

## Pollinators

*Activity Level: 4-6 Grade | Time: 60 minutes*

### PURPOSE

Students will learn about flower parts necessary for pollination and the different methods of pollination.

### NEBRASKA STATE STANDARD CONNECTION

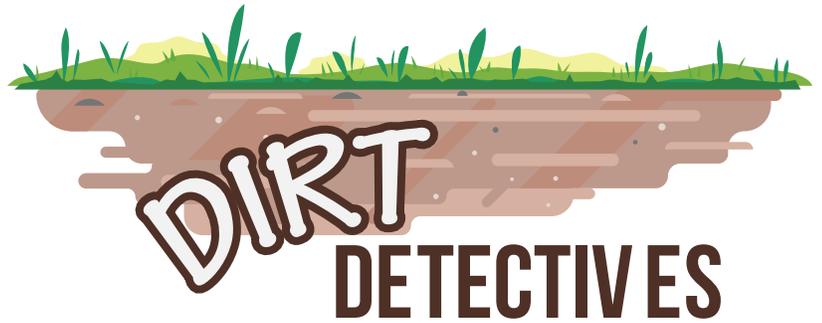
- SC.4.6.3.B Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.
- SC.5.8.2.C Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.
- SC.6.4.1.B Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principle and potential impacts on people and the natural environment that may limit possible solutions.

### ACTIVITY SNAPSHOT

1. Organize and Prepare Supplies
2. Read Background Information
3. Dirt Detectives: Pollinators PowerPoint
  - a. Perfect Pollination Activity
  - b. Pollination Simulation

### MATERIALS

- Dirt Detectives: Pollinators PowerPoint
- 1 bag of Cheetos
- Brown paper lunch sack, 1 per student
- Flower cutout, 1 per student
- Glue sticks
- Scissors, 1 per student
- 5 honey bee headbands
- 5 flower headbands
- 5 plastic cups of 100 mini (5mm) pompoms\*
- 5 plastic cups\* of water
- 5 medium (1") pompoms\*
- 5 jewel bag necklaces\*
- 5 drinking straws\*



- \*These items are included in the Pollination Simulation Kit, which is available for purchase from [www.agclassroomstore.com](http://www.agclassroomstore.com)

### WHAT'S THE CONNECTION TO AGRICULTURE?

Pollination is absolutely necessary for a plant or a tree to produce seeds. Seeds produce the crops we eat or the food we feed to our livestock animals.

### PROCEDURES:

#### 1. Organize and Prepare Supplies

See "Materials" on cover page.

*Prepare supplies and set up PowerPoint.*

#### 2. Background Information

Source: Utah Agriculture in the Classroom and Nebraska Agriculture in the Classroom; Soy of Science

Pollination is the transfer of pollen from the male parts, called the stamen, of the flower to the female parts of the flower, called the pistil. Pollination helps the plant form a seed, which can then make another plant! Soybeans are special because they don't have to rely on other plants for pollination. How is this possible? A "perfect flower" is one that contains both the male and female parts. A perfect flower can pollinate itself but can also be pollinated by other flowers.

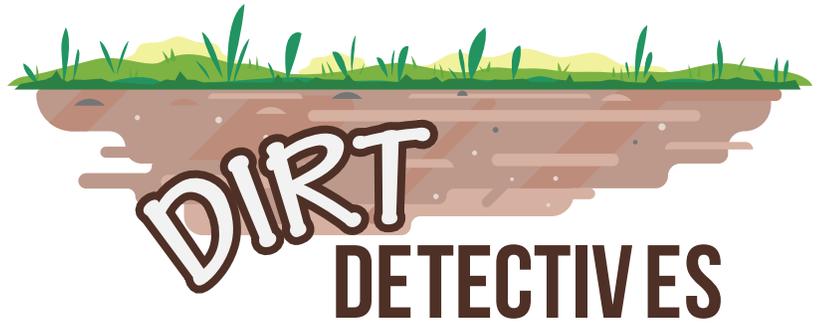
Honey bees are extremely important to humans. Bees are pollinators. They collect pollen and nectar from flowering trees and plants and transfer pollen from flower to flower. Bees pollinate 95 different crops, helping to create nearly one-third of the world's food supply. Additional pollinators include bats, birds, insects, wind, and sometimes water.

