

# The Power of Pollination

## **Essential Guiding Question: What is pollination? Why is it important?**

In this lesson, students will first quietly observe pollinators and discuss their findings with the group. Afterwards, explain the role of pollinators and provide a few pictures for reference. For instance, show an example of the squash bee, and explain their role in human and wild food systems. Here, students can be introduced to a handful of pollinator adaptations (baskets, ocelli, compound eyes, etc) and certainly pollinator threats, common favorite flowers, or other related pollinator conservation.

After this intro, students will dissect simple flowers using the provided color-coded dissection guide and accompanying tools. This guide includes a diagram and short write up of flower parts and their respective functions. Later, students 10 and up should be able to understand the structure of composite flower blooms (explained further along in this lesson plan.) Have a daisy or sunflower ready for this piece in the lesson. Older students might enjoy a few lesson extensions pertaining to this topic.

**Estimated time: 1.5—2 hours    Ages: 8-14, 15 and up with appropriate lesson extensions**

### **Materials:**

- Printed photos of pollinators
- Printed flower dissection guides
- Magnifying glasses or digital microscope
- Tweezers, sharp knife, tray or dish
- Butterfly net, optional
- Flower ID guides, optional

### **Learning Objectives**

- 1) *Students will identify and understand parts of a flower and their functions*
- 2) *Students will observe and understand pollinators and their role in a flower's life*
- 3) *Students will demonstrate their understanding creatively OR apply their knowledge to brainstorm ways to help pollinators at home*

## **Activity 1—Intro and Pollinator Observation (10-20 minutes)**

**Opening Question: What are flowers? What do they do, where do they live? What animal needs flowers?**

Test the students' prior knowledge through the question above.

After your initial discussion, have students observe flowers and the insects that visit them and write down their findings. When they return show them your pollinator pictures, and ask them if any of the photos closely match what they witnessed and recorded.

While you're on the subject, share a handful of issues Pollinators face, including pesticides and herbicides, Climate Change, and Invasive Plant Species.



### **Pollinator Facts to share:**

- 1) In a year, 4 generations of Monarchs are born. The fourth, born in Potter County and other similar regions in September, migrates to Mexico for the Winter. For their size, this journey is equivalent to an average sized woman traveling to the moon and back 500 times in about 4 months!
- 2) Flies are pollinators too! Lots of early Spring flowers of the forest attract flies and are very dependent upon them to survive.
- 3) Squash bees are masters of zucchini, pumpkin, cucumber, and other similar plants' pollination only. Because of this they are called "pollen specialists" and very important in agriculture.
- 4) Honeybees were introduced from Europe originally to aid in boosting crops' success. To this day, they are prized for their honey production as well as their role in creating successful crops.

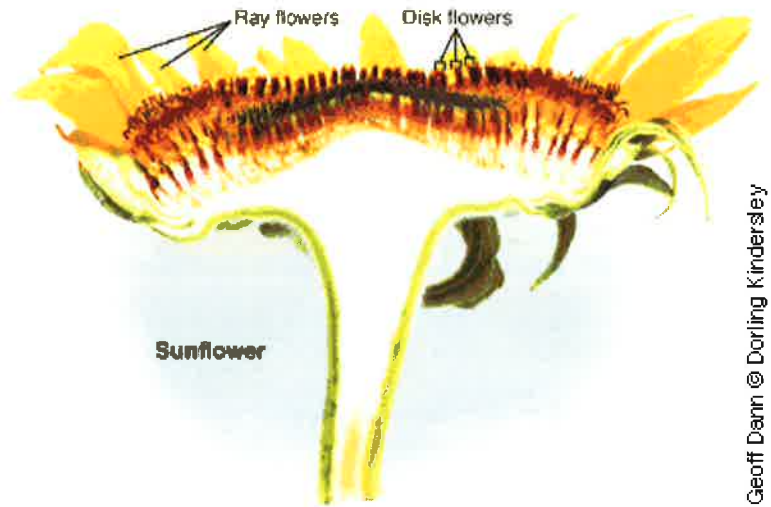
## Activity 2—Flower Dissection (30 to 60 minutes)

After the group discussion, explain to the group that in order to understand flowers better, we'll be dissecting some to observe their parts and respective functions. The Conservation District's color coded guide (on the next page) will help students easily differentiate parts, but we also recommend choosing a larger simple flower such as day lilies for the initial dissection to assist with the visualization. Older students can be self-guided during dissection, however students 12 and younger may need adult assistance, especially when using a knife to cut the flower ovaries length-wise to view the young, immature seeds inside.

