



Backyard Pollinators: In-Person

Intended Audience: Grades 6-8	Lesson Duration: 1 hour
<p style="text-align: center;">Lesson Objectives</p> <p>Students will be able to:</p> <ul style="list-style-type: none"> • Understand the basic anatomy of a flowering plant; • Recognize the relationship between cross-pollinating plants and pollinators; • Understand the adaptations flowers have adopted to attract specific pollinators; • Demonstrate comprehension of cross-pollination and botanical reproduction. 	
<p>NGSS Covered: MS-LS1-1, MS-LS1-2, MS-LS1-4, MS-LS1-6, MS-LS2-1, MS-LS3-1 MS-LS4-3, MS-LS4-4</p>	

Introduction: Welcome & Who We Are/What We Do	2 minutes
Lecture: Plant Identification and General Anatomy	10 minutes
Skit: It's All About Pollination	6 minutes
Lecture: Meet the Pollinators	6 minutes
Activity: Pollination Games (3 rotational centers)	30 minutes
Discussion: Circle Up Closing	5 minutes

Program Word Bank: angiosperm, pollination, pollinator, flower, petal, sepal, nectar, pollen, pollen transfer, stem, leaf, stamen, anther, stigma, pistil, ovary, self-pollinated, cross-pollinated, fertilized, anemophilous, hydrophilous, zoophilous, entomophilous, pollinator syndrome, ecological relationships, mutualism, parasitism, commensalism, diurnal, nocturnal, bee, butterfly, wasp, beetle, bird, bat, moth.

Materials

- 1.) Diagrams
 - a.) Laminated Simple Plant Diagram
 - b.) Laminated Flower Reproduction Diagram
 - c.) Large Laminated Crossword Puzzle
 - d.) Writing utensil (white board marker)
 - e.) Easel
- 2.) Skit
 - a.) Antennae headbands (3)
 - b.) Baskets (3)
 - c.) Kid gloves (3 pairs)
 - d.) Daffodil headband (6)
 - e.) Gold pom-poms (12)
 - f.) Crushed orange, red, & yellow chalk (pollen)
 - g.) Bumblebee Photos
 - h.) Flower reproduction visual
 - i.) Seed pods
- 3.) Common Native Plants & Pollinators Photos
 - a.) Individual Images with Descriptions
- 4.) Interactive Pollinator: Plant Activity
 - a.) Medicine dropper pollinators in various sizes (4ea./pollinator- 12 total)
 - b.) Various faux flowers with nectar
 - c.) Tupperware containers (4) Hives, nest, belly, den
 - d.) Water pitcher to fill flowers
- 5.) Pollinator Matching: Headband Game
 - a.) Photos
 - b.) Question Prompts
 - c.) Pollinator Descriptions
 - d.) [Pollinator Syndrome Chart](#)
 - e.) Stretchy Headbands (12)
 - f.) Timers (3-5)
- 6.) Scavenger Hunt
 - a.) Clip board
 - b.) Pencils
 - c.) Printouts

Lesson Instructions

Introduction: Welcome! NH Audubon is committed to protecting NH's natural environment for the wildlife and people that live there. USFWS works with others to conserve, protect and enhance fish, wildlife and plants and their habitats for the continuing benefit of the American people.

Topic 1: Plant Identification & General Anatomy

Activity: Plant Part Crossword Diagram. Present the blank plant diagram and ask the kids to raise their hands as you read out the clues. Bring up a volunteer from the audience to help label the accompanying flower parts diagram positioned alongside the crossword puzzle.

Topic 2: It's All About Pollination Skit

Ask the students if they've ever heard of pollination. Ask if they understand the concept of pollen transfer. Inform the students that a pollen exchange system is the focus of our lesson and ask the students if they can name a way in which pollen is transferred from one plant to another. Answers: a.) wind- anemophilous (example: oaks, ragweed), b.) water- hydrophilous (a variety of marine grasses) c.) animals-zoophilous (example: bats & birds), or d.) insects- entomophilous (bees, beetles, wasps, butterflies). Explain that we'll be focusing on entomophilous pollination today... and that they're going to help demonstrate how it happens.

Assign six students to be daffodils by wearing the headband. Have them remain in their seats where they are. Explain to the daffodils that, because they're plants, they must remain planted and stay in their fixed positions because they're rooted in the Earth. Once the headbands are secure, assign 6 volunteers to deposit 2 pom-poms and 5 shakes of their colored powder into one daffodil cup explaining that the pom-pom represents nectar and the colored powder represents pollen. Thank them and have them return to their seats. Explain how there is only ONE colored pollen in each flower and that while they are different for this activity, in reality they would be the same color because they are the same species.

