

Pollinations & Pollinators



Illinois Extension

UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN

Grades: K -5

Objectives

Students will understand the pollination process and that many plants depend on animals for pollination and many pollinators depend on plants for food. Students will also learn about the important role flowers play in plant reproduction and survival through flower dissection and pollination games.

Standards

NGSS Core Alignment, Ecosystems: Interactions, Energy, and Dynamics Standard

Background Information/Discussion

1. Teacher would first talk to children about flowers and their parts, either with pictures and/or fresh flowers. Words to focus on are: petal, stem, leaf, flower, pollen, color of petals, shapes of flowers.
2. Teacher would then introduce the topic of 'Pollination' and 'Pollinator'.
3. Definitions to introduce/review
 - a. POLLINATION is the movement of pollen from one flower to another OR from one part of the flower to another.
 - b. POLLEN is yellow in color and is usually found in the center of the flower and it used to make seeds.
 - c. NECTAR is the sweet liquid made by flowering plants to attract insects and other pollinators.
 - d. POLLINATOR is an animal that helps a plant to grow a flower by moving the pollen from one part of the flower to another. Pollinators are attracted to certain plants because of their size, color, location and shape.
4. *Why is pollination important in our everyday lives?*
 - a. *The movement of pollen in a flower helps the plant to grow. Plants need pollinators to help them to grow their flowers and develop into fruits and seeds.*
 - a. *one out of three bites of food we eat has been pollinated*
 - b. *plants that reproduce through pollination help provide the oxygen we need to breathe*
 - c. *some of the clothing we wear is made from plants that were pollinated*
2. *What are pollinators you have observed in your neighborhood?* (Birds, bees, butterflies, moths, insects, flies, beetles)

Books:

- *What is Pollination* by Bobbie Kalman
- *Flower Talk: How Plants Use Color to Communicate* by Sara Levine
- *The Reason for a Flower: A Book About Flowers, Pollen & Seeds* by Ruth Heller

Videos:

- Pollination <https://www.youtube.com/watch?v=ge3EM8AERV0>

- Like Fruit? Thank a Bee! <https://www.youtube.com/watch?v=txv2k7OoY7U&t=62s>
- Uncover how flowers attract their pollinators
<https://www.britannica.com/video/191192/flowers-pollinators>

Activity 1: Pollinator Summer Cookout

Materials:

Pollinator Summer Cookout Menu handout

Pencil

List of food that requires pollination

1. Let us find out more about pollination by planning a summer cookout. Have students complete the 'Summer Cookout Menu.'
2. After completion, explain their summer cookout would be a very dull meal if there were no pollinators. In fact, there would only be plain hamburgers, plain hot dogs, and water.
 1. Require pollination
- a. Lemonade (lemons), strawberries, mustard, ketchup (tomato), pickles (cucumbers), cheese (milk cows eat alfalfa), mayonnaise (made with lemon juice), onions, tomatoes, fries/chips (potatoes), cucumbers, carrots, cauliflower, celery, peppers, apples, strawberries, raspberries, cherries, watermelon, cantaloupe, peaches, pears, plums, hot fudge (chocolate)
3. Make a list on the board of other plants that are pollinated by pollinators.

Activity 2: Pollination: Act It Out

Materials:

Cotton rounds

Cheese puffs

Plates

Apple juice boxes

1. This activity demonstrates how pollinators collect pollen from plants. Flowers are pollinated when bees go from flower to flower. Pollen from flowers gets stuck on the bee's body. The pollen falls off and lands on the female part of a flower called the stigma. Then a seed can be formed.
2. Students will act out a bee pollinating an apple blossom by participating in the juice box activity. Students will pretend to be a bee.
3. Explain that the juice box with the white cotton flower is the apple blossom and the apple juice is the nectar. Nectar is collected by bees to make honey. Cheese puffs will be the pollen. Place three flower plates around the room with some cheese puffs on each plate.
4. Students will put a bee sticker on their hands. They will walk from their flower (juice box) to one of the plates to get one cheese puff. Return to their seat. They will eat the cheese puff, take a sip of nectar and then wipe the "pollen" from the cheese puff on the flower. Children may do this 3 times.

5. Afterward, talk about the pollen on their flower. Their flower has been pollinated and it can grow seeds to make more apples.

