

POWER OF POLLINATORS

North Dakota Ag in the Classroom

Level: Grades 4-6

Subjects: Language arts, critical thinking, science, math

Skills: Applying, comparing, similarities and differences, cooperating, creating and improvising, describing, discussing, and understanding cause and effect

Materials:

- Pictures of multiple foods
- TV screen, laptop, or smart screen and internet access
- Post-it notes

Vocabulary:

Pollination, nectar, pollen, cross-pollinated, self-pollinated, nectar guide, fruit, vegetable, stigma, ovule

Brief Description:

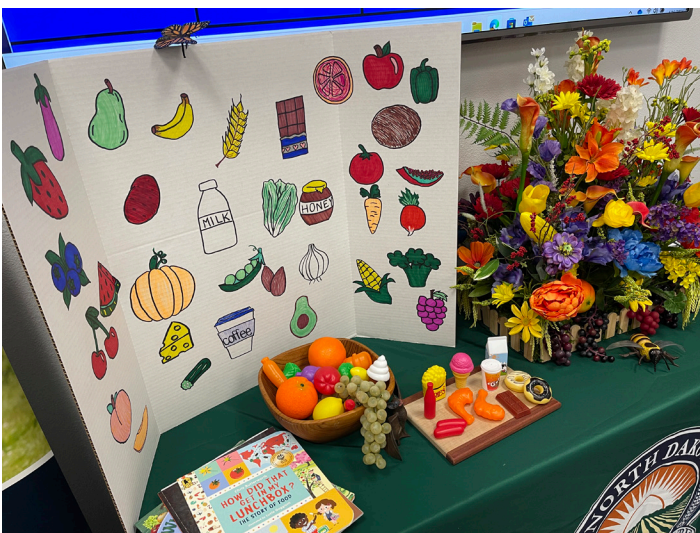
There is a lesson plan, multiple activity options, a video and a game included.

Objectives:

Students will learn how plants rely on pollination as much as water and sunlight. In fact, without them, our favorite foods would disappear!

Estimated Teaching Time:

30-45 minutes



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Lesson:

Three-fourths of the world's flowering plants and about 35 percent of the world's food crops depend on animal pollinators to reproduce. More than 3,500 species of native bees help increase crop yields. Some scientists estimate that one out of every three bites of food we eat exists because of animal pollinators like bees, butterflies, moths, birds, bats, beetles and other insects. If pollinators can't find the right quantity or quality of food (nectar and pollen from blooming plants within flight range), they don't survive. Right now, there simply aren't enough pollinator-friendly plantings to support pollinators.

How does pollination work?

Insects use the nectar made by flowers as food. In the process of getting the nectar, insects and other small animals transfer pollen from flower to flower. The transfer of pollen from one flower to the stigma of another flower is referred to as cross pollination. Self-pollination is when a plant consists of both the male and female parts needed to reproduce the fruit on their own. Self-pollination is a form of pollination in which pollen from the same plant arrives at the stigma of a flower or at the ovule. Both result in the formation of a seed.

The wind is also a terrific pollinator. Because wind-pollinated plants don't need to rely on insects, they are not scented, not brightly colored, have small flowers and don't have any nectar. Their pollen is lightweight so it can easily be blown in the wind to increase the chance of pollination. Many of the world's most important crop plants are wind pollinated: wheat, rice, corn, rye, barley and oats. Did you know that most conifer or pine trees are also pollinated by the wind?

The top 7 pollinators we depend on:

1. Honey bee
2. Butterfly
3. Beetle
4. Hummingbird
5. Moth
6. Bird
7. Bat

Honey bee

Bees are the #1 pollinator that we rely on. They must visit about 2 million flowers to gather enough nectar to make one pound of honey, not to mention they collect nectar from a 4-mile radius before taking it to the hive. That's a lot of work they must do! How do they know which plants have the most food for them? The bees "talk" to each other by performing a waggle dance - when a worker bee returns to the hive, it moves in a figure 8 and waggles its body to indicate the direction of the food source.

