



## Pollinator Party

Intended Audience: **Grades K-2**

Lesson Duration: 45-60 minutes

### Student Learning Outcomes

Students will be able to:

- Understand the basic anatomy of a flowering plant;
- Recognize the relationship between cross-pollinating plants and pollinators;
- Identify the key features of an insect;
- Demonstrate comprehension of pollination concepts.

NGSS Covered: K-2-LS1-1, K-2-LS1-2, K-2-LS2-1, K-2-LS2-2

Introduction: Welcome & Who We Are/What We Do	2 minutes
Lecture: Plant Identification and General Anatomy	4 minutes
Activity: Seed to Sapling	5 minutes
Skit: It's All About Pollination	10 minutes
Lecture: Meet the Pollinators	5 minutes
Activity: Pollinator Matching Game	10 minutes
Discussion: Share Out Circle	5 minutes
Activity: Scavenger Hunt in the Garden, Field, Meadow.	10 minutes
Discussion: Share Out Circle & Wrap Up	5 minutes

Program Word Bank: pollination, pollinator, flower, nectar, pollen, pollen transfer, root, stem, leaf, petal, seed, fruit, nut, antennae, compound eyes, UV light, bee, butterfly, wasp, beetle, bird, moth, nocturnal, diurnal.

## Program Notes for Naturalist

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### Materials:

- 1.) Plant Diagram (root, stem, leaf, flower, fruit, seed)
- 2.) Plant Identification Props (optional)
  - a.) Sun-themed flashlight: sunlight
  - b.) Spray bottle set on mist: water
  - c.) Shovel: soil
  - d.) Battery operated fan: air/CO<sub>2</sub>
- 3.) Red Oak & Acorn Image
- 4.) Skit
  - a.) Medium-sized container (family-sized yogurt containers work great) (3)
  - b.) Medium-sized container with handle (tin craft buckets,, yogurt container and string) (3)
  - c.) White pom-poms or cotton balls (12-15)
  - d.) Crushed orange, red, & yellow chalk kept separate from one another (pollen)
  - e.) Bumblebee images
  - f.) Antennae headbands (optional) (3)
  - g.) White kid gloves (3 pairs; optional)
  - h.) Seed pods (optional)
- 5.) Common Native Pollinators Photos
- 6.) Pollinator Puzzle Piece Matching Game
- 7.) Scavenger Hunt Activity Book
- 8.) Pollen Transfer Game
  - a.) Various picker uppers (tongs, chopsticks, clothespins, tweezers, spoons)
  - b.) Various cups and tubes
  - c.) Various sized pom-poms (nectar and pollen)
  - d.) Laminated flowers (squash flower, lily, cardinal flower, echinacea, dandelion)

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### 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

Select a couple eager students from the audience to represent flowering plants. Ask the remaining students to call out the part of the plant you are pointing to on an accompanying poster-sized diagram. As they say the plant parts, encourage the student to strike a pose to represent that part. Cover roots, stem, leaves, flower, fruit, seeds. Encourage them to mention what a plant requires for existence (sunlight, soil, water, CO<sub>2</sub>). When you prompt the living conditions, pretend to provide

the plants with what the students mention by turning the sun on them, misting them with water, pretending to shovel soil on their feet, blowing them with the fan, moving them apart from one another for adequate space. Thank the students and have them return to their seats. Now that we know the general anatomy of a plant, we will learn how a plant becomes a plant in the first place!

**Activity:** From Seed to Tree

Have students stand and separate from one another. Explain to them that they are about to be magically transformed into an acorn; more specifically an acorn of a northern red oak. Show tree image. Explain that an acorn is the fruit or nut of an oak tree that contains a seed safely tucked beneath that hard outer layer. Show the acorn image. The little cap atop the nut is what attaches it to the branch and allows nutrients pulled from the roots and sugars from photosynthesis from the leaves to reach it. Encourage the students to “be a nut!” Someone will undoubtedly start goofing off so reel them in with, “Okay now be an acorn!” Encourage them to roll up into a ball to represent the acorn.

Walk between the curled up students while discussing that some acorns, once dropped to the ground in Autumn are instantly covered by windblown leaves, some are relocated by rakes or squirrels, or roll down hills, fall into crevices, or are washed downstream by rivers and streams. Mention that the red oak acorns will rest for the winter wherever it is they land and only when the temperature has warmed and the days have lengthened will they begin to germinate. The seed begins to grow by firstly sprouting a root -instruct them to start unfolding one of their legs. Once the root is firmly submerged in the soil, the stem of the oak tree begins sprouting. Walk them through the stages of growth, encouraging them to control their movements since trees don’t typically grow in a day. Include rain, sun, and wind and mention that some might get eaten by a rodent or a deer before germinating. Go from seed to root to shoot to leaves, and then ask if they think they could produce an acorn the same year they sprouted. Encourage why or why not answers. Explain how a red oak in the forest won’t produce acorns until they’re about fifty years old! Have them sit and note that they know how a plant grows from a seed but how does the plant produce the seed in the first place!?