Activity 4 (3-5): Classroom Scavenger Hunt

Materials:

Pollination Scavenger Hunt (for the classroom) handout

Information posters- 2 sets of 10 (printed on colored paper)

1. Explain to students that they are going to learn about pollination through a scavenger hunt game. They will find out about pollination and learn why we should all care about pollinators. Students will need to find a partner or the teacher can assign.
2. Pass out the sheet 'Pollination Scavenger Hunt handout', one per group. Go over the directions at the top of the page. Have each group decide on a name for their team.
3. Mix up the scavenger hunt cards and place them around the room. (There should be duplicate cards). Determine a time limit or stop the game after a couple of groups finish.
4. At the end of the time, bring the students back having them sit with their team. Go over the answers.

Activity 5: Pollinator & Flower Match

Materials:

Pollinator & Flower Match Cards

1. Review: Some pollinators have special traits that allow them to pollinate different plants with their unique sizes, shapes, and body parts. Moreover, a flower's size, shape, color, and scent are adaptations to attract different pollinators. Some flowers (daisies) have a regular shape that attracts many different kinds of insects. Some flowers (certain orchids) are so specialized that they only attract one kind of insect. Pollinators are attracted to certain types of flowers including smells, or particular colors or shapes to the flower.
2. Give each student or pair of students, a set of 'Pollinator & Flower Match cards' to read and match up the pollinator to the flower it would most likely visit to pollinate. There may be more than one right answer, but try to find the best match.
3. After students are finished, review the cards as a class.

Alternative for younger students: There are seven pollinator cards and seven matching plant cards. Each set of cards is to have a matching colored dot on the back to indicate they are a pollinator/plant match. Give one card to each child and tell them they are to find their match by looking on the back of their card for a color. They are to find the person who has the same color they have. When the matches are completed, the children should sit down next to their match. Then have each pair of children discuss what is special about their match with help from the teacher.

Follow-Up Discussion/Evaluation

1. *What would happen if we didn't have pollinators?*
2. *How can we help pollinators? (Provide food, habitat)*
3. *Name 2 foods you eat that are pollinated by pollinators.*

Teacher Resources

USDA Pollinator Booklet

Pollinator Ag Mag

Supplemental Activity: Flower Dissection

Materials:

Flowers to dissect

Flowers & Pollination Worksheet

Flower Diagram

Hand lenses

Tweezers

1. Review the parts of the flower on the 'Flower Diagram'. Give each student, or pair of students, a flower to examine with hand lenses. Students will be trying to identify all the parts of their flowers. Once they identify a part of their flowers, they should look for it on their diagram. Remember that all flowers are different and they may not each have all the parts. Students can sketch the parts on a separate sheet or label the flower parts on the diagram while dissecting the flowers.

Parts of a Flower:

- Anther: holds the pollen
 - Sepal: protects flower bud
 - Stamen: provides support to anther
 - Stigma: traps pollen grains; located at the tip of the style.
 - Style: pollen travels through to ovary
 - Ovary: where seeds develop
 - Petal: showy part of the flower that attracts insects & other pollinators
2. Find a flower bud that has not opened. Show the students the specialized leaves that cover and protect the bud. Ask the students to look for the specialized leaves (sepals) on both a flower bud and a completely open flower.
 3. The petals appear when the bud opens up. Have the students identify the petals on their flowers. *What do you think the petals do for a flower?* (attract pollinators)
 4. Flowers hold a special powder called pollen on the anther, the tip of the stamen. Have the students look for the anther and the pollen. Sometimes it is difficult to see the pollen.

5. The pistil is made up of the stigma, style, and ovary. This part is responsible for seed development. The students should carefully pick off the flower petals to identify these parts. Using the flower diagram, demonstrate how the pollen travels from the stamen onto the top of the pistil. *I wonder how can it get there?* Allow the students to make some guesses- pollinators, wind, water, animals
6. Experiment with a variety of flowers to identify the parts of each. Great examples are lilies, alstroemerias, roses, daisies, snapdragons, and mums. For a tasty treat, experiment with edible flowers like brassica flowers, nasturtiums, and peas that students can eat as they dissect.