Allow time for students to view flower parts of interest to them under microscope and/or magnifying glasses.

Here, mention to students that some flowers are actually 100's of flowers in one! Composite flowers are those which are considered the most modern (or, recently evolved,) as well as the most successful (or, common.) An excellent example for explaining composite disk and ray flower structure is any specie of sunflower. The Ray flowers lie at the outside (what we see as petals) and disk flowers are at the center. Allow students to place each type under microscope and ask if they notice some of the same male and female flower parts mentioned before, during their first dissection.

**Older students (15 and up) might enjoy the challenge of finding flowers that exhibit both disk and ray (sunflowers, daisies, etc.) as well as those exhibiting disk flowers only (thistle, burdock, blazing star, etc) and lastly, flowers exhibiting ray-only flowers (dandelion, chicory, wild lettuce.) Compare and contrast.**



Geoff Dann © Dorling Kindersley

## Extensions

- 1) Butterfly collection—especially during September, Monarch Butterflies can be spotted in abundance in Potter County. Ask students to observe them eat and lay eggs on milkweed patches. Very carefully catch a few if a net is available to you.
- 2) As students to try pollinating flowers themselves—supply them with a few items to choose from—paint brushes, tooth brushes, tweezers, cotton swabs, etc. and Ask them to demonstrate pollination. Here is a good time to mention the painstaking work that some farmers must undertake to ensure their crops produce a healthy yield!

## Conclusion (10-15 minutes)

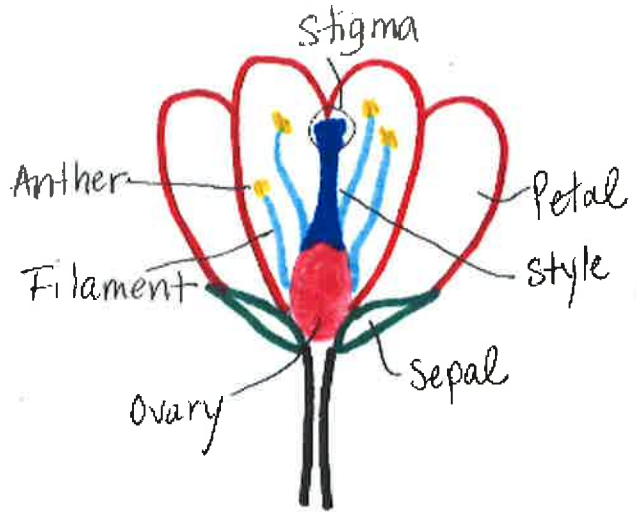
The conclusion of any lesson is crucial to an educator's success. This short time facilitates synthesis of the ideas you worked to convey in the last hour or more. Refer to the [Teaching Toolkit Assessment Guide](#) for ideas on how to phrase your conclusion!

The conclusion for this lesson should prove that students understand flowers and their lifecycle, as well as how it is intertwined in pollinator health. Younger students might do well with creating simple drawings of the pollination process and sharing with the group, writing a short story explaining pollination or parts of a flower, or disusing their favorite pollinator or flower that they learned about during the lesson. Students 15 years old and up should be encouraged to brainstorm a few ways to help pollinators at home. Facilitate small group discussions that outline common pollinator and plant threats, and corresponding prevention or backyard conservation.

# Flower Dissection Guide

Use the color-coded diagram shown to the right to organize the parts of your flower. Read the following to answer the questions " what does this piece do?" for the flower:

Flowers are the reproductive parts of many plants all around the world, even in the desert! Flowers have male AND female parts. The male parts are the stamen, made up of the anthers and the filaments. Anthers hold pollen. The female part is called the pistil, and this is made up of the stigma, style, and ovary. The Pistil later becomes a fertilized "fruit" and seeds. Pollinators must visit flowers to move male pollen to other flowers' female Pistils. The fertilized pistils later become seeds, which starts a whole new generation of plants! The stem send nutrients and water up from the ground to the flower. The sepals support the petals, stamens, and ovary, later they support the fertilized "fruit" of the flower. Most often, Petals help a flower track the sun and serve as a landing pad for pollinators.



Name - \_\_\_\_\_

How many? \_\_\_\_\_

What does it do?

