GET GROUNDED: INTRODUCTION

Did you know that honeybee keepers travel with their colonies? Because the blooming season is too short for any one plant in a single location to make it worthwhile for this business, beekeepers in North Dakota (ND) travel with their colonies to California from October to March to pollinate the fruit crop. Then they return to ND to pollinate the ND crop. Honeybee pollination is an essential Ecosystem Service that is vital to our world. In fact, 4 out of the 5 bites of food you eat is the result of bees and other animals pollinating those fruits and vegetables. **Pollination** is a *Regulating Service*.

Pollination is the transfer of pollen from the male part (anther) of the flower to the female part (stigma). The transfer of compatible pollen results in fertilization and the formation of seeds and fruits.

Use these tidbits of information to experiment and explore.

DIG IN!: ACTIVITY

Pollen from another flower of the same kind brings a new mix of genes to the plant and its seeds, making it more adaptable. Let’s see how it works!

1. Place a funnel over a cup of juice and insert one pipe cleaner through the funnel into the cup. This represents the **pistil** of a flower.
2. Now, crumple the top of the pipe cleaner to make a **stigma** to trap pollen.
3. Next, attach two pipe cleaners tightly around the straw so they stick out to each side, enough to touch the sides of the funnel. The straw should be able to reach the bottom of the cup.
4. Spread yellow corn meal (or flour) to represent **pollen** in a flower, in four or five strips evenly spaced around the inside of the funnel.
5. Insert the straw to drink and adjust the two pipe cleaners to pick up the corn meal “pollen.”
6. Re-adjust the pipe cleaners until it brushes up against the pipe cleaner representing the pistil. Go back with the pollen from the first visit and pretend it is from another flower of the same kind. Deposit the pollen on the stigma or tip of the pistil.
7. If you want, decorate the outside of your funnel. Then visit different types of “flowers” with different types of pollen, and see what happens.

Pollination is an essential Ecosystem Service. Some plants self-pollinate, but not as a rule. Other plants also send up sprouts, which are clones of the original plant. Aspen trees are known for this. Hundreds of aspen trees in a clump may all come from the same original tree. Now let’s look around your own community.
1. Go outside and observe anything in your area that is connected to pollination in your community. Items to observe might include:
   - Plants fertilized through pollination.
   - Animals you observe that are pollinators.
2. Develop a way to record your observations in your Field Notes. Record anything you notice about these animals and plants.
3. Based on what you observed, what are you wondering about and what do you want to know more about?
4. Share your questions with the group, and have a youth leader or adult leader record the responses. The leader should record responses.

**THINK ABOUT IT: REFLECTION**

Discuss how you might investigate the answer to your questions.
- What happens if we didn’t have honeybees?
- How would the decrease in honeybees affect humans’ well-being?
- How would the decrease in honeybees affect other species?
- How will the larger ecosystem be affected by the decrease in honeybees?

Create a story about an ecosystem where honeybees aren’t present. Include how the ecosystem is changed because of the lack of this service. Illustrate the story. Share with children at an area library or school.

**NATURAL CONNECTIONS TO OTHER ECOSYSTEM SERVICES**

In addition to honeybees’ direct economic value to humans, pollination provides service to many communities in North America and enhances its aesthetic, recreational, and cultural aspects of human activity. Thus, the service pollinators provide is not only a Regulating Service, but has ties to Cultural Services; both which are supported through Supporting Services.
IMPORTANT FACTS

It is reported that honeybees are worth $14.6 billion to the Agriculture Industry. Since 1996, some beekeepers have been reporting 30-90% loss of their colonies. This is known as **Colony Collapse Disorder (CCD)**. Scientists theorize four possible causes:

- Pathogen.
- Parasite.
- Environmental stresses.
- Bee management stresses.

One thing you can do to help preserve honeybees is to limit or eliminate pesticide use, especially during mid-day when bees may be out foraging. You can also plant good nectar sources such as red clover, foxglove, bee balm, and joe-pye weed.

Did you know that honeybees aren’t the only pollinators? Bats, moths, and birds are pollinators too. You can determine who pollinates flowers by their physical characteristics. For example, flowers that open at night are pollinated by bats. Flowers that are red are pollinated by hummingbirds because honeybees can’t see red.

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**DIG IN DEEPER:**

**EXTENSION ACTIVITIES**

Pollinators and flowers have a mutualistic relationship. What does this mean? Talk with a scientist, research online, or use texts to identify the word **mutualism**. Use the definition, research tools, and your critical thinking skills to figure out the following:

- What is a mutualistic relationship?
- Describe how a mutualistic relationship works between pollinators and flowers.
- What other organisms have mutualistic relationships?
- What things in your life are mutualistic?