

# People Are Like Peas in a Pod

**Grade level:** 6 - 12

**Subject:** Life Sciences, Genetics

**Duration:** one class period

**Group size:** up to 32 students

**Setting:** classroom

## **Content Standards:**

*California Science Content Standard for Public Schools*

Life Science/Biology: Grade 7 – 2c, 2d, 2e; Grade 9-12 – 3a, 3c

## **Objective(s):**

The objectives of the activity is:

- To observe and appreciate the diversity of individuals within a population.
- To promote student understanding of how dominant traits, recessive traits, genotypes, and phenotypes help produce variation in a population.
- To demonstrate how to construct a Punnett Square.

## **Materials needed:**

Part One:

1. dozen intact fresh pea pods
2. a roll of paper towels

Part Two (enough materials for groups of two):

1. styrofoam cups
2. one-half cup of black-eyed peas
3. plastic or metal tray
4. metric ruler
5. graph paper
6. notebook

Part Three:

1. 2 pieces of 8-1/2" by 11" black or dark colored construction paper cut into 4 parts, each about 2 1/2" by 8 1/2"
2. 2 pieces of clear transparency film cut into four parts

## **Procedures:**

Part One

1. Write the words population, species, and variation on the blackboard.
2. One member from each group will obtain a pea pod.
3. Have each group examine a pod to observe the variations in pea size. When students open the pods, they will notice that the peas near the center are larger. Why? Are the peas constricted? This can lead to a discussion of heredity and environment.
4. Relate the terms species, population, and variation to the pea pods.

## Part Two

1. Have students form groups of two and have one member from each group get the supplies.
2. Point out that the cup of peas is the group's sample population and that they are looking for variations within that sample.
3. Ask students to pour the peas onto the tray so they can see all the peas at once. Each group should look for ways the peas are similar or different.
4. Tell each group to choose three differences (variables) including one that can be measured with the ruler.
5. Monitor the class as they decide which characteristics of peas they will select. Those who can't find any characteristics other than color, texture, or size might need a little prodding. Ask those students a question such as, "What other differences do you see?"
6. Taking one variable at a time, students should sort their peas on the tray, then write the variable and record the number of peas showing that characteristic in their notebook.
7. Students will take the results for each variable and plot the number of peas on the graph paper. (A bar graph works well.) Place a model on the chalkboard as an example.
8. Have those students who finish the sorting, classifying, and plotting before others, compute the data percentages and record them in their notebook.
9. When the class has finished the assignment, have each group share their results. Write the results on the chalkboard and discuss the similarities and differences between the findings of each group. Some questions to consider for discussion: Why are some peas wrinkled or small? Why are there differences between samples?

## Part Three

1. Discuss and write the terms dominant trait, recessive trait, genotype, and phenotype on the blackboard. Have students write the definition for each in their notebook.
2. Place students in groups of two and have one member from each group get the materials.
3. Explain to students that they have two pieces of dark construction paper and two pieces of clear plastic. Say "The dark paper represents a dominant gene and the clear plastic represents a recessive gene." In the activity, use the words "dark" or "clear" to describe the phenotype and the letters "D" for dominant and "d" for recessive to describe the genotype.
4. Write the following instructions on the chalkboard. Describe the genotype and phenotype.
  1. Place one dark strip on top of the other dark strip. Result?
  2. Place one dark strip on top of one clear strip. Result?
  3. Place one clear strip on top of one dark strip. Result?
  4. Place one clear strip over the other clear strip. Result?
5. Discuss and demonstrate the results on a Punnett Square. Then show students how to show inheritance through three generations.
6. Provide students with a list of dominant genes in humans. Working in pairs,

- students will select one human trait and demonstrate three generations on a Punnett Square.
7. Individual groups will write their results on the chalkboard. Then each group will discuss the accuracy of their results.

**Performance Assessment:**

Students will write a paragraph explaining how inheritance of dominant and recessive genes helps produce variation in a population.

**Conclusions:**

Dominant and recessive genes can contribute to variation in a species. Variation is necessary for the survival of a species.

**References:**

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<http://www.iit.edu/%7Esmile/chbi9921.htm>