TEXAS FARM BUREAU'S

BE AG SMART POLLINATOR CONNECTION

Be Ag Smart! The Pollinator Connection has been developed and produced by Texas Farm Bureau Agriculture in the Classroom.

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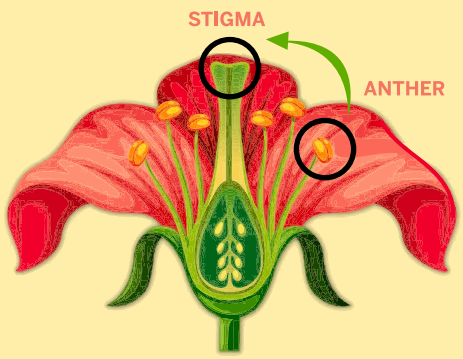
Teachers—For lesson plans, videos and other resources for your classroom, go to texasfarmbureau.org/aitc

What is Pollination?

Pollination is how plants reproduce. It is the action of pollen moving from the anther part of one flower to the stigma of another flower. It can happen in a variety of ways, but it must occur for the plant to become fertilized and produce fruits, seeds, and young plants.



One way plants produce offspring is by making seeds.

Flowers are the tools that plants use to create their seeds. Seeds can only be produced when pollen is transferred between flowers of the same species. The seeds contain embryos that develop into plants. Before it can form a seed embryo, pollination and fertilization must occur in the flower.

Types of Pollination

Self-Pollination

A self-pollinating plant can fertilize itself. The pollen moves from the anther to the stigma of one flower to another flower on the same plant.

Cross-Pollination

A cross-pollinating plant needs a vector to move the pollen from one flower to another. A vector is the way by which pollen is transferred from flower to flower.

Cross-pollination can occur in two different ways:

(20%)	(80%)
Abiotic	**Biotic**
Water and wind	Insects

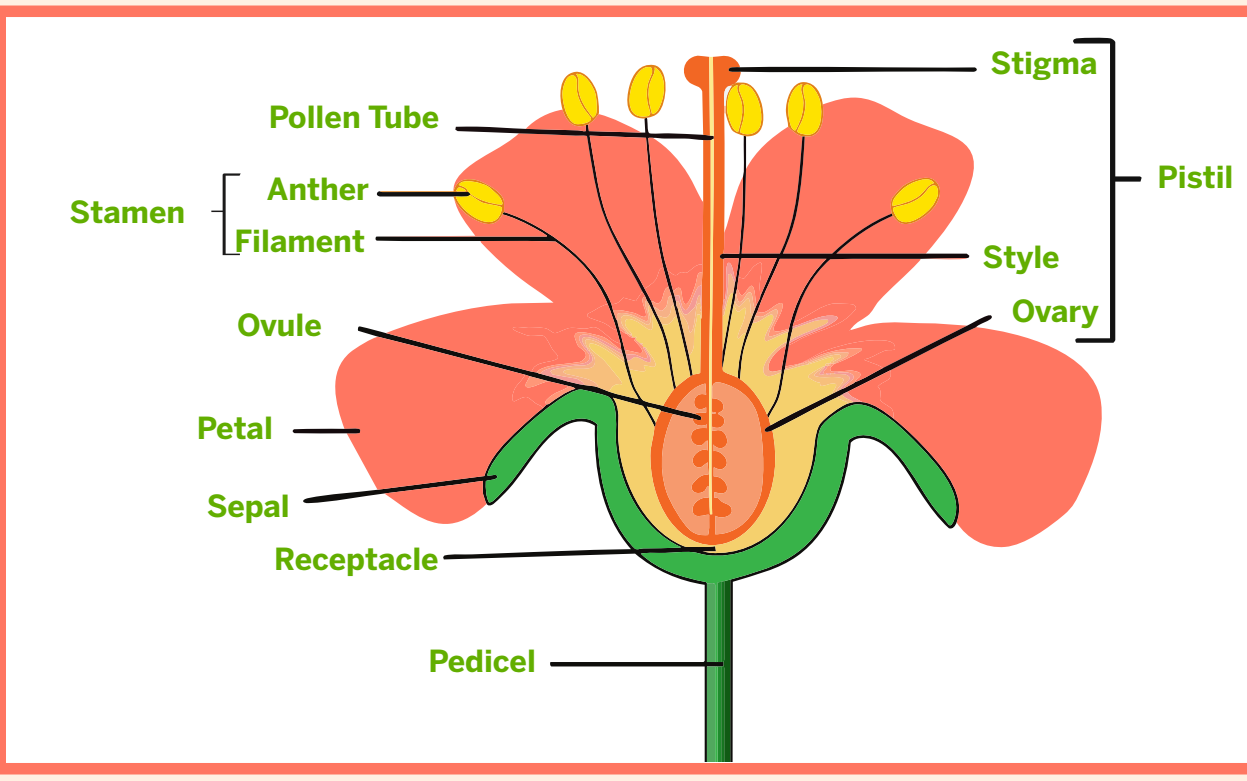
Some plants can self-pollinate, but others require cross-pollination. **Mark an X through the crops that require cross-pollination.**

Hint: There are three!

