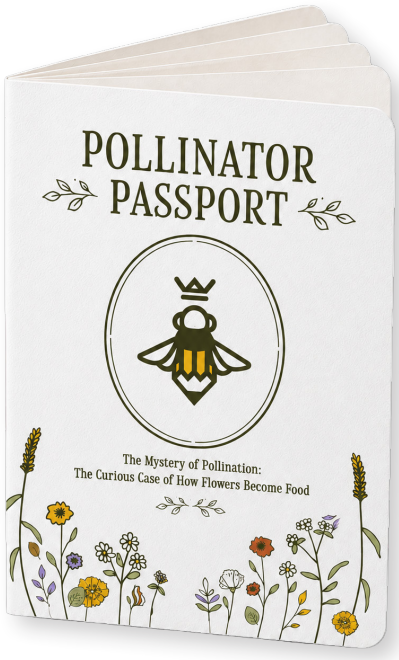

TEACHER'S GUIDE

THE MYSTERY OF POLLINATION:
The Curious Case of How Flowers Become Food

Grade Levels: 2nd–5th

The Pollinator Passport program was made possible through the generous support of **Beekeeper's Naturals.**

Curriculum created by **The Bee Cause Project** to inspire the next generation of environmental stewards.

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THE MYSTERY OF POLLINATION: The Curious Case of How Flowers Become Food

Students become pollinator detectives as they investigate the mystery of how flowers become food. Guided by their educator through five stages of inquiry, students uncover clues using engaging videos, hands-on indoor lessons, outdoor investigations, experiments, games, data collection, and multimedia activities. Along the way, they gather evidence, make observations, and connect each discovery to ultimately solve the mystery of pollination and the essential role pollinators play in our food system.

- **Mission:** Students uncover how pollination works, why it matters for food systems, and how they can support pollinators in their community.
- **Case Brief:** A farmer's crops are blooming, but fewer fruits and vegetables are growing. What could be missing?
- **Story Connection:** Students become Pollinator Detectives, investigating the mystery and making connections to Little Bee and the Bloom.
- **Evidence Log:** Students will record predictions about what plants need to produce food.

Learning Objectives

In this activity, students will:

- Explain basic cross-pollination
- Identify common pollinators in the environment
- Understand basic plant reproduction
- Begin connecting pollination to food and human health
- Take action to support pollinators in their own communities

Students will **wonder, discover, connect, explore**, and **act** through this pollinator passport classroom expedition.

Materials Needed

- **Pollinator Passport** for each student
- Crayons/markers/pencils (classroom supplies)
- Straws
- Clothespins
- Tweezers
- Toothpicks
- Sponges
- Cotton balls or tiny pom-poms
- Small cups
- Paper flowers
- Food coloring
- Powdered drink mix
- Small bag of rice
- Fuzzy (microfiber) mittens
- Pipettes
- Device for video playback (iPad, Chromebook, SmartBoard, Promethean Board, etc.)
- Slide Show
- ***Little Bee and The Bloom*** by Carly Kremer
- Small container of pollen pellets
- Honey Tasting Kit

Clue #1

THE FLOWER PUZZLE — WONDER

Concept: Flowers need help to reproduce to make more flowers.

- What is pollen?
- Basic flower parts (simple, age-appropriate)
- Introduction to pollination
- Explain basic pollination

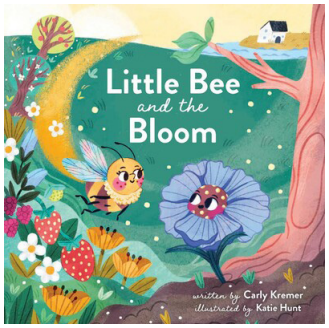
TEACHER NOTES:

- Watch Pollination Explained. The focus of this lesson is on understanding basic flower reproduction.
- Watch Pollination: Trading Food for Fertilization to understand the importance of the trade among plants and animals.
- Read Pollination Problems.
- Keep language flexible for grade level (2–5)
- Encourage observation over correctness
- Weather matters; adjust expectations if pollinators aren't visible
- Always check for allergies to bee stings, and before giving students bee pollen and/or honey.
- *I Wonder...* and Journal Prompts are considered 'low-stakes' writing and should be used for either Quick-writes: 3-5 minutes in-class brainstorms or reflections, or Exit tickets: Short paragraphs answering a prompt or asking a question before receiving the stamp of completion.

MINI - LESSON:

Introduce pollen, pollination, honey bees, and flower parts.

Read ***Little Bee and The Bloom*** by Carly Kremer
*** Read-aloud video available from the author



Discuss:

- What does the flower need to live and thrive?
- Why does the flower need Little Bee?
- How does Little Bee help the flower?
- What does the flower give Little Bee to help her complete her mission? (Hint: What is the sticky gold on the bee's legs and traveling in clouds on the wind?)
- Why do you think it is important for the flower to give Little Bee nectar?
- Who does Little Bee ask to help her with her mission?

READ AND WATCH:

Introduce the concept of cross-pollination.

- Flower Power - Flight of the Pollinators - Wild Kratz video
- KWL Chart - This resource can be used to support students individually, as a brainstorming tool, and to create a class "**Wonder Wall**" to capture student questions on a larger scale (chart paper, dry-erase board, digital charting program, etc).
  - **KWL Chart / Wonder Wall**
    - What do we KNOW?
    - What do we WONDER?
- Explore the graphics for cross-pollination on a digital platform.
  - https://www.britannica.com/science/pollination
- Share **bee pollen (provided in educator box)** with students.
  - Bee pollen is one of the most nutrient-dense foods on the planet, and it is provided by the unique partnership between honey bees and flowers.
  - Encourage students to explore through their senses (taste, feel, smell, sound, sight).
  - **Pollen (bee pollen)** is small yellow pellets that bees collect from flowers. It's the primary food source for bees, and humans can use it for energy and vitamins. The bee carries pollen on her corbicula (pollen pants) back to the colony of bees.
  - Take a look with students at Images of Pollen under a microscope.
  - Explore other Pollen Resources

KEY TERMS:

Students should use their own words to describe the following terms as part of their evidence collection, and add to their words as they discover new meaning. **The Word Puzzle** at the end of the passport is a collection of all of the Key Terms.

