

Glittering Offspring

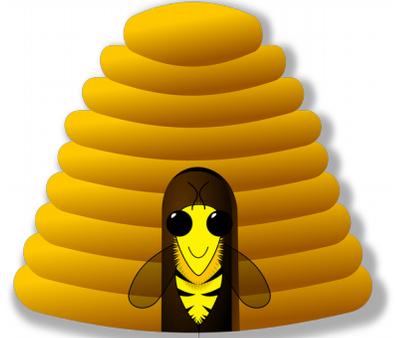
A lesson from the New Jersey Agricultural Society's Learning Through Gardening Program

Overview: Students learn how dominant and recessive gene traits are combined by pretending to be bees choosing a flower from which to gather pollen, using a bent pipe cleaner (bee's leg) and glitter (pollen). Students use the 'Glitter Plant Trait Key' to figure out what their plant will look like based on the 'pollen' they chose.

Grades: 4-5

Objective: The student will be able to

- Define dominant and recessive genes.
- Explain how dominant and recessive traits combine as characteristics in offspring.



Background: When an offspring is formed, its traits are determined by a combination of genes from each parent. Each parent contributes one-half of the genes for each trait. In the simplest cases, genes are either dominant or recessive. When a dominant gene combines with a recessive gene, the dominant gene's characteristics are expressed in the offspring. When two recessive genes are combined, the recessive characteristic is expressed in the offspring.

In agriculture, there are many examples of dominant and recessive traits. For example:

- Red potato skin is dominant over white potato skin.
- Russet-colored potato skin is dominant over white potato skin
- Green peas are dominant over yellow peas.
- Red cherry tomatoes are dominant over yellow cherry tomatoes.
- Tall sunflower plants are dominant over short sunflower plants.
- Yellow-kernel corn is dominant over white-kernel corn.

Materials

'Plant Parent 1' cards – one for each student

'Plant Trait Key' - one for each student or transparency for the whole class

Six colors of glitter: red, gold, blue, silver, green, and magenta

Pipe cleaners cut into 3-inch pieces, one piece for each student

'Glittering Offspring' worksheet – one for each student.

Preparation:

Make copies of the 'Plant Parent 1' cards and cut them apart. Prepare one card for each student.

Cut the pipe cleaners in 3-inch segments, one piece for each student.

Place the following eight piles of mixed glitter on eight small paper plates, leaving about 12 inches between each plate.

- Red, blue, and green
- Red, silver, and green
- Red, blue, and magenta
- Red, silver, and magenta
- Gold, blue, and green
- Gold, silver, and green
- Gold, blue, and magenta
- Gold, silver, and magenta

Procedure:

Pass out one 'Plant Parent 1' card to each student. Explain that the card represents one of the parents of a plant offspring and that each color on the card represents one trait which that parent will pass on to the offspring. Pass out one pipe cleaner piece to each student. Tell students that they are going to become pollinators. The pipe cleaners represent the hairy legs of a bee and the glitter piles represent the flower of different second parents for the plant offspring.

Have students bend the pipe cleaner into “bee legs” (A right angle bend near one end.)

Tell students they will visit *one* of the eight flowers (glitter piles) that will be the *second parent* (Parent 2) to the offspring they are creating. Ask each student to place his or her “bee leg” into the pile of glitter.

Have students return to their desks and remove the glitter from the “leg” onto a sheet of paper. Have them identify which colors are present for Parent 2.

Explain that sometimes a trait that an offspring receives from a parent is not visible, even though the offspring carries the information for that trait.

Show students the 'Glitter Plant Trait Key' that lists the trait that the offspring will show for each color (trait) received from Parent 1 and Parent 2.



Ask students to complete the Glittering Offspring worksheet using the Glitter Code listed at the top of the 'Plant Trait Key'. Only red and/or gold colors can determine the color of the petals; only blue and/or silver can determine the length of the stem; and only green and/or magenta can determine the color of the leaf. Example: If you had Red, Silver, and Green listed on your 'Plant Parent 1' card and you obtained the colors Gold, Silver, and Magenta from your glitter pile (Parent 2), then your plant would have would be:

Red and Gold = Red Petals
Silver and silver = Short Stem
Green and Magenta = Dark Green Leaves

Discuss with the class the similarities and differences among the offspring and the frequencies of each visible trait.

Evaluation:

Completed 'Glittering Offspring' sheet

Extensions:

Have students draw pictures of their plant offspring based on the Parent 1 and Parent 2 traits.

Instead of using the 'Plant Parent 1' cards, have the students pair up and each use their chosen glitter to create a plant offspring.

Have the students design their own dominant and recessive features for the gene pool.

Based on features of an offspring, discuss what the parent plants may have looked like.

Plant Parent 1 Cards

<p>Parent 1 Red Blue Green</p>	<p>Parent 1 Gold Blue Green</p>
<p>Parent 1 Red Silver Green</p>	<p>Parent 1 Gold Silver Green</p>
<p>Parent 1 Red Blue Magenta</p>	<p>Parent 1 Gold Blue Magenta</p>
<p>Parent 1 Red Silver Magenta</p>	<p>Parent 1 Gold Silver Magenta</p>

Glitter Plant Trait Key

Glitter Code: **Red or Gold = Color of Petal**
Blue or Silver = Length of Stem
Green or Magenta = Color of Leaf

Plant 1 (Parent 1 card)	Plant 2 (Glitter)	Visible Trait
Red	Red	Red Petals
Red	Gold	Red Petals
Gold	Red	Red Petals
Gold	Gold	White Petals
Blue	Blue	Tall Stem
Blue	Silver	Tall Stem
Silver	Blue	Tall Stem
Silver	Silver	Short Stem
Green	Green	Dark Green Leaves
Green	Magenta	Dark Green Leaves
Magenta	Green	Dark Green Leaves
Magenta	Magenta	Light Green Leaves

Glittering Offspring

Name _____ Date _____

Complete the table and draw a picture of the plant offspring.

	Parent 1	Parent 2	Outcome
Flower Petal			
Stem			
Leaf			

Plant Offspring Picture