WHY ARE POLLINATORS IMPORTANT?

According to the U.S. Department of Agriculture, **75%** of the world's flowering plants and **35%** of the world's food crops cannot reproduce without pollen being carried to them by animal pollinators. They are responsible for 1 out of every 3 bites someone eats.

FLOWER PARTS



WORD BANK

Pollen Tube **Anther** **Filament** **Petal** **Ovule**
Receptacle **Sepal** **Pedicel** **Stigma** **Style** **Ovary**

1. _____ Transports cells from the male part of the flower to the female part of the flower.
2. _____ Responsible for creating and releasing pollen.
3. _____ Holds and supports the anther.
4. _____ Attracts pollinators to the flower to facilitate the transfer of pollen
5. _____ Home to the female eggs.
6. _____ The base or stalk where the flower parts are attached. (Petals, sepals, stamens)
7. _____ Protects the developing flower bud as it grows.
8. _____ Supports an individual flower or fruit and transports water and nutrients.
9. _____ Helps collect the pollen. It is waxy/ sticky for the pollen to attach to.
10. _____ Connects the stigma to the ovary to allow the pollen to travel through.
11. _____ Contains the ovules, which develop into seeds after fertilization. This part becomes the fruit of the plant when mature.

POPULAR POLLINATOR PLANTS

SPRING BLOOMING


INDIAN BLANKET


UPRIGHT PRAIRIE CONEFLOWER


PRAIRIE FLAX


LEMON BEEBALM

SUMMER BLOOMING


ENGELMANN'S MILKWEED


WHITE PRAIRIE CLOVER


COWPEN DAISY


CARDINAL FLOWER

FALL BLOOMING


YELLOWSTONE THISTLE


TANSEYLEAF TANSYASTER


PRAIRIE SUNFLOWER


CANADA GOLDENROD

DRAW YOUR POLLINATOR GARDEN!

Name that Pollinator

WORD BANK:

Honeybee **Butterfly** **Bats** **Moths** **Hummingbird**





What is an animal pollinator?

An organism that helps move pollen from one flower to another.

Why do they travel to the flower?

The insect receives energy from the sugar in the nectar and proteins, fats, vitamins, and minerals from the pollen grains.

How do they pollinate?

When the pollinator moves from one flower to another, the pollen can fall off the pollinator and onto the next flower's stigma. This can result in the reproduction of the flower. When the pollen germinates, a pollen tube forms on the sticky surface of the stigma and grows down into the plant's ovule.

POLLINATION SYNDROME:

Pollinators are attracted to petal shapes, scents, and colors. **Draw a flower that each pollinator would be attracted to the most.**