Credit:

These activities are adapted from activities developed by Garden Project of Lane County; National Association of Conservation Districts; Chicago Botanic Garden; Livingston County Master Gardeners; Kids Gardening

Summer Cookout Menu

1. Will you serve lemonade or strawberry milkshakes?
2. Will you serve hamburgers or hot dogs?
3. Circle the condiments that you will offer.

mustard ketchup pickles cheese mayonnaise
onions tomatoes

4. Will you have potato chips or French fries?
5. Circle vegetables that you will provide.

cucumbers tomatoes carrots cauliflower
celery peppers

6. Circle fruits that you are thinking about serving.

apples strawberries raspberries cherries
watermelon cantaloupe peaches pears
plums

7. Will you serve hot fudge sundaes? Yes or No



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Food That Requires Pollination

Alfalfa: leafcutter bees and honey bees

Almond: honey bees

Anise: honey bee

Apple: honey bees, blue mason orchard bees

Apricot: bees

Avocado: bees, flies, bats

Banana: birds, fruit bats

Blueberry: Over 115 kinds of bees, including bumblebees, mason, mining & leafcutter

Cardamom: honey bees, solitary bees

Cashew: bees, moths, fruit bats

Cherry: honey bees, Bumblebees, Solitary bees, flies

Chocolate: midges (flies), stingless bees

Coconut: insects and fruit bats

Coffee: bees or flies

Coriander: honey bees, solitary bees

Cranberry: Over 40 native bees, including bumble

Dairy Products: Dairy cows eat alfalfa pollinated by leafcutter and honey bees

Fig: 800 kinds of wasps

Grape: bees

Grapefruit: bees

Kiwifruit: honeybees, bumblebees, solitary bees

Macadamia Nut: bees, beetles, wasps

Mango: bees, flies, wasps

Melon: bees

Nutmeg: honey bees, bird

Papaya: moths, birds, bees

Peach: bees

Pear: honey bees, flies, mason bees

Peppermint: flies, bees

Pumpkin: squash and gourd bees, bumblebees

Raspberry and Blackberry: honeybees, bumblebees, solitary bees, hoverflies

Sesame: bees, flies, wasps

Strawberry: bees

Sugarcane: bees, thrips

Tea Plants: flies, bees and other insects

Tequila (agave): bats

Tomato: bumble bees

Vanilla: bees

Pollination Scavenger Hunt

Team Name: _____

Search for the lime green signs around the room to help you answer the following questions. After answering the question, leave the poster as is, and search for other signs.

1. What is pollination?

2. Why is pollination important?

3. Name 8 pollinators.

(1) _____ (2) _____
(3) _____ (4) _____
(5) _____ (6) _____
(7) _____ (8) _____

4. Name 3 native pollinators that are disappearing.

5. One out of every _____ bites we eat is courtesy of a pollinator.

6. Explain how a flower and a bee have a connection to each other.

7. Birds and other animals are more dependent upon _____ and _____ than we are.

8. Using the flower poster:

The female parts are called _____. It is made up of three parts: _____, _____, and _____.

The male parts are called _____. It is made up of two parts: _____ and _____.

9. How do flowers advertise for pollinators?

10. Explain how a bee helps to pollinate a flower.



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Pollination Scavenger Hunt Activity Cards

<p>Pollination is the act of transferring pollen grains from the male anther of a flower to the female stigma.</p>	<p>Without pollination, the human race would not survive. More than 150 food crops in the US depend on pollinators, including almost all fruit and grain crops.</p>
<p>Pollinators are anything that helps carry flower pollen to the pistil. These include bees, wasps, moths, wind, birds, butterflies, bats, and flies.</p>	<p>Native pollinators such as bats, hummingbirds, and solitary bees are disappearing.</p>
<p>One out of every three bites we eat is courtesy of a pollinator.</p>	<p>A flower and a bee have a strong, vital connection with each other. Without this connection, the flower cannot manufacture seeds and the bee would not have food.</p>

Birds and other animals are even more dependent upon fruits and seeds than we are.

See the flower board to identify female and male flower parts.

Flowers can advertise for pollinators with their fragrances, markings on petals, colors, nectar, and even landing platforms.

A bee visits a flower to collect pollen and nectar to take back to its hive. When a bee visits the next flower, some of the pollen brushes off onto the flower. If it sticks to the stigma of the flower, pollination will take place. The bee makes no effort to put the pollen in the right place.

Monarda



- Tubular flower shape
- Large quantity of nectar
- Bright red and purple petals

Monarda



- Tubular flower shape
- Large quantity of nectar
- Bright red and purple petals

Magnolia



- Bowl shaped flower
- White Petals
- Large amount of pollen
- Open during the daytime

Magnolia



- Bowl shaped flower
- White Petals
- Large amount of pollen
- Open during the daytime

Snapdragon



- Flower has “landing pads”
- Sweet smell
- Many small blossoms
- Flowers are many different colors

Snapdragon



- Flower has “landing pads”
- Sweet smell
- Many small blossoms
- Flowers are many different colors

Zinnia



- Clusters of small flowers
- A flat top to stand on
- Flowers are brightly colored, yellow, red, orange, pink, etc.