#### 3. PowerPoint

Slide 1: Dirt Detectives Lesson 6: Pollination

Slide 2: Review the lessons covered so far.

- *Lesson 1: Our World and Soil – Technology Advances*
- *Lesson 2: Soil Types – Sand, silt, and clay; which is ideal for growing crops? A mixture of all three which is called loam. All have their advantages and disadvantages*
- *Lesson 3: Traits – Why are traits important? They provide a variety and different choices when selecting plants and animal genetics.*
- *Lesson 4: Choices – How can genetically modified seeds help farmers be more efficient? Insect and herbicide resistant, drought tolerant seeds allow farmers to use less weed and insect repellent and less water if seeds are drought tolerant.*
- *Lesson 5: Germination & Seeds – What are the different uses for seeds? Food, animals, clothing, fuel, reproduction.*



Slide 3:

- What do you think of when you hear the word pollination?
- Pollination is very important to the life cycle of plants. Some seeds provide food for people or animals. While some seeds can be used to make clothing or even for fuel for our vehicles.

Slide 4:

- What is pollination?
- Pollination is the act of transferring grains of pollen. It is absolutely necessary for a plant or a tree to produce seeds.

Slide 5:

- Why is pollination important?
- Plants equal food.
- Food for us, what kind of plants produce seeds for us to eat? Crops-corn, soybeans, wheat, vegetables.
- Clothing, what kind of plants produce seeds for clothing? Cotton.
- Food for animals, what kind of plants produce seeds for animals to eat? Corn, soybeans, alfalfa, etc.

Slide 6:

- How does pollination work?
- The stamen is the male part of the plant that includes the filament and anther.
- The pistil is the female part of the plant that include the stigma, style, ovary, and ovule.

Slide 7:

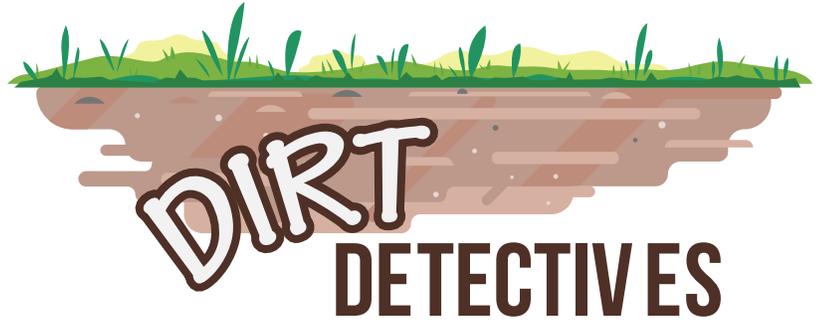
- There are two ways to pollinate flowers.
- One way is self-pollination: it takes place when pollination occurs within just one flower or between flowers on the same plant. Soybeans are a plant that can self-pollinate.
- The second way is cross pollination: it is the most common; pollen is transferred between flowers on two different plants. Corn is a plant that is usually cross-pollinated.
- 90 percent of flowering plants rely on animals as pollinators.

Slide 8:

- What are pollinators?
- Pollinators are an agent that moves the pollen.
- Pollen is the yellowish/orange looking dust found on the anthers of a flower.

Slide 9:

- Bees are pollinators. They transfer pollen when they pollinate different flowers.
- Bees are attracted to flowers that are white, yellow, lavender, or blue.



Slide 10:

- Bats are a pollinator.
- Bats feed on pale or white very fragrant plants with fruit.

Slide 11:

- Flies are pollinators.
- Flies like stinky smells; they like maroon flowers with an unpleasant odor.

Slide 12:

- Beetles are pollinators.
- Beetles like large bowl-shaped flowers.

Slide 13:

- Butterflies are pollinators.
- Butterflies like red, pink, orange, blue, or yellow flowers.