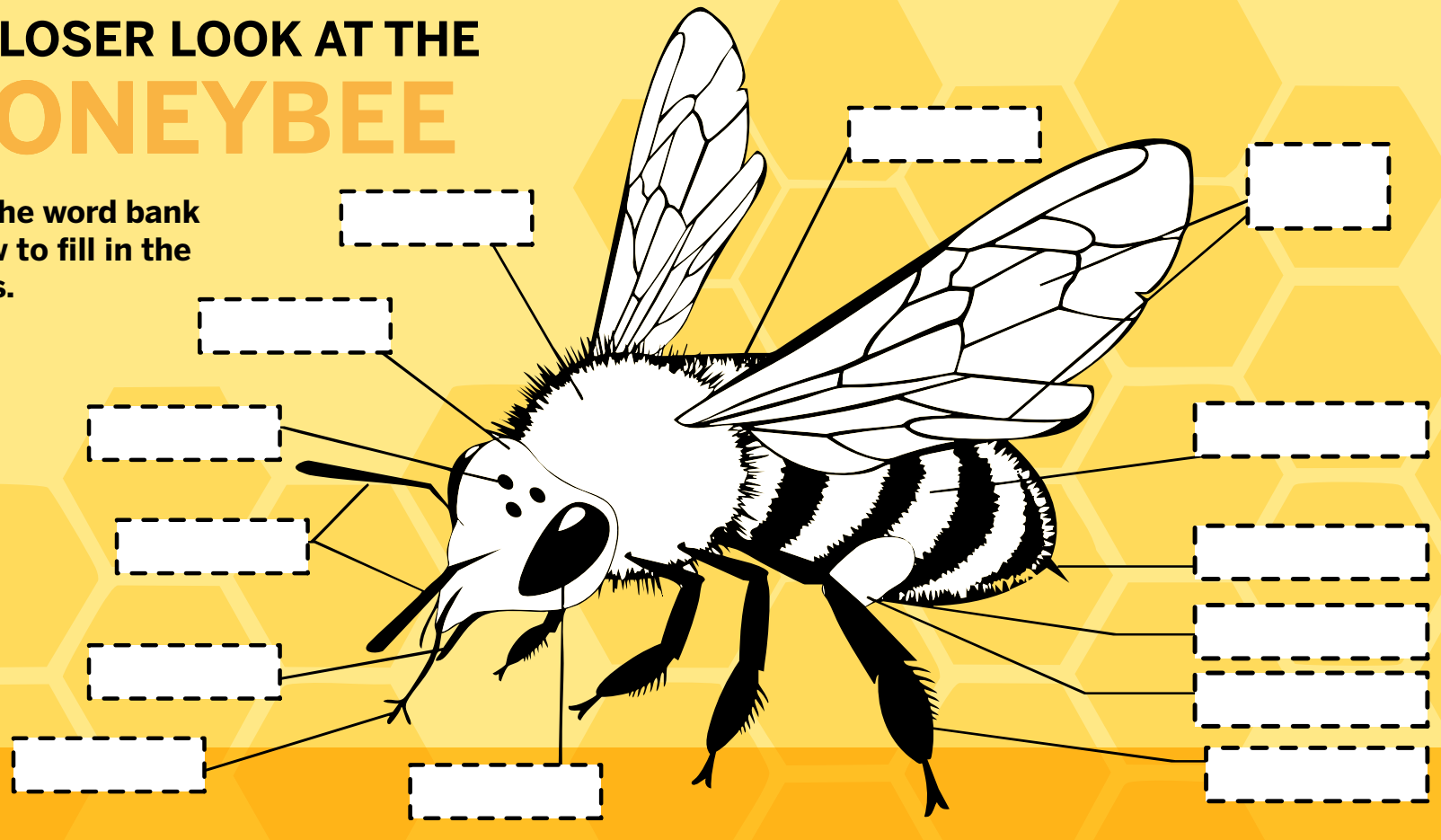
Butterfly
Flowers: Orange, yellow, pink, and blue that have large landing pads.

Moth
Flowers: Large and white that are easy to see in the dark.

Honeybee
Flowers: Purple, blue, and yellow with sweet scents.

A CLOSER LOOK AT THE HONEYBEE

Use the word bank below to fill in the boxes.



Types of Pollination Answer Sheet:
Apple, Onion, Watermelon

Head: Contains two compound eyes, three simple eyes, two antennae, mandibles, and a proboscis

Compound Eye: Allows the bee to see ultraviolet light and visible light except for red

Simple Eye: Allows the bee to sense changes in brightness

Antennae: Detects smells and movement

Proboscis: Tongue that functions like a straw to suck honey or nectar

Mandibles: Jaw-like structure used to chew pollen and honey

Thorax: Contains flight muscles, four wings, and six legs

Wings: Allows the bee to fly

Legs: Allows the bee to walk and brush pollen off of the body

Pollen Basket: The area where pollen is stored for transport

Abdomen: Where digestion and reproduction take place

Stinger: Used to defend themselves and their hive

Honey Sac: Stores nectar unless the bee returns to the hive

Wax glands: Produces beeswax

WIND POLLINATION

Wind-pollinated plants often have small flowers with no petals, no colors, no odors, and no nectar. They do have a large amount of pollen. Their pollen is light and can easily travel through the air. Examples: Grasses, trees, and cereal crops (wheat, rice, barley, oats).

WATER POLLINATION

Plants that are pollinated by water are aquatic plants. The pollen floats on the surface of the water until it comes into contact with the plant. Examples: Zostera, Pondweed, Waterweed, and Hydrilla.

Flower Parts Answer Sheet:
1)Pollen Tube 2)Anther 3)Filament 4)Petal 5)Ovule 6)Receptacle 7)Sepal 8)Pedicel 9)Stigma 10)Style 11)Ovary

POLLINATOR STRESSORS

PATHOGENS

Many different viruses, mites, and fungi are pathogens that are harmful to pollinators.

DEFORMED WING VIRUS (DWV):
Damages bees in the hive. Bees with this virus will have curly, deformed wings as adults and will be unable to fly.

NOSEMA CERANAE:
A fungus that can infect bee colonies and lower reproductive abilities.

WEATHER & CLIMATE

In warm weather and low precipitation, flowers produce less nectar to conserve energy. When the nectar is low, it means that pollinators get fewer calories and sugar, which can lower the pollinators' health and reproduction.

POOR NUTRITION

Nectar is the main source of carbohydrates, and pollen is the main source of proteins and lipids. Without these, the pollinator cannot survive.

HABITAT LOSS

Pollinators rely on certain flowers for nectar. When they are removed, even if other plants are introduced, the pollinators no longer have a way to get the nutrition they need to survive.

TEXAS FARM BUREAU®

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