- beehive
- bee pollen
- corbicula
- colony

OUTDOOR FIELD MISSION

OBSERVE REAL FLOWERS.

- Discuss what "*if you want, I'll share my wings, so you can see what flying brings*," from **Little Bee and The Bloom.**
  - » Ask the students to consider what this might mean in relation to the act of pollination ***before*** the Flower Power Walk.
  - » Introduce the **Pollination Log** in the Passport. Students will use this log to gather field data.
- Take a **Flower Power Walk**
  - » This can be on a school campus, a local park, a farm, or a field trip to an appropriate outdoor area.
  - » Students will put one tick mark for every pollinator that they see and the flower color they were visiting. At this point, students may only be able to identify a few of the pollinators on the Pollination Log but should be able to participate in record collecting for classroom discussion on some level.
  - » Students observe:
    - › Flowering plants
    - › Explore the **shapes of flowers, height of flowering plants, number of colors found, single corolla (petal) or multi-corolla flowers, cluster flowers,** etc.
    - › And if no flowers are present, why not?
    - › Insects present - Why? Why not?
    - › How might sunlight, plant type, flower color, or time of day affect the pollinators we observed?
    - › Why might one location attract more pollinators than another?
    - › Pollinator activity (if visible)
    - › NOTE - pollinators are typically more active on sunny days than cloudy days, make connections to weather and how pollinators survive the conditions for foraging

INDOOR ACTIVITY

DRAW AND LABEL A FLOWER WITH POLLEN.

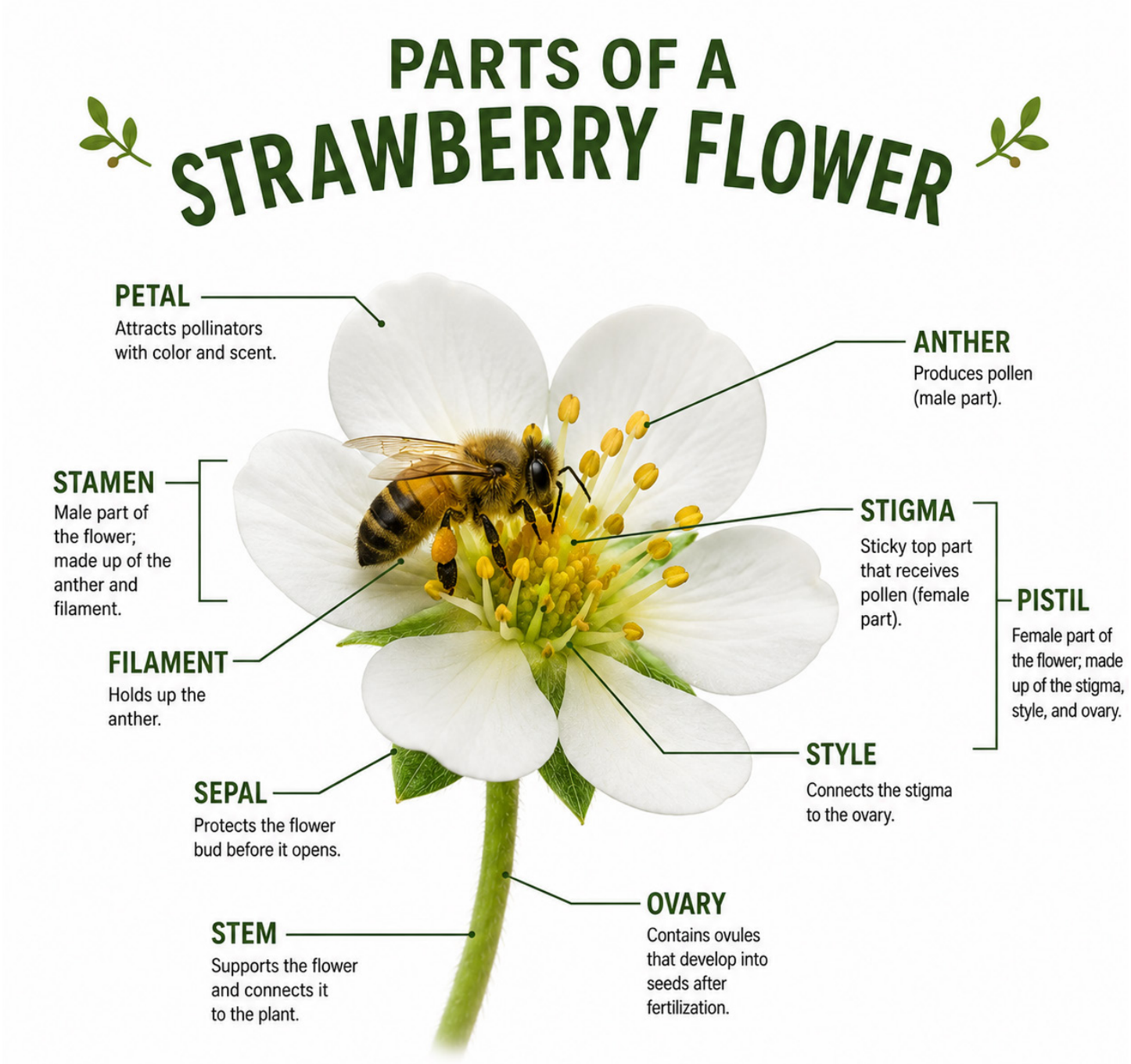
Students will need support to list types of flowering native plants that grows in their area using their zip code.

- https://nativeplantfinder.nwf.org/plants
- https://www.pollinator.org/guides
- https://www.pollinator.org/garden-cards

- **Journal Prompts**
  - » Why are flowers colorful?
  - » Did you notice any smell or fragrance from any of the flowers?
  - » Why do you think some flowers have fragrance and some do not?
  - » How could flowers become food?