Next, assign six students (and perhaps a teacher) to be bumblebees (antennae headband, gloves, carrying basket) and talk the students through the following skit:

Bumblebees are just one type of the 100 wild bee species native to NH. They are social bees and live in underground colonies, often making their homes in abandoned mice dens or crevices between the roots of trees. They are diurnal, meaning they sleep at night, and are busy workers during the warm, dry days of spring and summer. Bumblebees eat nectar and pollen that they acquire by visiting flowering plants! Unlike honeybees, bumblebees don't produce honey. Bumblebees are larger than honeybees and covered in fine hairs making them appear fuzzy. They are capable of stinging but

rarely do unless bothered or defending their nest. Bumblebees use their robust bodies to gather nectar from flowers that sometimes make it more difficult for smaller pollinators to reach. Their strong wings and buff bodies are capable of not only muscling into tight spaces but also vibrating pollen directly out of a flower (tomatoes)- show photos.

Instruct the bees that the sun has risen (hold up the sun and slowly walk in a circle around the group while continuing the skit). Instruct the bees to stretch and warm their bodies in the sun's rays because like all insects, they are cold-blooded (ectotherms) and can't generate their own body heat. Then tell them to get to work collecting nectar to bring back to their hive! Their job is to spend the entire day collecting nectar and pollen from the available plant species in their region (from 3-5 miles from their nesting site on average). Typically, but not always, bumblebees will collect from one specific flowering plant before returning to their hive to drop off their goodies rather than mix and match. For some flowers such as daffodils and tomatoes, bumblebees are a perfect fit and for others plants, many different types of pollinators, from bees to butterflies, hummingbirds and wasps, are capable of doing the job.

Once the nectar has been collected, have the daffodils carefully remove their hats and bring them up to the center, lining them up before returning to their seats. Have the bumblebees come up to the stage and present their baskets. Next, ask them to hold up their gloved hand. Ask the students what they see (more than one color pollen). Ask the students what they think that means. Have new volunteers look inside the daffodil cups and report to the group what they see. Remind them if need be, that before the bumblebees descended on the field there was only one color pollen in each flower. Discuss how the bumblebees' gloves are covered in different colored pollen. Discuss how pollen from one daffodil is now found inside another. Discuss that the pollen from another daffodil now found in the cup of another will be the beginning of a seed!

Continue with a visual that shows the pollen entering the stigma, going into the ovary and developing. Explain how if the daffodil pollen ended up in another type of flower, like a tulip or a cherry blossom, a seed wouldn't be produced because they aren't of the same species. Thank the students for their participation; allot time for questions.

Ask the students if they've ever encountered seeds in their day to day life. Show them the examples on hand (daffodil, lily, maple, pinecone, catalpa). Ask if the students have ever eaten seeds. Prompt peas, peanuts, beans, corn, almonds, pistachios, coconuts.

Topic 3: Pollinator Syndromes

Introduce the various pollinators commonly found in the garden using the photographs and attached descriptions. Discuss Pollinator Syndromes using the [chart](#) from [pollinators.org](#).

Rotating Activity Centers: Walk the students through all the activity instructions then divide the class by 3 and send them on their way!

Activity 1: Pollination Relay Race

Introduce the game- Emphasize that since they'll be acting as unique pollinators, they have unique characteristics that enable them to seek nectar from specific plants. Present them with a flower and the pollinator pipettes and ask them to determine if this is a one size fits all scenario.

Walk around the 'garden' to observe the flowers to examine their traits. Have students describe them using their newly improved botanical vocabulary.. Divvy out the pollinator pipettes and give them 3 minutes to buzz around the prop flowers. Have them return to a predetermined location to deposit their nectar: honeybee hive, bumblebee den, hummingbird nest, hornet belly. After a set amount of time have them stop and present how much nectar they collected before moving through the flowers as a group and asking who was best suited for each sample.

Activity 2: Pollinator:Plant Headband Game

This is a fairly common game so instructions can be limited if the students note that they already know how to play. The goal is that the student will guess which pollinator or plant they have and will be presented with a question key to assist in narrowing it down.

Activity 3: Scavenger Hunt: This is a point system scavenger hunt. Each possible item has a point assigned to it. Students are encouraged to pair up and then have 10 minutes to explore the gardens and seek the listed items before returning to the starting site and tallying up points.

Closing: Allot at least 5 minutes to receive feedback from the students regarding the activities. Inquire about lingering questions. Ask what they've learned. Use some sort of visual evaluation (thumbs up, sideways, down) regarding how much they enjoyed learning about pollinators, ask them to show how much they knew about pollinators before class and how much they know now using arms width, etc. Extend thanks for attending the program, inform teachers to look out for the online survey link you'll be sending for evaluative purposes, and encourage them all to continue exploring nature.