



# POLLINATORS

## **Overview:**

Plants provide food, shelter and oxygen for other living things. Reproduction in plants is crucial to all other life on this planet. The first step in plant reproduction is the process called pollination. Pollination occurs when grains of pollen are transferred from the male reproductive organ of the flower to the female reproductive organ of a flower. Depending on the type of plant species, a flower can produce male, female or both structures and pollination can also occur within the same flower. Some flowers are pollinated by wind or water while others are pollinated by insects and animals.

## **Objectives:**

1. Students will design flowers to attract pollinators and study the attractive quality of colors, shapes and patterns.
2. Students will understand the different types of pollinators and their relationship to the life cycle of the flower.
3. Students will understand why pollinators are necessary to help provide the food that we eat.

## **Background:**

Pollinators play an essential role in providing our food supply. There are over 100,000 species of pollinators and they pollinate approximately 75% of our human food crops. Pollinators also play an important role in the function of ecosystems and preserving biodiversity. Pollinators that are important Kansas ecosystems include bees, wasps, moths and butterflies.

### **Suggested Grade Level:**

3rd-6th

### **Time:**

75 minutes

### **Subjects:**

Science

Language Arts

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## Who's that Pollinator?

### Materials:

- Samples of a variety of flowers with varied shapes, sizes and colors
- Images of pollinators and the flowers that they pollinate
- Pencil and paper
- Construction, crepe or tissue paper
- Pipe cleaners
- Scissors
- Markers or paint
- Felt or fabric
- Clay, glue or tape
- Pom poms
- Other materials that students could use to construct flowers
- Glitter Glue



### Preparation:

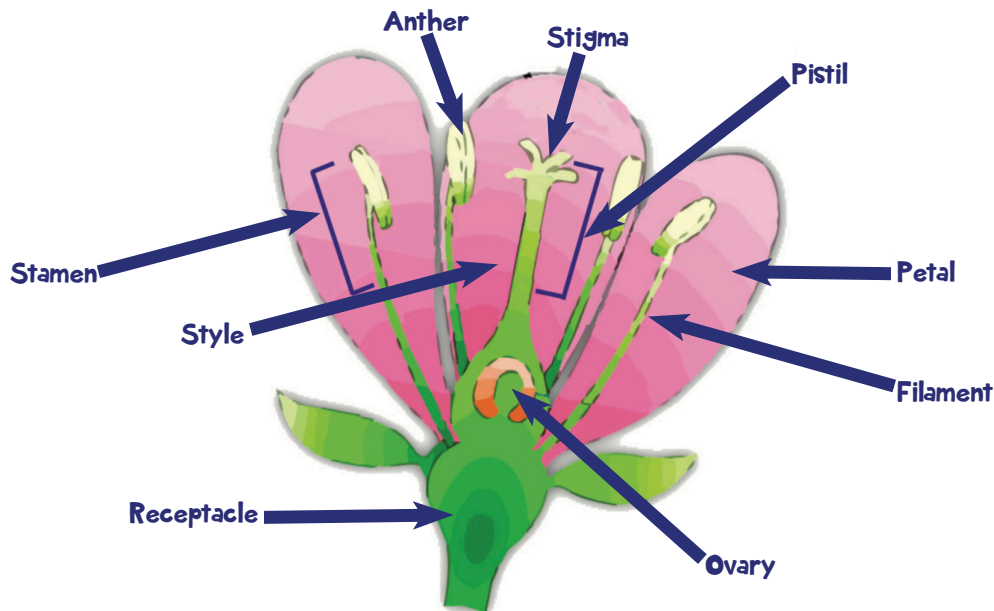
Collect a number of sample flowers from the garden, schoolyard or local florist and bring them into the classroom. Gather pictures of different pollinators and the flowers that they prefer to visit. Also provide a wide variety of different materials to allow the students to construct a new flower.

### Procedures:

1. Using the images, introduce a variety of different pollinators. Discuss the flowers that each pollinator is attracted to and how they collect pollen and nectar.
2. Teacher divides students into groups and gives each group a variety of flowers to investigate. Have the groups discuss what pollinators might be attracted to that flower and their reasoning behind it.
3. Challenge each group to design a flower that would attract a specific pollinator. Suggest that each group member create a drawing of a potential flower and then the group decides on one flower to construct together.
4. Provide the groups with a variety of materials so that each group can construct their new flower.
5. The groups will present their flowers to the class (groups may tell a story or act out the pollination process) After the presentations, the rest of the class will guess the pollinator.

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## Plant Reproduction



**Stigma:** Receives the pollen during fertilization

**Style:** Tube located on top of the ovary that supports the stigma and connects it to the ovary  
**Sepal:** Protects the flower in bud and supports the petals when they are in bloom

**Ovary:** Female reproductive organ that often supports the style

**Receptacle:** Holds the floral parts or the petals, sepals and stamens

**Filament:** Structure that supports the anther

**Anther:** Part of the flower where the pollen is produced

**Petal:** Protect some parts of the flower and attract or repel specific pollinators

**Pistil:** The female organs of a flower. Which consists of the ovary, stigma and style

**Stamen:** The male organs that fertilize the flower. Which consists the filament and anther.

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## Pollination Methods



**Wind Pollination:** Flowers of wind-pollinated plants are small, odorless and colorless; most have no petals. They produce large amount of lightweight pollen that floats with wind currents. Some pollen grains reach female flower of the same plant. Long stamens and long feathery stigmas and styles help disperse and catch the pollen. Grasses, oaks, willows, birches, alders, poplars, beeches, hickories, trees and conifers are wind pollinators.