- **Discussion Follow-Up**
  - » After the Flower Power Walk, have students discuss what they observed
  - » Review the quote from Little Bee and the Bloom, and what the students think it means.

- **Passport Follow Up** - Student should complete Clue #1 assignment and receive a "stamp" for completion before moving on to the next Clue.
  - » All assignments can be completed independently, as partners, in teams, or as a whole class, depending on the students' needs.



Classroom Extensions

Available to be used at the educator's discretion to extend the learning in the classroom and at home

- **Flower power** continues with Flower Talk: How Plants Use Color to Communicate, read aloud by the author, and The Bee Cause Book Club Lesson plan.
- Connect with children's author of ***The Thing About Bees***, Shabazz Larkin, with The Bee Cause Q&A Webinar. Lesson plan included.
- Want more opportunities for outdoor garden observations? My Pollinator Journal
- Explore the parts of a flower with this Dissect a Flower Experiment
- Join a classroom ***Citizen Science Project***. We recommend the Insight Citizen Science App.

Clue #2

DISCOVER — MEET THE POLLINATORS

Concept: Different pollinators help plants in different ways.

- Identify common pollinators
- Learn how pollinators' mouth parts and bodies help them get the nectar/pollen they need

TEACHER NOTES:

- Students investigate the "suspects" responsible for moving pollen. They discover that pollination is not only done by **bees**, but also by **butterflies, moths, beetles, flies, hummingbirds, bats**, and even **water** and **wind**.
- Read Wind and Water Pollination. This is background information for other possible ways that plants are pollinated.
- Students compare pollinators and learn how different mouth & body structures help them gather and transfer pollen.
- Not all garden insects are pollinators; some are beneficial insects.
- Watch Gardening - Pollinators and Beneficial Insects for background information.
- Focus on pollinator diversity, observing relationships between flowers and pollinators, honey tasting and sensory science, continued observation, natural curiosity, and discovery.
- Outdoor Field Mission - Pollinator Bodies and Indoor Activity - Pollinator Feeding Station can be set up for individual, team, or whole class exploration at the teacher's discretion.

Check back in with the "**Wonder Wall.**" Allow students to add new items to each category from their passport work, discussion, and the first Clue Collection.

» What do we KNOW?
» What do we WONDER?
» What do we WANT TO LEARN MORE ABOUT?

MINI - LESSON:

Introduce the Pollinator Team

Reread pages 12-16 of ***Little Bee and The Bloom*** and highlight the following quotes:

- *"There's a problem, don't you see, this golden pollen clings to me. To help seeds sprout and bloom with pride, it must be spread out far and wide."*
- *"It sticks to me! I just found out! I'll land on you, then fly about!*

Discuss:

- What does the Bloom mean?
- Why are fuzzy insects like bees especially good at carrying pollen?
- Why might some flowers attract butterflies while others attract bees?
- What kinds of animals do you think might be pollinators? Why?
- Note that some garden animals are considered 'beneficial insects.' While they do not pollinate flowers, they are part of the larger ecosystem.

READ & WATCH:

Introducing the Pollinators.

- Watch The Beauty of Pollination (PBS Learning)
- Honey bees, Carpenter bees, Bumblebees - top agents—very efficient pollinators
- Butterflies - color-loving travelers
- Moths - nighttime pollinators
- Beetles - ancient flower visitors
- Flies - surprisingly important helpers
- Birds - especially hummingbirds
- Bats - night shift workers

These animal agents visit flowers to collect food like nectar. While they're busy drinking nectar, pollen sticks to their bodies and gets carried to the next flower to complete the plant's lifecycle. That transfer is called **pollination**.

- Bee "fur" is called **setae** (singular: seta). These are hair-like bristles that cover a bee's exoskeleton, serving to trap pollen, detect cues in the environment, and aid in thermoregulation.
- Beetles are smooth-bodied and transfer pollen as they walk across flowers to drink nectar. They are sometimes called "accidental pollinators" and are not efficient in their task.
- Butterflies and moths have tiny sensory hairs, but their wings are primarily covered in overlapping scales that catch pollen. Butterflies look for flowers with good landing pads (petals) due to their long legs.
- Birds and bats are mostly hairless on their beaks, tongues, and faces. They pick up pollen on their feathers or fur while feeding.

Discussion Questions

- Why do you think pollination is important for plants, animals, and people?
- Which pollinator surprised you the most from the video, and why?
- How does the body structure of different pollinators (such as bee setae, butterfly scales, or bird feathers) help them transfer pollen?
- Why might flowers that are pollinated at night have different pollinators, such as moths or bats, instead of butterflies or bees?

KEY TERMS:

Students should use their own words to describe the following terms as part of their evidence collection, and add to their words as they discover new meaning. **The Word Puzzle** at the end of the passport is a collection of all of the Key Terms.

- setae
- pollinator
- bee
- scales
- proboscis
- attract

Outdoor Field Mission - Pollinator Bodies

EXPLORE THE FOLLOWING FIELD MISSIONS.

Each can be set up for individual, team, or whole class exploration at the teacher's discretion.

1. **Bee Power**

   Focus Information:
   - » Bees have fuzzy hairs called **setae**
   - » Pollen sticks easily to bees
   - » Bees are very efficient pollinators

   Materials:
   - » Cotton balls
   - » Fuzzy (microfiber or velcro) mittens
   - » Paper flowers

   ***Challenge**: Students wear fuzzy gloves and try to collect and transfer as much "pollen" as possible from flower to flower in 30 seconds.*

   Discussion:
   - » Why did the pollen stick so well?
   - » Why are bees such strong pollinators?

2. **Butterfly Balance**

   Focus Information:
   - » Butterflies use long mouthparts
   - » Their wings have scales

   Materials:
   - » Straws
   - » Small cups with colored water

   ***Challenge**: Students use only a straw to "drink nectar" from flowers without touching them with their hands.*

   Discussion:
   - » Why would butterflies need a long mouthpart?
   - » Why do butterflies like open colorful flowers?

