**Plant and Flower Parts**

**Grade Level(s)**

4th grade

**Estimated Time**

30 minutes

**Purpose**

To identify the male and female structures of the flower, recognize their function in reproduction.

**Materials**

* Perfect Flowers (lilies or Alstroemerias are good options)
* Large note cards
* Packing tape

**Vocabulary**

* **Perfect Flower:** flower that has male and female structures in one flower
* **Imperfect Flower:** flower that does not have both male and female structures
* **Complete Flower:** Has all of the parts (petals, sepals, male and female)
* **Incomplete:** Missing one or more parts
* **Stamen:** male structure of flower
* **Anther:** part of stamen that contains pollen
* **Filament**: part of stamen that supports anther
* **Pistil:** female part of flower
* **Stigma**: top of pistil, where the pollen enters
* **Style**: middle section of pistil, where the pollen travels through
* **Ovary:** base of the pistil that contains eggs
* **Ovule:** where pollen meets the egg cell within the ovary
* **Pollen:** fine, powdery substance discharged from the anther that contains the male gamete that fertilizes the ovule
* **Pollination**: the process by which pollen is transferred to the female reproductive organs of a plant, thereby enabling fertilization to take place
* **Tassel**: male structures of the corn plant (anther, filament)
* **Silk:** part of the female structures of the corn plant (ear), including stigma and style

**Background**

Perfect vs. Imperfect flowers

* + Perfect flowers contain both the male productive structures (stamen) and female reproductive structures (pistil).
    - The stamen contains the anther, which holds pollen, and the filament, which supports the anther.
    - The pistil contains the stigma, which pollen sticks to; the style, which the pollen travels through; and the ovary, where the pollen meets the egg cell and fertilization occurs.
    - Lilies are an example of a perfect flower.
    - Soybeans also have a perfect flower, but these flowers are very small and may not be the best to dissect.
      * When talking about reasons behind detasseling corn, bring up soybeans and talk about how their small, perfect flowers would make hybrid seed production different in this species.
  + Imperfect flowers contain either the male portion OR the female portion of the flower, but not both.
    - Corn is an example of a plant with imperfect flowers.
      * Corn contains two flowers: the tassel and the ear.
        + The tassel (male flower)contains the anthers and is responsible for producing pollen.
        + The silks on the ear (female flower) contain the stigma and style. Each kernel is its own ovule.
* Complete vs. incomplete flowers
  + Complete flowers contain four flower parts: petals, sepals, stamen, and pistil.
  + Incomplete flowers are missing one or more of these four parts.
    - It is possible for a perfect flower to be incomplete, but it is not possible for an imperfect flower to be complete.
* Detasseling
  + Like it sounds, detasseling is the act of removing the tassel from a corn plant.
  + Corn is detasseled only when the field will be used for seed corn. Corn planted for other purposes (feed, ethanol, or processing to be made into syrups, fibers, or other things) will pollinate itself, and those farmers will not detassel their crops.
  + Seed corn is detasseled to stop the plant from pollinating its own ears. When this happens, growers can plant “male rows” and “female rows” that together will make a hybrid seed.
    - The “male rows” and “female rows” will be corn plants of different varieties, or that exhibit slightly different traits. Combining them will create a hybrid.
    - Generally, there are about 3-4 female rows for every one male row. Female rows are detasseled, and male rows are left to pollinate them. Corn is pollinated by wind.
    - Hybrid plants are beneficial, because they can take positive traits from two different varieties and combine them for ultimately a better next generation. Hybrid plants also exhibit “hybrid vigor” or heterosis, which means that the first generation offspring will perform better than either parent. The same type of benefit is exhibited in animals crossed between two breeds, and is explained more thoroughly here: <http://www.iowabeefcenter.org/bch/CrossbreedingGeneticsPrinciples.pdf>

**Interest Approach – Engagement**

Ask students what they think flowers are for. What constitutes a flower? Are they just pretty?

**Procedures**

1. Give each student group of 2 or 3 a perfect flower, a sheet of paper (to dissect the flower on).
2. They will be drawing their flower and labeling structures in their science notebooks. Then, they will remove the stamen and pistil, labeling those structures, and taping them to notecards. Tell students to ask questions if they are unsure, because once pieces are cut off the flower, they cannot be put back on.
3. Tell students to take out their notebooks and draw and label their flower. Answer questions if any arise. At this time, talk about other structures they might see on the flower. What do the petals look like? Can you see the stem? Are there sepals on this flower?
   1. Explain to the class that a flower with sepals, petals, stamens, and pistils is called complete. If the flower is missing one of those pieces, it is called incomplete. Ask students if a flower can be perfect and incomplete. The answer is yes, it can be.
4. Tell students to remove the stamen from the flower and place it on the notecard. Then label the notecard “stamen” and label the anther and filament.
5. Then, have the groups remove the pistil from the base of the flower.
6. Cut the ovary crossways and pinch the ovary until one or more of the ovules comes out.
   1. Tell students to observe, sketch, and take notes in their notebook.
7. Have students place the pistil on a second notecard and label the stigma, style, ovary, and ovule.
8. Help students place a strip of packing tape over the flower structures securing them to the note card.
9. Tell students to write the names of all group members on the back of the notecard and turn in the notecards at the end of class.
10. Review: How do flowers get pollinated? How are new seeds created? How do seeds spread?

**Organization Affiliation**

National Ag in the Classroom

**Agriculture Literacy Outcomes**

**T2.3-5.c** Explain how the availability of soil nutrients affects plant growth and development.

**Iowa/ Common Core** **Standards**

**4-LS1-1.** Construct an argument that plants, and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.