**Bee Pollinators:** Bees are attracted to nectar and pollen and the sweet fragrance of flowers and generally visit flowers that are white, yellow, lavender or blue. Flowers that attract bees provide a landing platform and have markings that act as a guide for the bees. They collect pollen from one flower and carry it on their bodies to another flower.



**Wasp Pollinators:** Wasps are attracted to flowers that provide nectar. Many orchids are pollinated by wasps. In some cases they may lay their eggs on the orchid. Fig wasps carry pollen from male to female flowers, which are located deep in the middle of the fig.



**Fly Pollinators:** Flies are attracted to heavy musky smells; some are also attracted to nectar. Some flowers that are pollinated by flies are maroon with strong, unpleasant odors. The flies lay eggs in the flower, inadvertently pollinating it.

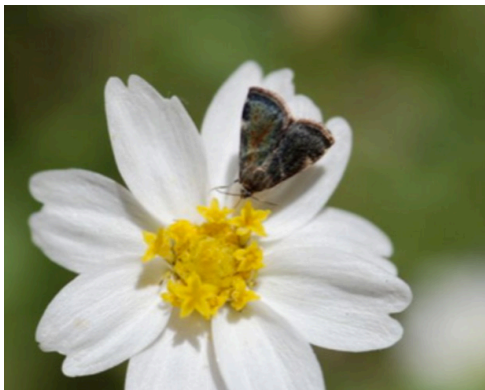
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**Beetle Pollinators:** Beetles are attracted to large bowl-shaped flowers. They only feed on pollen and not on nectar. While they feed, they pollinate the flowers. They crawl over the stamens, depositing pollen that they collected while feeding on another flower. Flowers that they pollinate are often large such as; poppies, magnolias and waterlilies.



**Butterfly Pollinators:** Butterflies are attracted to nectar, but do not collect pollen. They perch on the flower and have a long tongue that they insert into the floral tube to collect the nectar. Butterflies prefer flowers with strong perfumes and brilliant colors such as red, pink, orange, blue or yellow.



**Moth Pollinators:** Moths generally are attracted to flowers that are white or pale, visible during the night and very fragrant. Moths tend to pollinate during the night but some types pollinate during the day. They use their long tongues to gather nectar from tubular flowers. Moths often tend to pollinate flowers such as orchids.



**Bird Pollinators:** Most birds have a poor sense of smell and the flowers that they are attracted to do not need to be fragrant. The flowers are often tubular and long in shape and instead of upright are often sideways or drooping.

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## Pollinators Bring Food to the Table

### Background Information:

Pollination is vital to agriculture and food production. Crops that produce edible fruits or seeds require pollination in order to mature. Some foods we eat including corn, wheat, oats and rice are wind pollinated. Wind pollination means that these crops do not require pollinators such as insects to form the seeds that we eat.

The following are foods that require insect-pollinators:

- **Trees:**

- apples, pears, peaches, apricots, nectarines, cherries, beach plums, quince, persimmons, paw paws, English walnuts

- **Shrubs, vines and canes:**

- blueberries, buckberries, gooseberries, currants, cranberries grapes, black raspberries, red raspberries and blackberries

- **Perennials:**

- strawberries

- **Annual fruits and vegetables:**

- beans, cantaloupe, cucumbers, eggplants, peas, peppers, pumpkins, soybeans, summer squash, tomatillos, tomatoes, watermelon, winter squash, zucchini

- **Seeds:**

- coriander, dill, pumpkin and sunflower seeds

### Materials:

- Paper plates (one per student)
- Elastic band, string or pipe cleaner (one per student)
- Pictures of fruits and vegetables that originated as flowers (magazines or printed out)
- Glue
- Scissors
- 20-30 pony beads per student

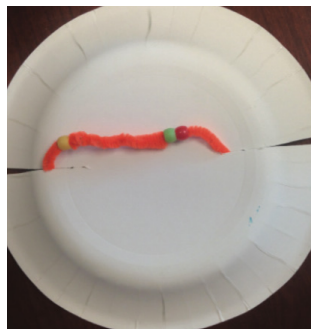


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## Pollinators Bring Food to the Table

### Procedures:

1. Use the background information to explain to the students about pollination and its importance to fruit production.
2. Explain to the students that they will be keeping track of the number of times over the next day they eat a product that grew from a flower.
3. Provide each student with a paper plate. Instruct the students to glue pictures from magazines or printed pictures of the different fruits and vegetables.
4. Assist the students in cutting two notches in their plates that are directly across from each other.
5. Have the students string 25-30 beads on the elastic or string and tie the ends together so it forms a sort of bracelet.
6. Have the students loop the bracelet of beads around the plate and onto the notches. The beads should be tight around the plate.
7. Inform the students that over the next 24 hours everytime they eat a fruit or vegetable that grew from a flower they should move a bead to the front.
8. The following day, have the students count the number of beads they moved to the front and discuss the fruits and vegetables they ate.



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## Pollinators Bring Food to the Table



**APPLES**



**PEACHES**



**BLUEBERRIES**





# POLLINATORS



**PUMPKINS**



**SOYBEANS**



**SUNFLOWERS**