They do it in one of four ways: tell them (or do charades for) a.) wind (example: oaks), b.) water (some marine grasses) c.) animals (example: hummingbirds), or d.) insects (bumblebees, moths, butterflies). Explain that we’ll be focusing on insect pollination today... and that they, the students, are going to help demonstrate how it happens.

**Skit:** It’s All About Pollination

Assign three students to be flowers. Offer them empty containers (without lids). Explain to them that as flowers, they must remain planted with strong roots so that they don’t spill any pollen or nectar from their holding baskets. Assign a handful of volunteers to deposit 3-5 pom-poms and 10 shakes or a few spoonfuls of their colored powder into one flower (basket/container) explaining that the pom-pom represents nectar and the colored powder represents pollen. Ask the flowers to

share what color pollen they received with the class. There should only be ONE color per flower at this stage. Have the flowers shake their basket as though a strong wind had blown by (to ensure the pollen spreads to the pollen).

Assign three students to be bumblebees (antennae headband, carrying basket, kid gloves).

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 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 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.

Have the bumblebees show the class what they collected. Ask the students how many colors they see in the bumblebee basket, on the bumblebee gloves, or attached to the pollen pom poms. Discuss how the pollen has mixed together in the bumblebasket. Ask the flowers to ask if the contents of their container is different from earlier. Inquire as to whether there is any nectar or pollen left. Ask if there is only one color of pollen. Ask if it is the same color they started with. Discuss how pollen from one flower is possibly found inside another. Discuss that the pollen from a plant of the same species transferred to another will start to make a seed! Explain how if the pollen of one species ended up in the flower of another type of species, 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. Show them the examples on hand and ask if the students have ever eaten seeds. Prompt peas, beans, corn, almonds, pistachios, coconuts. How do seeds develop? Through pollen transfer.

**Activity A:** Pollen transfer relay race. Break the group into two lines and set the tongs and several large pom poms on the laminated flowers. Suggestion: 2 colors per flower species, each flower across from one another (2 yellow pom poms on one dandelion across from two red pom poms on another dandelion, etc.). Have the first student pick up the tongs and transfer one pollen across to the other flower and replace it with a different colored pom pom. Have them bring the new pom pom to the original flower, drop it, and offer the tongs to the next student who repeats the task until everyone has had a chance to move a pollen piece. Keep this simple, it's supposed to be. Ask the kids how it went and send them back to their seats.

## **Topic 2:** Common Plants & Pollinators

Introduce the various pollinators commonly found in the garden using the photographs and attached descriptions. Have the students inquire about how each individual pollinator interacts with a flower. How does the pollinator get the nectar from the plant? Do they land on it, hover by it, touch it with their feet, tongue, bellies? Prep Activity B while they ponder this.

**Activity B:** Using the same laminated plants, add tubes, cups, and smaller pollen (pom poms) that will require different tools to access. Disperse the other picker upper tools and have the kids repeat the first Activity. See if each team (on each flower set) can successfully transfer all of the pollen from one flower to another. Encourage them to try all the tools. Ask how it went. This second activity should be much more challenging and offers the opportunity to discuss how not all flowers appeal to every type of pollinator. Some flowers store their nectar in a place that is only accessible to a specific type of pollinator.

## **Activity C:** Pollinator: Plant Puzzle Match

Hand out the Pollinators; hand out the plants. Have the students try and match them up in an allotted time. Describe how and why these matches work the way they do (adaptations).

**Honeybees:** attracted to the color yellow, require a flat landing pad.

**Hummingbird:** long, thin beak perfect for slipping inside the tubular flowers of a trumpetvine.

**Beetles:** are clumsy landers and often bounce off the sides of larger flowers before falling into the center, where the nectar and pollen is stored.

**Bumblebees:** are one of few pollinators robust enough to pry apart the petals of a snapdragon to access the nectar stored within.

**Moth:** the white flowers of a penstemon are highly visible at night when moths are out.

**Fly:** attracted to white colors and require a flat landing pad.

**Wasp:** prefer closely clustered flowers that allow them to crawl from nectar source to nectar source rather than flying to individual blossoms.

**Monarch:** are big fans of flowers from the milkweed plant (butterfly weed in this case) and always lay their eggs on a milkweed species as that is the host food for their larval (caterpillar) stage.

**Activity D:** if applicable

Now that we know how seeds are formed, by transferring pollen from flower to flower of the same species and the variety of different pollinators that call NH home... let's go see if we can find the different types of plants and their pollinators outside in the schoolyard/playground/garden.

Divide the class into groups of 3-4 and present them with the Scavenger Hunt Activity Book. Set parameters for your location and then regroup after an allotted time and discuss what they found. Use the following prompts if need be:

- 1.) What did you see? What did you hear?
- 2.) Did you see familiar faces? Were you able to identify any insects?
- 3.) Did the pollinators look the same as one another?
- 4.) Did the pollinators look different from one another?
- 5.) How were they the same/different?
- 6.) Were all the flowers the same size, shape, color?
- 7.) Were they all aromatic?
- 8.) Did you see any other creatures in the garden? What/who?
- 9.) Did anyone see a moth? Why or why not?
- 10.) Did some flowers have more pollinators on them than others?
- 11.) Did you notice any patterns in the garden?

**Wrap Up/Closing Circle:** Q&A and thanks for coming!