Names - \_\_\_\_\_

How many? \_\_\_\_\_

What does it do?

Name - \_\_\_\_\_

How many? \_\_\_\_\_

What does it do?

Name - \_\_\_\_\_

How many? \_\_\_\_\_

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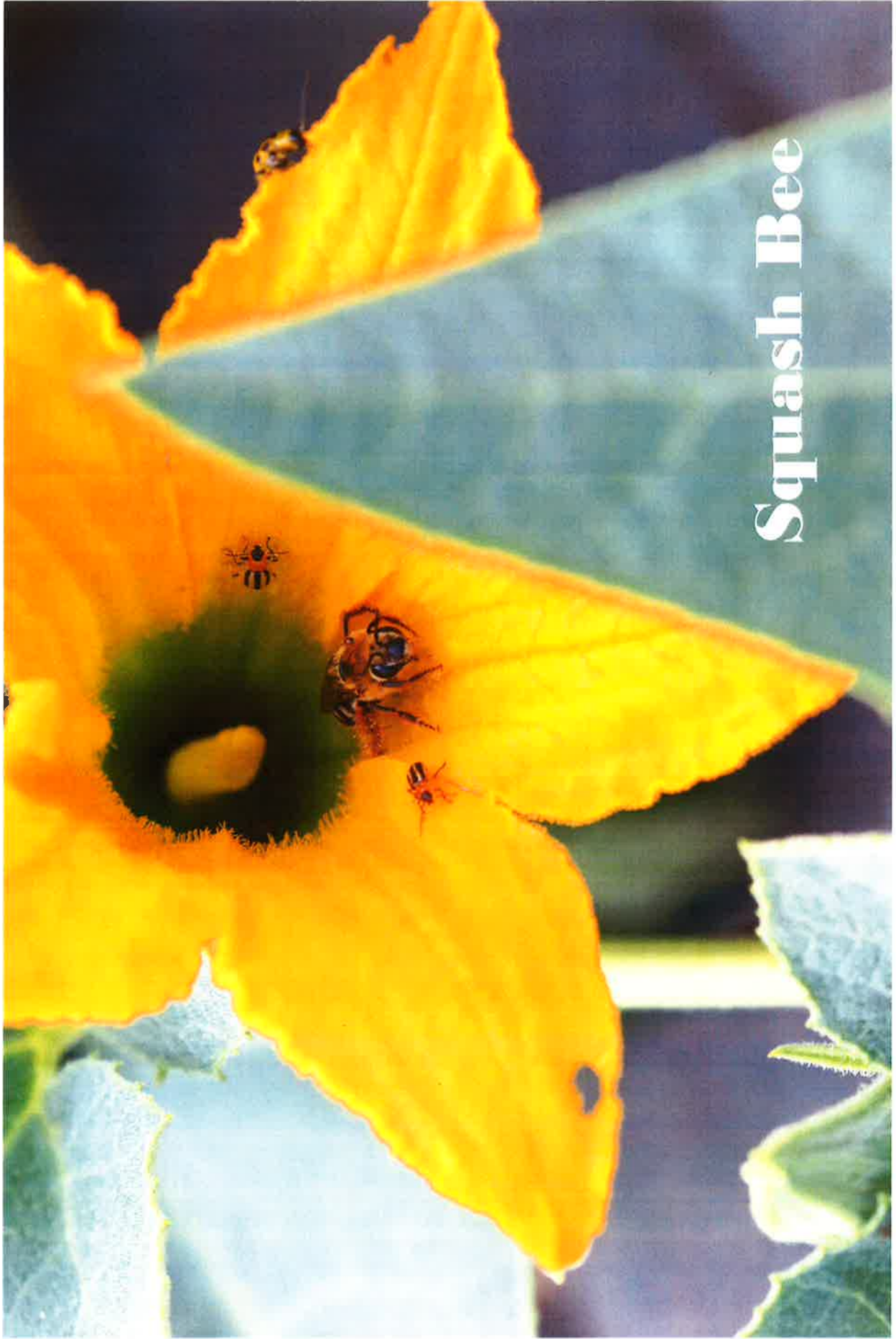
How many? \_\_\_\_\_

What does it do?

Name - \_\_\_\_\_

How many? \_\_\_\_\_

What does it do?



# Squash Bee



**Honey Bee**

# **Fly on Painted Trillium**



*Mary Anne Borge*

# Monarch Butterfly