- A typical beehive houses 60,000 bees, most of them workers busy making honey and the honeycombs in which it is stored.
- The average worker bee produces about 1/12th tsp of honey in her lifetime.
- Americans consume about 1.31 pounds of honey per person annually.
- Bees are attracted to bright colors, especially blue and yellow. Bees cannot see red.



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Monarch butterfly

The adult butterfly feeds on nectar from flowers while the caterpillar (larva stage) feeds only on the milkweed plant. Each year monarchs migrate up to 6,000 miles roundtrip from their overwintering home in Mexico to summer homes in North America - like your backyard. Milkweed is the only plant where monarch butterflies lay their eggs. It is also the main source of food for monarch caterpillars.

Bats

Bats like white flowers as they can see them better at night. They are terrific pollinators for nocturnal plants like bananas, mangoes and cacao. Did you know that some bats have tongues that are 3 times as long as their bodies?!

Birds

Hummingbirds DO see red. Their long beaks are designed to help get into those flowers that are a tight cone shape.

Water and wind

Although not nearly as effective as animal pollinators, water and wind still play an important role in the pollinator world. Wind-pollinated plants don't have pollen and their nectar is lightweight so it can easily move in the wind.

FLOWER TRAITS

- Food: Protein = pollen; Sweets = nectar
- Color
- Nectar guides: The intricate patterns on flowers that direct pollinators straight to where the food is stored. Pollinators can find their meal quickly, then move on to the next flower.
- Shape of flower/plant
- Scent
- Bloom time

[\[show the video Pollination: Trading Food for Fertilization \(YouTube.com\)\] 11 minutes](#)

A WORLD WITHOUT POLLINATORS

Which foods need pollination?

If we eat the FRUIT, it relies on pollination.

If we eat a part of the plant OTHER THAN the fruit, then it doesn't need pollination.

Fruit is used in the botanical sense meaning anything with a seed INSIDE, whether the fruit is sweet or not. Many of the vegetables we eat are the fruits of flowering plants. Ex: Tomatoes, squash, peppers

Which foods don't need pollination?

Vegetables (that do NOT produce fruit) generally don't need pollination. Vegetables are the parts of the plant that DON'T have seeds, this can include leaves, stems, immature flowers or roots. Again, this is just concerning crops we use as food prior to the flowering stage. The vegetable category includes a lot of cool season plants suitable for fall or winter growing when pollinators are not active.



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Show the board of multiple fruits, vegetables, drinks, and other foods and have the kids guess which foods would NOT be available without pollinators. Once the food has been eliminated, cover it with a Post-it note to hide it. This gives a visual of what the food supply would be if animal pollinators did not exist. Talk about that with the students.

YES = POLLINATOR RELIANT

Almonds
Avocado
Apricot
Barley
Beans (bush, pole, Lima)
Blackberry
Blueberry
Cantaloupe
Cashews
Cherry
Coconut
Corn
Cranberry
Cucumber
Currant
Eggplant
Elderberry
Fig
Gourd
Juneberry
Kiwi
Lemon
Lime
Mango
Marrow
Melons
Oats
Okra
Orange
Papaya
Peach
Pear
Peppers (red, green, bell, chili)
Plum
Pumpkin
Quince
Raspberry
Rice
Rye
Strawberry
Squash
Tomato
Watermelon
Wheat
Zucchini

NO POLLINATION NEEDED

Asparagus
Beets
Broccoli
Cabbage
Celery
Carrots
Cauliflower
Garlic
Grape
Herbs
Horseradish
Kale
Kohlrabi
Lettuce
Leafy greens
Leeks
Onions
Parsnips
Peas
Potatoes
Radish
Rutabagas
Salsify
Sweet Potatoes
Turnips

PLAY POWER OF
POLLINATORS
JEOPARDY TO SEE
WHAT THEY LEARNED



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