3. **Hummingbird Hover**

   Focus Information:
   - » Birds transfer pollen with their feathers
   - » Long beaks/tongues help reach nectar
   - » Birds like tube-shaped flowers

   Materials:
   - » Pipettes
   - » Tall flower tubes (toilet paper or paper towel tubes)
   - » Small cup (set down inside of the paper tube)

   ***Challenge**: Students use the pipette to collect nectar from deep flowers while standing outside a marked circle.*

   Discussion:
   - » Which flowers work best for birds?
   - » Why are long beaks useful?

4. **Night Shift Pollinators**

   Focus Information:
   - » Moths and bats pollinate at night
   - » Night flowers may smell stronger or appear pale
   - » Pollinators can work day OR night

   Materials:
   - » Blindfolds or a shaded area
   - » Scented flowers/cotton balls

   ***Challenge**: Students must find the correct flower using smell only.*

   Discussion:
   - » Why would smell matter more at night?
   - » Why don't butterflies usually pollinate at night?

Indoor Activity - Pollinator Feeding Station

TEST DIFFERENT "MOUTHS" ON DIFFERENT "FLOWERS."

Explore the following field missions. Each can be set up for individual, team, or whole class exploration at the teacher's discretion.

Materials:

- Straws
- Clothespins
- Tweezers
- Toothpicks
- Sponges
- Cotton balls or pom-poms
- Cups or paper flowers
- Colored water
- Small marshmallows/rice

Flower Stations

Set up different flower types:

- Deep narrow cup
- Wide shallow bowl
- Tiny holes
- Sticky pollen station (powdered drink mix or pom-poms)

Students explore and discover:

- Which mouths work best?
- Which flowers match which pollinators?
- Why specialization matters

Mouthpart Matches

Pollinator	Mouth Tool	What it Demonstrates
Butterfly	Straw	Long proboscis sipping nectar
Bee	Small sponge or fuzzy pom-pom	Hairy mouth/body collecting pollen
Hummingbird	Long straw or turkey baster	Reaching deep flowers
Beetle	Clothespins	Chewing mouthparts
Fly	Sponge tip	Lapping liquids

- **Journal Prompts** -
  - » I wonder how flowers attract the "right" pollinator...
  - » Which pollinator would you want to be? Explain.
  - » What did you discover about flowers today?

- **Discussion Follow-Up** - What might happen if bees did not have setae (tiny hairs)? Describe how pollen moved during the challenge. What kinds of flowers do you think butterflies prefer?

- **Passport Follow Up** - Students should complete Clue #2 assignments and receive a "stamp" for completion before moving on to the next Clue. All assignments can be completed independently, in teams, or as a whole class.

Classroom Extensions

Available to be used at the educator's discretion to extend the learning in the classroom and at home

- Get to know the basics of the honey bee with the Complete Six-Week Bee Unit.
- Explore more book clubs with The Bee Cause. Check out the full Book Club Library, including Educator's and Student's Guides on the website. https://www.thebeecause.org/2-support-materials/lesson-plans/bee-cause-book-club-educators-and-students-guides/
- Students can engage with Nature Cat to help the pollinators at PBS Kids. https://pbskids.org/games/play/pollinator-pathway/875783
- My Pollinator Journal
- Join a classroom **Citizen Science Project.** We recommend the **Seek** by **iNaturalist App**.

Clue #3

THE PLANT LIFECYCLE — CONNECT

Concept: Pollination supports the plant lifecycle and food systems.

- Understand plant reproduction
- How pollinators help plants produce seeds and grow new plants
- How pollination affects our food systems

TEACHER NOTES:

- Students begin to understand the lifecycle of a plant and begin making connections between pollination and the foods they eat every day.
- Through games, observation, and discussion, they discover that pollination is part of the plant lifecycle and that many foods depend on pollinators to grow.
- Focus on helping students make connections between flowers, seeds, fruits, and food systems.
- Encourage students to think about what foods would disappear without pollinators.
- Read for background info about seeds or watch Seeds and Germination Explained.

MINI - LESSON:

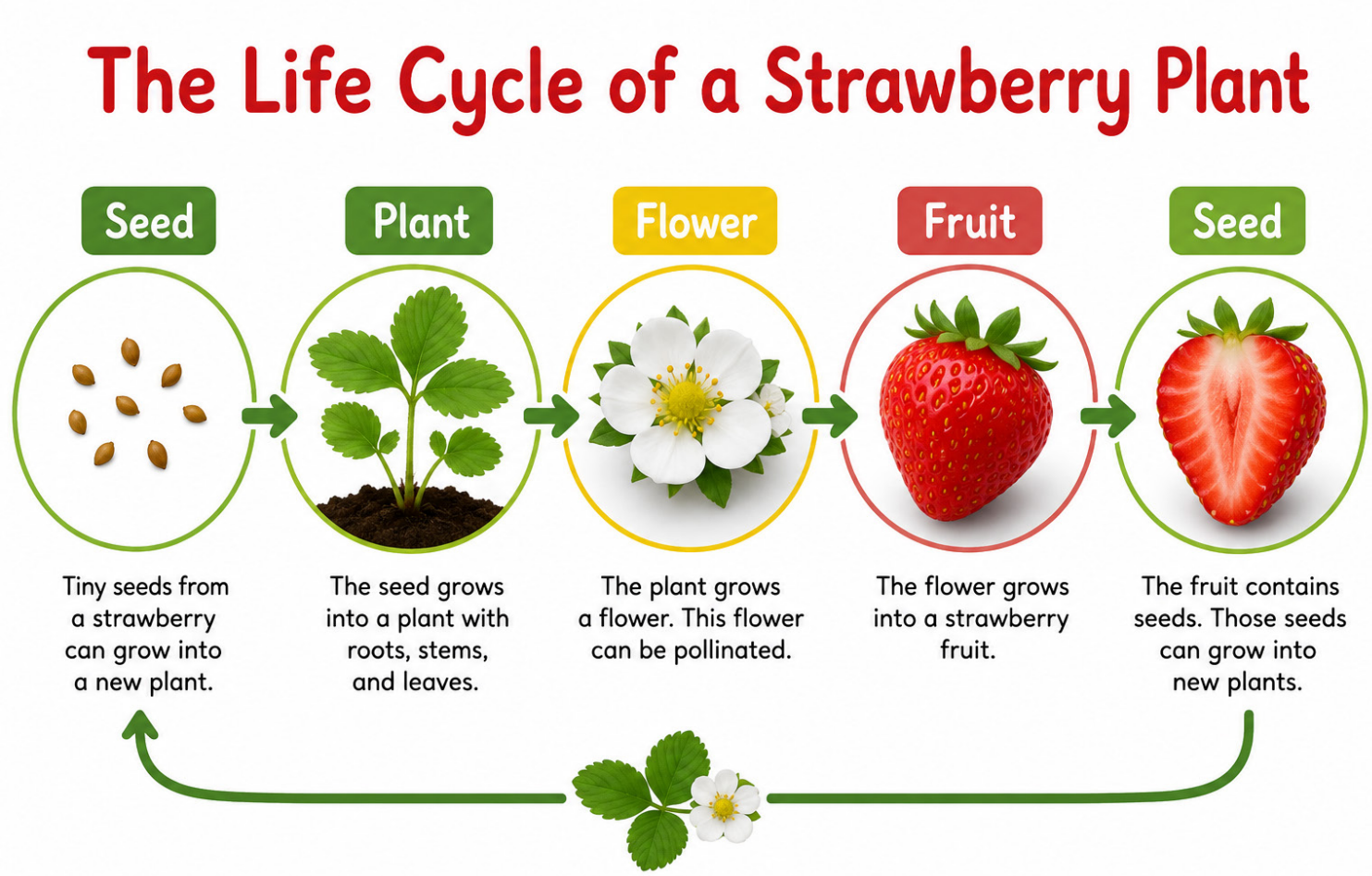
The Plant Lifecycle

- Check in with students about the KWL Chart/ Wonder Wall.
- Review pages 30-31 in ***Little Bee and The Bloom.*** Discuss the pollination process as the students understand it to this point.
- Discuss *"Let's thank the bees for all they do, to bring good food for me and you."*
- Introduce the plant lifecycle:
  Seed > Plant > Flower >Fruit > Seed

SEE DIAGRAM ON FOLLOWING PAGE

READ & WATCH:

- Watch How Does a Seed Become a Plant and explore the lifecycle of flowering plants using the diagram.
- Discuss how fruits form after pollination occurs and how seeds create new plants.
- Introduce the idea that pollination supports food systems.



Discuss:

- Why do plants need seeds?
- Have you eaten seeds? Why didn't they grow inside your body?
- How does pollination help flowers make seeds?
- What foods in your lunchbox started as flowers?
- What might happen if pollinators disappeared?

KEY TERMS:

Students should use their own words to describe the following terms as part of their evidence collection, and add to their words as they discover new meaning. **The Word Puzzle** at the end of the passport is a collection of all of the Key Terms.

- lifecycle
- seed
- fruit
- flower

Outdoor Field Mission: "Every Third Bite *Tag*"

STUDENTS PLAY A MOVEMENT GAME TO MODEL HOW POLLINATORS HELP GROW FOOD.

How to Play:

- Choose 5-6 students to act as pollinators (bees, butterflies, bats, etc.).
- The remaining students become flowers holding food picture cards (apple, blueberry, almond, cucumber, strawberry, etc.).

Round One:
Set a timer for 1 minute of play

The Goal:

- Pollinators must "pollinate" flowers by tagging them.
- Once tagged: The flower can "grow" into food and run to the Harvest Basket (designated space).
- Untagged flowers stay frozen because they cannot produce fruit.

Round Two:

- Students reset the timer for 1 minute of play.
- Remove half of the pollinators and replay the game.

Discussion:

- What happened when fewer pollinators were available?
- How did the "harvest" change?
- What foods disappeared from the lunchbox?
- Why do scientists say every third bite of food depends on pollinators?

Indoor Activity

LUNCHBOX INVESTIGATION

- Students explore foods that depend on pollination.
- Students can research complete lists of pollinated foods, such as the Pollinated Foods example list
- This activity can be done with the students' lunchboxes, food trays from the cafeteria, or with images of common lunchbox food items.
- Provide magazines, food labels, drawings, or lunchbox examples.
- Students sort foods into: **Pollinator-Dependent Foods & Non-Pollinator Foods**
  - » Create a "Pollinator Lunchbox"
  - » Draw their favorite pollinated foods

Journal Prompts:

- What foods would you miss most if pollinators disappeared?
- Why are seeds important?
- How are flowers connected to the foods we eat?
- What surprised you about pollination today?

Discussion Follow-Up:

- How does pollination help plants continue their lifecycle?
- Why is pollination important for people?
- What connections did you discover between flowers and food?

Passport Follow-Up:

- Students should complete Clue #3 assignments and receive a "stamp" for completion before moving to the next Clue. Activities may be completed independently, with partners, in teams, or as a whole class, depending on student needs.

Classroom Extensions

Available to be used at the educator's discretion to extend the learning in the classroom and at home

- Create a "Pollinator Pantry" bulletin board featuring pollinator-dependent foods.
- Host a Pollinator Picnic featuring only foods that require animal pollination.
- Plant seeds and observe the plant lifecycle over time. Check out The Reason for a Seed lesson plan for more seed exploration with The Bee Cause.
- Want to know more about unexpected pollinators? Check out Crabs, Cockroaches, and 3 Other Pollinators That Aren't Bees
- Join a classroom **Citizen Science Project**. We recommend BumblebeeWatch.org.

Clue #4

THE FOOD CONNECTION — EXPLORE

Concept: Pollinators help create diverse foods, support healthy ecosystems, and promote human nutrition.

- Begin connecting pollination to food and human health
- Understand how bees use pollen and nectar to make honey

TEACHER NOTES:

- Explore how pollinators influence food flavor, diversity, and food systems through honey tasting and pollinator observation.
- Encourage students to notice how different flowers support different pollinators and foods.
- Watch Honey, How It's Made for background information
- Focus on sensory science and observation.