Zinnia



- Clusters of small flowers
- A flat top to stand on
- Flowers are brightly colored, yellow, red, orange, pink, etc.

Moon Flower



- White flowers
- Flowers open at night
- Nectar resources

Moon Flower



- White flowers
- Flowers open at night
- Nectar resources

Trillium



- Dark purple petals
- Foul smell
- Pollen resource

Trillium



- Dark purple petals
- Foul smell
- Pollen resource

Saguaro



- Blossoms at night
- White petals
- Smells like over-ripe melons
- Large quantity of nectar

Saguaro



- Blossoms at night
- White petals
- Smells like over-ripe melons
- Large quantity of nectar

Bat

- Active at night
- Likes fruity fragrance
- Feeds on nectar



Ishan seefromthesky on Unsplash

Bat

- Active at night
- Likes fruity fragrance
- Feeds on nectar



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Butterfly

- Attracted to bright flowers
- Nectar is main food
- Needs a place to stand while feeding



Butterfly

- Attracted to bright flowers
- Nectar is main food
- Needs a place to stand while feeding



Bee

- Likes sweet smelling blossoms
- Likes clusters of small flowers
- Eats nectar and pollen
- Wants a place to land while feeding



Bee

- Likes sweet smelling blossoms
- Likes clusters of small flowers
- Eats nectar and pollen
- Wants a place to land while feeding



Fly

- Eats pollen
- Likes dark or pale colored flowers
- Attracted to foul smelling odors



Philip Veater on Unsplash

Fly

- Eats pollen
- Likes dark or pale colored flowers
- Attracted to foul smelling odors



Philip Veater on Unsplash

Hummingbird

- Hovers while feeding
- Main food source is nectar
- Likes red and purple flowers
- Attracted to tube shaped flowers



Hummingbird

- Hovers while feeding
- Main food source is nectar
- Likes red and purple flowers
- Attracted to tube shaped flowers



Moth

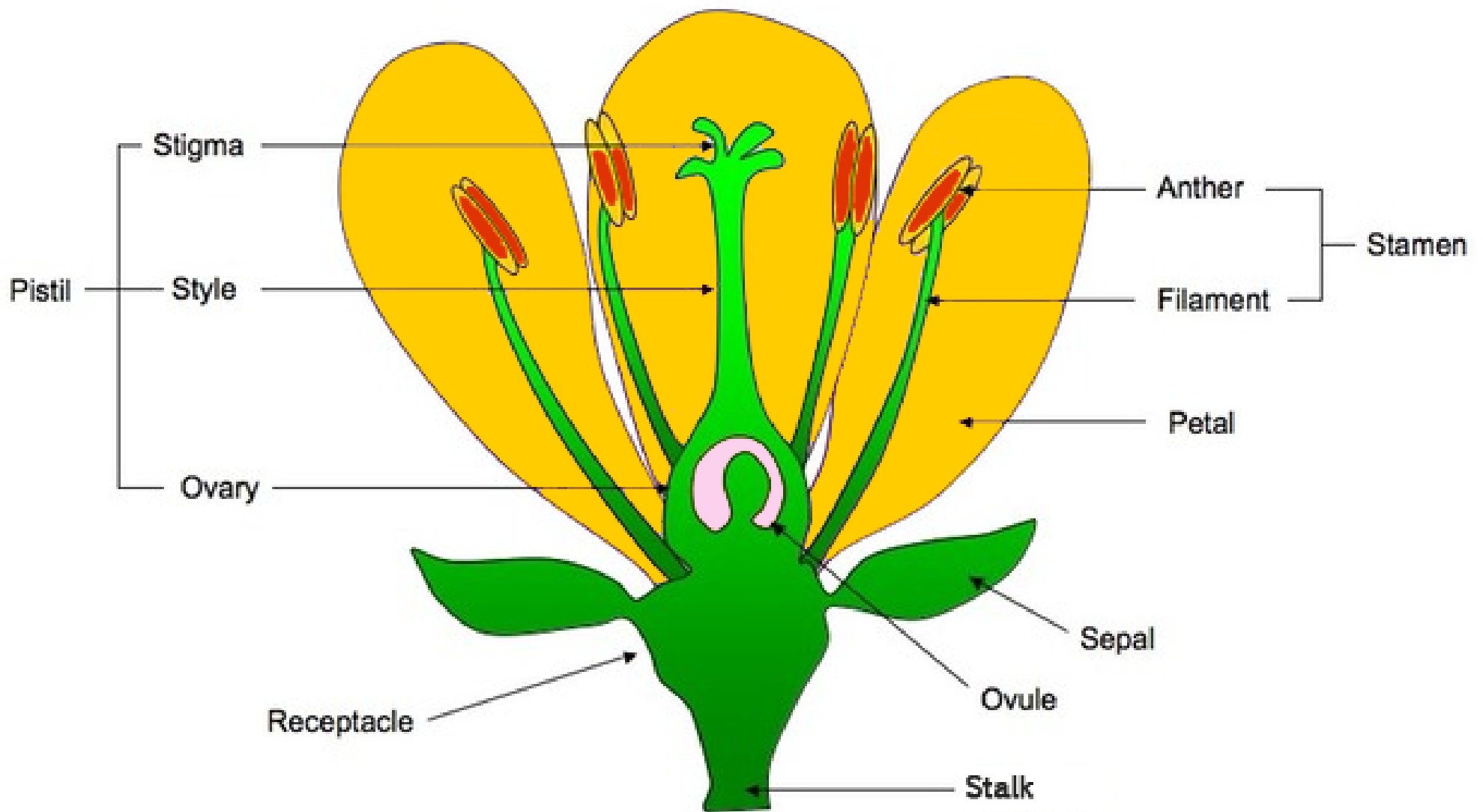
- Active at night
- Likes white flowers
- Needs large quantities of nectar



