (on back of Generations Traits Worksheet)
8. Once you have finished answering your questions, place your Generations of Traits in your learning log and clean up your area by returning all items to the bag.
9. Throw your labeled cups away. (This will allow for the next group to start from the beginning).

**Assessment**

1. What similarities and/or differences did the children inherit from the parents?
2. What similarities and/or differences did the children inherit from the grandparents?
3. Of the four children, do any of them have the same number and type of traits?

**Clean-up**

Please return all materials as you found them. All the pom-poms should be placed in the small ziplock bag. All other materials belong in the big ziplock bag. Throw your labeled cups away.

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**Task Objective**

Students will be able to recognize and understand that traits are passed from parent to offspring and each child/sibling can receive a different mixture of traits from their parents.

**Explanation**

Reproduction is the production of offspring by the union of male and female gametes. Gametes are reproduction cells that form new cells during the fertilization of an egg and sperm. These cells contribute a set of traits to the offspring. Traits are inherited characteristics that are passed down from the parents to the child. Not all traits are inherited; some traits are the result of our environment.

Some inherited traits are eye color, hair color, tongue curling, and whether your earlobes are attached or unattached. Some environmental traits are skinny versus fat, living conditions, and our language skills.

In this activity, the children are able to understand the process of reproduction and the passing of traits.

**Common Misconceptions**

Some people feel that they inherit their traits not just from their parents but from all family members such as aunts and cousin due to certain resemblance that are pointed out by family members. Traits are only passed from parents and by grandparents.

**Real World Connection**

Participating in this activity will illustrate the passing of genetic traits from parent to child. The activity shows how and why we may look like one parent more than the other. The same is true with siblings.

**Connections Across the Curriculum**

Math: Represent and interpret data.

[CCSS.Math.Content.5.MD.B.2](http://www.corestandards.org/Math/Content/5/MD/B/2) Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots.

English Language Art: Key Ideas and Details

[CCSS.ELA-Literacy.RI.5.3](http://www.corestandards.org/ELA-Literacy/RI/5/3/) Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text.

Social Studies: Culture

CCSS - 50.03 Recognize the contributions of individuals and people of various ethnic, racial, religious, and socioeconomic groups to the development of civilizations.

5.1.tpi.6. explore the contributions of people of various racial, ethnic, and

religious groups in the United States

**References**

<http://teach.genetics.utah.edu>

<http://www.authorstream.com/Presentation/aSGuest123414-1296129-inherited-traits-vs-1-environmental-notes/>

<http://jc-schools.net/dynamic/science/sci5.html>

<http://www.uen.org/core/science/sciber/sciber5/stand-5/>