

Plant Reproduction: Sexual Propagation

Grade: 7

GPS: S7L3. Students will recognize how biological traits are passed on to successive generations.

- b. Compare and contrast that organisms reproduce asexually and sexually (bacteria, protists, fungi, plants & animals).

Essential Question: How do plants reproduce sexually?

Teacher Note: This lesson builds on the prior lesson, “parts of a flower”. In this lesson students learn how pollination occurs in nature, and how plant breeders mimic that process to create new plant varieties. Students will “breed” their own plant variety using observations made in the school garden.

Interest Approach: Project the Green Revolution article and questions on the board for students to begin as they enter the classroom. This is a very simplistic version, so feel to elaborate on the ramifications of the green revolution.

The Green Revolution!

The Green Revolution is one of the most important events in the last 100 years. In the mid 1900s, there was a major food crisis. **Malthusian** economics predicted farmers could not grow enough food fast enough to feed the growing world population. Scientists believed millions of people would starve to death. A **plant breeder** named Norman Borlaug found a solution for the problem. He created a variety of rice that was more productive than normal rice. Farmers could grow up to ten times more rice with this new kind of rice! The “miracle rice”, along with irrigation and fertilizers, changed world agriculture. Scientists estimate that this new rice saved millions of lives. All of this happened because of **plant breeding**, or developing plants more useful to people by controlling the pollination process.

- 1.) What do you think are some uses of plant breeding?
- 2.) How do you think scientists and gardeners develop new varieties of plants?

Lesson:

After discussing the opening activity, use the flow chart below to teach the processes of pollination, and pollination through plant breeding. Have students illustrate and label each step as you discuss it. Provide example from online sources, textbook, or your own illustrations to give students a visual representation of this process. Compare and contrast natural pollination verses plant breeding. This is a great time to bring up differences in heirloom plants and hybrid plants if time permits.

Learning Activity: In this activity, students will “cross” two garden plants, and “develop” a new variety. Students will go into the school garden and two varieties of the same plant that they would like to “cross.” Make sure to stress that they pick two varieties of the *same* plant. They are making a new variety, not a new plant altogether. The easiest to use will be different varieties of flowers or vegetables that you have in the garden. Students will use the worksheet below to complete the exercise.

Check for Understanding: Use the following questions after the lab as an individual exercise or as class discussion.

1. How is pollination different from plant breeding?
2. What are some reasons for developing new breeds of plants?
3. What two flower parts hold genetic material before they are combined?
4. How do new plants started from seed compare genetically to the parent plants?

Plant Breeding Lab

What plant will you be breeding?

Plant Characteristics: Plant breeders combine breed different varieties of plants to achieve certain characteristics. It might be larger and more colorful flowers, better tasting fruit, a more compact growing habit, or a variety of other characteristics.

1. Pick two varieties of the same plant; for example, two different types of tomatoes.
2. Write down three of the same characteristics for each plant. For tomatoes the examples might be fruit color, fruit shape (round, oval, bumpy), fruit size.
3. After observing characteristics from each, pick which characteristics you think the new plant might have. They can be identical to the mother or father plant, or a mixture of the two.

Characteristics of mother plant:

- 1.
- 2.
- 3.

Characteristics of father plant

- 1.
- 2.
- 3.

Characteristics of the offspring plant

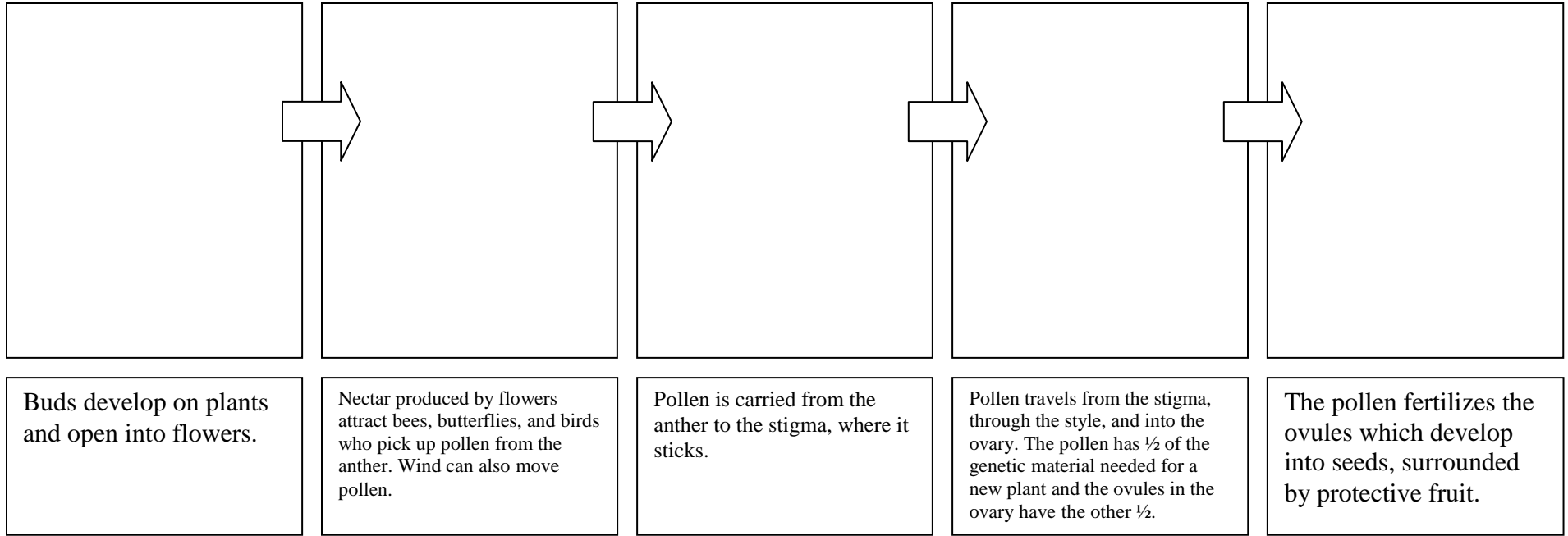
- 1.
- 2.
- 3.

What will you name your new variety?

Draw a picture of your new plant using the characteristics above



Pollination



Pollination through plant breeding