Slide 14:

- Moths are pollinators.
- Moths like orchids.

Slide 15:

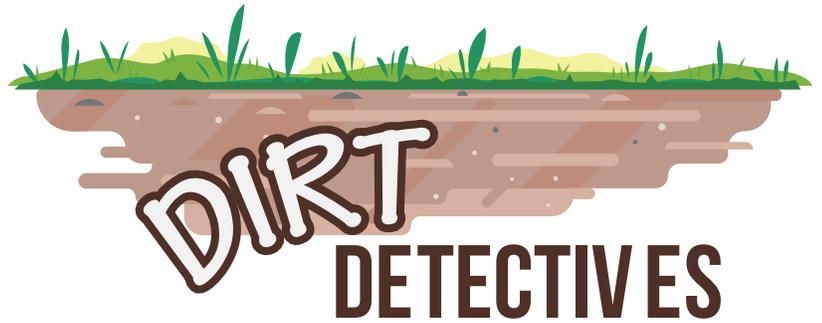
- Birds are a pollinator. They transfer pollen when they pollinate different flowers.
- Birds like flowers with that grow sideways or droop.

Slide 16: Pollination Activity

1. Cut of the flower
2. Open the paper bag
3. Get Cheetos
4. Begin eating Cheetos
5. Do NOT lick your fingers!
6. Glue flower to the bag
7. Is there Cheeto dust on your bag?
8. Rub your finger on to your flower. This is called self-pollination.
9. Rub your Cheeto finger on someone else's flower. This is called cross-pollination.

Slide 17: Review

1. The \_\_\_\_\_ represented pollen. *Cheeto Dust.*
2. The \_\_\_\_\_ represented the insect or wind that does the work of pollination. *Our hands/fingers.*
3. Why is pollination important for agriculture? *Pollination is necessary for seed production.*



#### Slide 18: Pollination Simulation Activity

1. Choose five people to represent flowers and five people to represent worker bees. The number of flowers and worker bees may vary according to group size.
2. Choose an area to serve as the “garden” and an area to the side of the garden to serve as the “beehive.”
3. Each flower will wear a flower headband and hold one container of mini pompoms to represent pollen and one container of water to represent nectar. The flowers will choose a location inside the garden in which to stand.
4. Each worker bee will carry one medium-sized pompom to represent the bee’s hairy body, one jewel bag tied with yarn and worn as a necklace to represent the honey sac, and one straw to represent the proboscis (the bee’s straw-like tongue).
5. The worker bees will leave the beehive in search of nectar. When a worker finds a flower, they will land their medium-sized pompom into the container of mini pompoms. The worker will then simulate gathering nectar with their proboscis by filling a straw with water using their finger to create a vacuum. The water will be deposited into the jewel bag. When the worker removes the medium-sized pompom from the container, the tiny pompoms will stick to the larger pompom much the same way pollen sticks to the hairs of a bee when it visits a flower.
6. After collecting nectar and pollen from the flower, the worker will find a new flower to visit. Here the worker will brush off some of the pollen collected from the previous flower into the new flower’s container. They will then collect more nectar and pollen before visiting another flower.
7. Once the worker bee has filled their honey sac with nectar, they will return to the hive.
8. For the purpose of this simulation, the worker bee must collect nectar and pollen from each flower before visiting a flower for a second time.
9. After completing the simulation, discuss your observations concerning the role worker bees play in pollination.

#### Review:

- What is pollination? *Pollination is the act of transferring grains of pollen.*
- Why is it important? *It is absolutely necessary for a plant or a tree to produce seeds.*
- Who are pollinators? *Birds, bees, bats, bugs, even wind or rain.*

#### Slide 19: Next Lesson

- We will investigate renewable and nonrenewable resources and see how crops can be used to create products that we use every day.

#### Review:

- Ask students to get out their scientific journal.
- What have you learned from today’s lesson? Write down key concepts and ideas that will help us solve our problem: how we grow more food with less land?
- Brainstorm new ideas and ways to solve this problem and write it in the ideas box.