MINI - LESSON:

Pollinators, food diversity, and honey

- Check in with students about the KWL Chart/ Wonder Wall.
- Introduce the concept of **plant diversity**. Watch Plant Diversity - The Many Types of Plants
  - » Diversity means variety, or having many different kinds of things. One way to help students understand this concept is by comparing leaves of different plants.
  - » Cacti have thick, waxy skin to hold water and spines to protect themselves.
  - » Cypress trees grow "knees" above the swampy water to help them breathe air.
  - » The shape of the plant, flower color, size of the flower, and many other attributes of plants are part of the diversity of the plant kingdom.
- Introduce the concept that plant diversity creates food diversity.
- Share the **Pollinated Fruits of the Rainbow Graphic**
- Challenge students to name other fruits and vegetables from every color of the rainbow.

Discuss:

- Do each of these foods taste the same or different? Why?
- Why does it matter to have diverse foods to choose from?
- How does pollination affect the foods we eat?
- If flowers look and smell different, what do you think that means for the taste of the nectar from different flowers?
- Why might honey taste different depending on the flowers bees visit?
- Why do you think the strawberries are not growing properly?
- What do pollinators have to do with solving the mystery?

READ & WATCH:

It's time to discuss and taste honey in the **Honey Tasting Detective Lab.**

- Watch How Do Bees Make Honey
- Honey is the only food on the planet that will not spoil or rot.
- Honey has been used for millennia as a topical dressing for wounds since microbes cannot live in it. It also produces hydrogen peroxide.
- To make one pound of honey, workers in a hive fly 55,000 miles and tap two million flowers.
- It takes one ounce of honey to fuel a bee's flight around the world.
- Honey is nectar that bees have repeatedly regurgitated and dehydrated.

Indoor Activity

HONEY TASTING DETECTIVE LAB

Students sample different honey varieties: Lavender, Acacia, Orange Blossom, and Bee Cause Wildflower Honey (can use any variety of local honey that is available in the area).

This lab can be set up for individual, team, or whole class exploration at the teacher's discretion. Students should record their observations in their Pollinator Passport.

Materials:

- Lavender, Acacia, Orange Blossom, and Wildflower honey
- Toothpicks
- Paper towel

Students Observe:

- Color
- Texture
- Smell
- Taste

Steps:

- Inspect the honey. Hold it up to a light. What colors do you see? Write down words that describe what you see in your passport.
  - » Examples: sunshine, caramel, bright, lemon, dark, yellow, black, bubbly, popsicle, creamy, blush, maroon, coral, salmon
- Watch the honey move. Squeeze a little honey onto a paper towel or a toothpick.
  - » What do you notice about the way it moves? Is it fast or slow?
  - » That is called the viscosity: higher viscosity means it has a greater resistance to flow, and lower viscosity means it moves quickly.
- Smell the honey. What do you observe with your nose? Write down words that describe the smell.
  - » Examples: lavender, woodsy, fruity, jammy, citrus, floral, dusty, smoky, spicy, berry, earthy, hay
- Taste the honey. Write down the words that describe the taste.
  - » Example: raisin, smoke, marshmallow, pineapple, coffee, sugar, sunrise, earth, nut, candy, bite, pucker
- Combine your words to create your name for each honey straw flavor. (Think MadLibs)
  - » Examples: Sunshine Lavender Smoke, Citrus Jammy Candy, Spicy Marshmallow Puff.
- Follow the above steps for each of the types of honey.
- Reveal the final answers for the type of honey for each taste test.
- Create a classroom graph ranking favorite honey varieties.

Journal Prompts:

- Why is food diversity important?
- How are flowers connected to honey?

Discussion Follow-Up:

- Why does honey taste different?
- What flowers did the bees visit to make the different varieties of honey?
- How does plant diversity affect honey?
- Why do different flowers attract different pollinators?
- How does pollination help farmers and gardeners?
- What connections did you notice between flowers and food?

Passport Follow-Up:

Students should complete Clue #4 assignments and receive a "stamp" for completion before moving to the next Clue. Activities may be completed independently, in teams, or as a whole class, depending on student needs.

Classroom Extensions

Available to be used at the educator's discretion to extend the learning in the classroom and at home

- Create a class pollinator recipe book featuring pollinator-dependent foods.
- Compare grocery store foods that rely on pollinators vs no pollinator required.
- Research local flowering plants and pollinator relationships.
- Learn more about what a world without bees would look like with The Bee Cause Book Club Lesson What If There Were No Bees?
- Join a classroom **Citizen Science Project**. We recommend The Great Sunflower Project.

Clue #5

BEE A FRIEND — ACT

Concept: Discover how people can protect pollinators by creating healthy habitats, planting native flowers, creating natural spaces for nesting, and teaching others about pollinator conservation.

TEACHER NOTES:

- Students shift from learning to action by exploring ways they can support pollinators in their homes, schools, and communities.
- The Bee A Friend to Pollinators lesson is a complete campus survey that can be used to support this final ACT portion of the learning.
- Focus on empowerment, stewardship, and environmental responsibility.
- Encourage students to recognize that even small actions can help pollinators survive and thrive.
- I Wonder… and Journal Prompts will shift to encourage reflection, advocacy, and action.

MINI - LESSON:

Pollinators Need Our Help

Discuss:

- Why are pollinators important for healthy ecosystems?
- What challenges do pollinators face?
- How can humans help pollinators survive?

Introduce the Fundamental Needs of Pollinators:

- Food
- Water
- Shelter
- Safe habitat

Discuss how native flowers, clean water, and purposeful habitat spaces help pollinators thrive.

Outdoor Field Mission: Pollinator Habitat Hunt

STUDENTS ASSESS OUTDOOR SPACES TO IDENTIFY POLLINATOR-FRIENDLY LANDSCAPE PRACTICES AND PLACES WHERE IMPROVEMENTS CAN BE MADE.