Moth

- Active at night
- Likes white flowers
- Needs large quantities of nectar





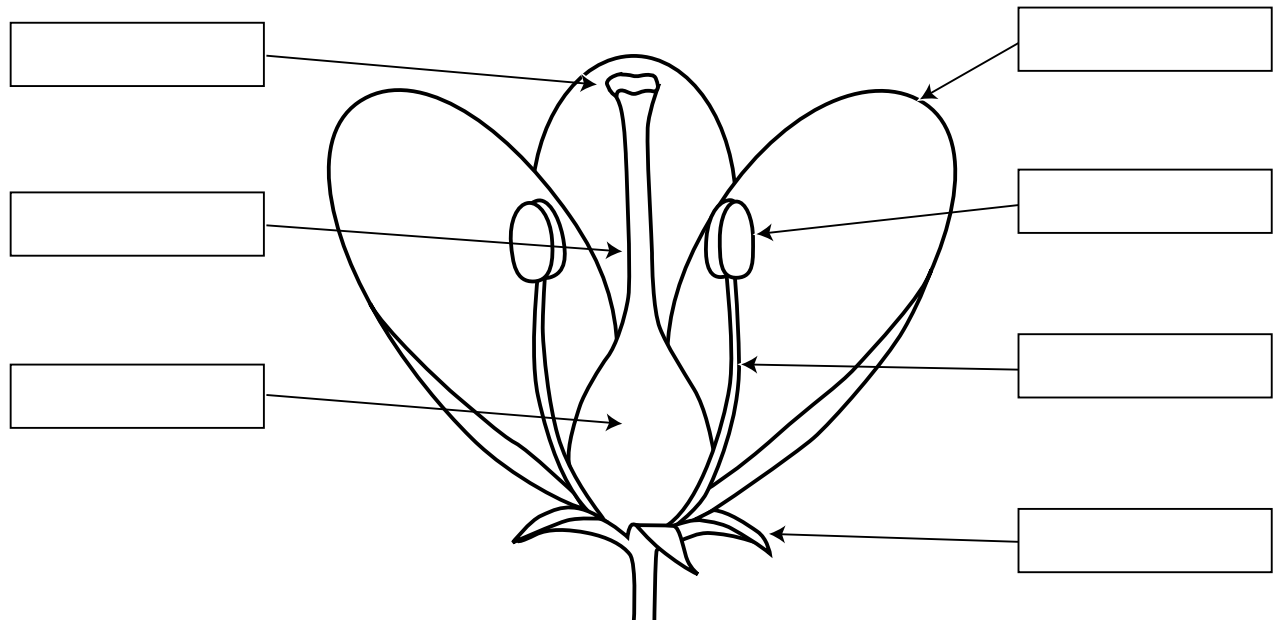
Parts of a flower



Name: _____

Flowers & Pollination

Complete the boxes with the name of the flower part from the words in the box below. Color the parts of the flower.



anther stamen ovary petal sepal style stigma

How Pollination Works

Fill in the blanks.

1. The definition of pollination is _____.
2. Name a fruit or vegetable that requires pollination. _____
3. Name or draw two pollinators.
 - a.
 - b.
4. Name one way you can help pollinators. _____