Students search for:

- Flowers
  - » Native, year-round blooms, trees, shrubs, vines
- Water sources
  - » Wetlands, birdbath, fountain, puddles, natural sources
- Shelter spaces
  - » Beehive, logs, weedy No Mow area, native bee house, bare soil
- Signs of pollinator activity
  - » Native bees, butterflies, hummingbirds, wasps, flies, honey bees, moths, bats, beetles

Discussion:

- What makes a habitat safe for pollinators?
- Why would pollinators need year-round blooms in warmer climates?
- What improvements could help pollinators survive here?
- How can clubs, schools, and communities protect pollinators?

Indoor Activity — Bee a Friend to Pollinators Action Plan

STUDENTS CREATE A PLAN FOR HELPING POLLINATORS AT HOME OR SCHOOL. STUDENTS SHOULD CONSIDER FOOD, WATER, SHELTER, AND A SAFE HABITAT WHEN CREATING THEIR ACTION PLAN TO SUPPORT POLLINATORS.

Students create a plan for helping pollinators at home or school. Students should consider food, water, shelter, and a safe habitat when creating their action plan to support pollinators.

- Design a pollinator garden space
- Create Bee Bath plans
- Draw a "No Mow Zone"
- Make advocacy posters
- Write letters encouraging pollinator protection

Now it's time to act like a real detective. Encourage students to use the following elements for their Action Plan.

- **Food** - Plant native flowers, year-round blooms will feed the pollinators through every season
- **Water** - Bee Bath - all living things need water to survive
- **Shelter** - Safe places to nest, raise their young, and continue their lifecycles
- **Bee an Advocate** - Protect pollinators by teaching others what you've learned
- **Bee Natural** - No Mow Area, no pesticides

STRAWBERRY SOLUTION MISSION:

- Strawberries can self-pollinate; however, pollination by bees and hoverflies produces better-formed and larger fruit. Poor pollination makes the berries small and misshapen.
- Strawberry flowers have both male parts (stamen) and female parts (pistil). Each pistil must receive pollen grains from the stamen for full pollination. The berry forms from the pistil developing an individual seed called an achene. The red, sweet part we eat is a large, juicy carrier for the seeds!


Pollinated Strawberry


Unpollinated Strawberry

Journal Prompts:

- How can you help pollinators at your school? At home? In your community spaces?
- Why do pollinators need safe habitats?
- What action would you like to take first?
- Why is it important to protect pollinators?

Discussion Follow-Up:

- Why do pollinators need humans to help protect them?
- How can small actions make a big difference?
- What would happen if communities worked together to support pollinators?

Passport Follow-Up:

Students should complete Clue #5 assignments and receive their final "stamp" to become Certified Pollination Detectives. Activities may be completed independently, with partners, in teams, or as a whole class.

Classroom Extensions

Available to be used at the educator's discretion to extend the learning in the classroom and at home

- Create a school pollinator garden.
- Host a Honey Tasting at your school, club, or community event.
- Host a Pollinator Awareness Day at your school, club, or community event.
- Create classroom presentations teaching younger students about pollinators.

STANDARDS ALIGNMENT

GRADE 2
NGSS

2-LS2-2
Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.

Lesson Connections:
- Pollinator Team investigations
- Pollinator Bodies activities
- Flower Power Walk
- Pollination demonstrations
- Pollinator Feeding Station

2-LS4-1
Make observations of plants and animals to compare diversity of life in different habitats.

Lesson Connections:
- Outdoor pollinator observations
- Habitat Hunt
- Pollinator identification
- Native plant investigations

K-2-ETS1-1
Ask questions and define problems.

Lesson Connections:
- Mystery-based investigation
- Wonder Wall
- KWL Charts
- Journal prompts

COMMON CORE ELA
RI.2.1
Ask and answer questions about key details in a text.
RI.2.3
Describe connections between events, ideas, and scientific concepts.
W.2.2
Write informative/explanatory texts.
W.2.8
Recall information from experiences or gather information from provided sources.
SL.2.1
Participate in collaborative conversations.
SL.2.4
Tell a story or recount an experience with appropriate facts and details.

GRADE 3
NGSS

3-LS1-1
Develop models to describe how organisms have unique and diverse lifecycles.
Lesson Connections:
- Plant Lifecycle investigations
- Seed > Plant > Flower > Fruit > Seed activities
- Plant reproduction lessons

3-LS3-2
Use evidence to support the explanation that traits can be influenced by the environment.

Lesson Connections:
- Pollinator adaptations
- Flower-pollinator relationships

3-LS4-3
Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.

Lesson Connections:
- Pollinator Habitat Hunt
- Bee a Friend Action Plan
- Habitat discussions

COMMON CORE ELA
RI.3.1
Ask and answer questions referring explicitly to the text.
RI.3.3
Describe relationships between scientific ideas.
W.3.2
Write informative/explanatory texts.
W.3.7
Conduct short research projects.
W.3.8
Recall and gather information from print and digital sources.
SL.3.1
Engage effectively in collaborative discussions.

COMMON CORE MATH
MP.2
Reason abstractly and quantitatively.
MP.4
Model with mathematics.
3.MD.B.3
Represent and interpret data.

Lesson Connections:
- Pollination Logs
- Honey tasting graphs
- Observation data collection

GRADE 4
NGSS

4-LS1-1
Construct an argument that plants and animals have internal and external structures that support survival, growth, behavior, and reproduction.

Lesson Connections:
- Flower structures
- Pollinator body structures
- Setae, proboscis, beaks, wings
- Plant reproductive structures

4-LS1-2
Use a model to describe that animals receive information through senses and process information in their brains.

Lesson Connections:
- Honey sensory lab
- Pollinator sensory adaptations
- Night Pollinator investigations

4-ESS3-2
Generate and compare solutions to reduce impacts of environmental changes on organisms.

Lesson Connections:
- Bee a Friend Action Plan
- Habitat assessments
- Conservation activities

COMMON CORE ELA
RI.4.1
Refer to details and examples when explaining text.
RI.4.3
Explain events, procedures, and scientific ideas.
W.4.2
Write informative/explanatory texts.
W.4.7
Conduct short research projects.
W.4.8
Gather relevant information from sources.
SL.4.1
Engage effectively in collaborative discussions.

COMMON CORE MATH
4.MD.B.4
Represent and interpret data.

Lesson Connections:
- Pollinator observations
- Honey preference graphing
- Field data collection

GRADE 5
NGSS

5-LS1-1
Support an argument that plants get the materials they need for growth chiefly from air and water.

Lesson Connections:
- Plant growth discussions
- Plant lifecycle investigations
- Pollination and reproduction lessons

5-LS2-1
Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

Lesson Connections:
- Food system connections
- Pollinator-food relationships
- Ecosystem interactions

5-ESS3-1
Obtain and combine information about ways communities use science ideas to protect Earth's resources and environment.

Lesson Connections:
- Pollinator conservation
- Native plant investigations
- Action plans
- Habitat protection

COMMON CORE ELA
RI.5.1
Quote accurately from a text when explaining.
RI.5.3
Explain relationships among scientific concepts.
W.5.2
Write informative/explanatory texts.
W.5.7
Conduct short research projects.
W.5.8
Recall and gather information from multiple sources.
SL.5.1
Engage effectively in collaborative discussions.
SL.5.4
Report on a topic using appropriate facts and details.

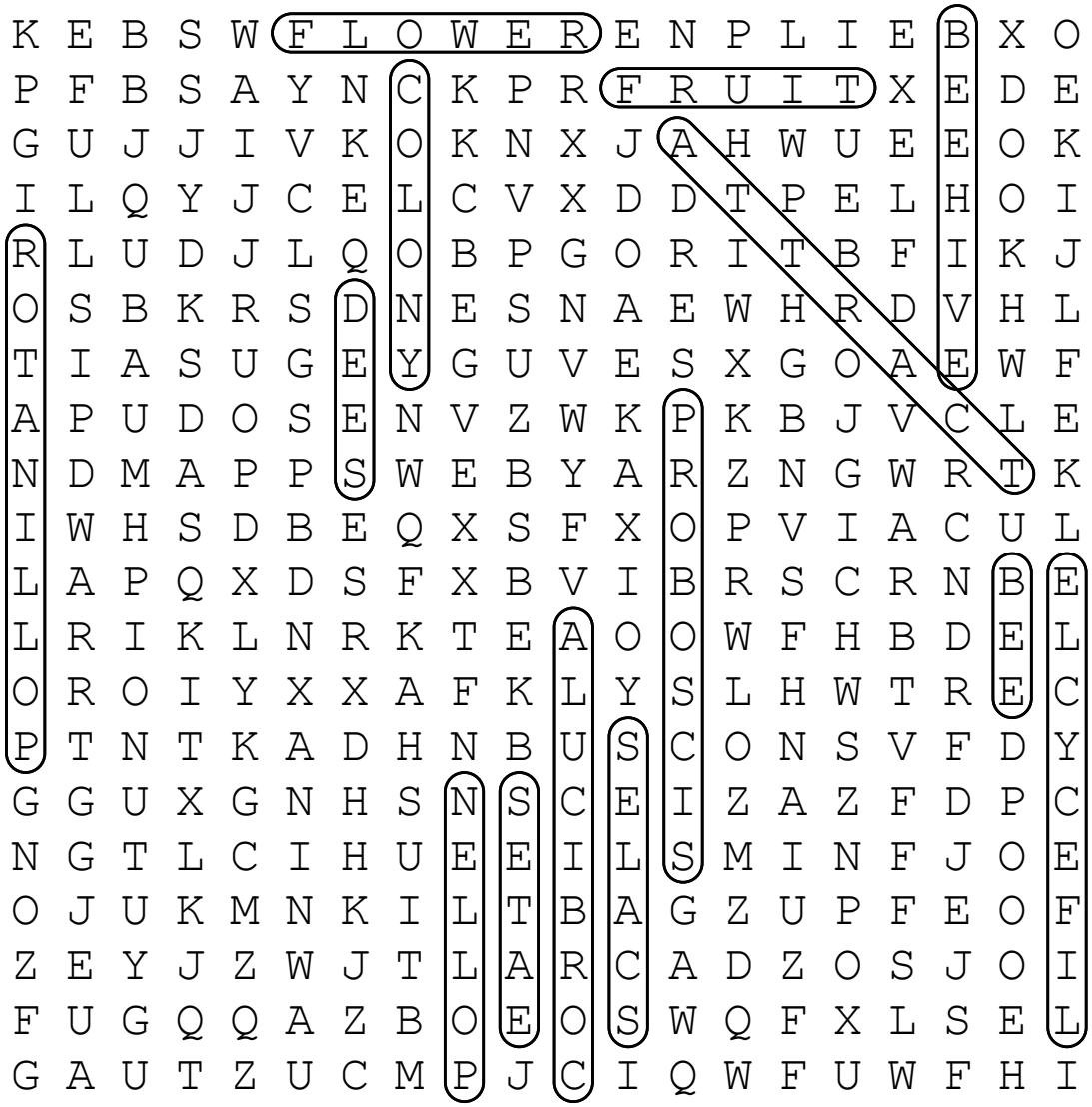
COMMON CORE MATH
5.MD.B.2
Make line plots and analyze data.
MP.4
Model with mathematics.
MP.5
Use appropriate tools strategically.

Lesson Connections:
- Pollination data logs
- Honey tasting data
- Pollinator observation records
- Habitat assessment checklists

CROSS-GRADE ENVIRONMENTAL LITERACY & STEM PRACTICES

The lesson also strongly supports NGSS Science and Engineering Practices:
- Asking Questions and Defining Problems
- Developing and Using Models
- Planning and Carrying Out Investigations
- Analyzing and Interpreting Data
- Constructing Explanations
- Engaging in Argument from Evidence
- Obtaining, Evaluating, and Communicating Information

WORD SEARCH - ANSWER KEY



BEEHIVE
CORBICULA
POLLEN
COLONY
SETAE
POLLINATOR
BEE
SCALES
PROBOSCIS
ATTRACT
LIFECYCLE
SEED
FRUIT
FLOWER