LESSON PLAN PACKETS

Lesson plans for every grade band

Each band has a 45-minute lesson, objectives, materials, vocabulary, discussion questions, standards touchpoints, a reproducible student handout, and answer keys. The planter visit and credit pages are at the end.

Pre-K and kindergarten (Pre-K to kindergarten, ages 3 to 6)	**page 2**
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LESSON PLAN PACKET

Pre-K and kindergarten

Pre-K to kindergarten, ages 3 to 6

Ages 3 to 6, pre-readers and early readers, with an adult or older buddy.

> **Big idea:** Plants feed animals. Some plants belong here and some do not.

This packet holds a 45-minute lesson, a reproducible student handout, and answer keys. It is built from the same data as the free games and tools on pollinatehappiness.com, a student-led project on Long Island where brothers Aidan and Ben Ellis have installed five native pollinator planters.

Lesson at a glance (45 minutes)

Time	Activity	What students do
0-5 min	**Circle time: who visits flowers?**	Look at a flower (real or a photo). Name animals that visit flowers. Buzz like a bee, flutter like a butterfly.
5-13 min	**Read-aloud picture quiz**	Watch the photo on the big screen, listen to the voice, and point or call out: friend to bees, or trouble?
13-21 min	**Feed the Bird**	Look at the bird. Take turns tapping the plant picture that gives it food.
21-28 min	**Name That Song**	Close eyes and listen to a bird song. Open eyes and choose the matching bird picture.
28-38 min	**Life Cycle in Order**	Put egg, caterpillar, chrysalis, and butterfly in order as a class. Then act it out: curl up, crawl, hang still, fly.
38-45 min	**Draw and tell (exit ticket)**	Draw on the student page while an adult reads each prompt. Tell a buddy one thing a plant gives an animal.

Extensions (another day, or early finishers)

- **Color and talk:** Coloring pages with one sentence each. Read the sentence together.
- **Go outside:** The Backyard bingo card with an adult reading the squares, or a visit to a planter.

Learning objectives

By the end of the lesson, students will be able to:

1. Point to or name one animal that eats a native plant (for example, the monarch caterpillar eats milkweed).
2. Put four pictures of a monarch's life (egg, caterpillar, chrysalis, butterfly) in the right order.
3. Tell a buddy whether a plant is a friend to bees or trouble, and give one reason.

Materials and prep

Materials

- Projector or large screen with speakers (the games read aloud and play bird songs).
- One tablet per small group with an adult, if available (optional; the whole lesson works on one screen).
- Student page from this packet, one per child, plus crayons.
- Optional: a real flower, a milkweed leaf, or a photo of one of our planters to pass around.
- Optional extension printouts: coloring pages and the Backyard bingo card (links below).

Before class

- Open each game link before class and turn on little-kids mode where the link includes ?mode=kids. Test the sound.
- Print the student page. Fold the exit-ticket strip under if children will draw first.
- Plan movement breaks: the life-cycle act-out works well between screen activities.
- Planning a walk? Each of our five planters has a printable field-trip sheet (see the Visit a real planter page).

Online activities (free, no sign-up)

- **Read-aloud picture quiz:** https://www.pollinatehappiness.com/games/native-or-invasive?mode=kids
- **Feed the Bird:** https://www.pollinatehappiness.com/games/feed-the-bird?mode=kids
- **Name That Song:** https://www.pollinatehappiness.com/games/name-that-song?mode=kids
- **Life Cycle in Order:** https://www.pollinatehappiness.com/games/life-cycle
- **Color and talk:** https://www.pollinatehappiness.com/games/coloring
- **Go outside:** https://www.pollinatehappiness.com/games/field-bingo

Vocabulary

Word	What it means
Plant	A living thing that grows in the ground and makes its own food from sunlight.
Native plant	A plant that has always grown here, like milkweed. Our bugs and birds know how to eat it.
Invasive plant	A plant from far away that spreads everywhere and crowds out the plants our animals need.
Pollinator	An animal, like a bee or a butterfly, that carries pollen from flower to flower.
Nectar	Sweet juice inside a flower. Bees, butterflies, and hummingbirds drink it.
Caterpillar	A baby butterfly or moth. It eats leaves and grows and grows.

Discussion questions

Each question is followed by what a strong answer sounds like.

1. **What do bees and butterflies get from flowers?**
   Strong answer: Food: sweet nectar to drink, and pollen for bees to carry home.
2. **What does a monarch caterpillar eat?**
   Strong answer: Milkweed leaves. It cannot eat anything else, so no milkweed means no monarchs.
3. **Why might a bird like a plant with berries?**
   Strong answer: Berries are food for the bird, especially in winter when there are no bugs.
4. **What comes after the caterpillar?**
   Strong answer: The chrysalis. The caterpillar hangs still inside it and turns into a butterfly.
5. **If a plant is trouble, what should we plant instead?**
   Strong answer: A plant that belongs here and feeds our animals, like milkweed or goldenrod.
6. **How did you know which bird was singing?**
   Strong answer: Names a clue: the sound was high or low, fast or slow, or it sounded like words.

Standards touchpoints

- NGSS K-LS1-1 (what plants and animals need to survive)
- NGSS K-ESS3-1 (relationship between the needs of living things and where they live)

Informal mapping to the Next Generation Science Standards; not a formal alignment. New York State's P-12 Science Learning Standards are built on the same framework; check your district's curriculum for exact codes.

STUDENT HANDOUT | free to copy

My Bee and Butterfly Page

Name _____ **Date** _____

An adult reads each part out loud. Draw, circle, and tell your buddy.

1. Draw a flower. Draw a bee or a butterfly visiting it.

2. Circle the plant a monarch caterpillar eats.

Milkweed Pizza Grass

3. Write 1, 2, 3, 4 to put the monarch in order.

☐ Butterfly ☐ Egg ☐ Chrysalis ☐ Caterpillar

4. Tell your buddy: what color flower would you plant? An adult can write it here.

EXIT TICKET

Circle: Do bees need flowers?

Yes No

Circle the one that is a pollinator.

Bee Rock Shoe

Draw one food a bird eats.

Answer keys

Games that draw random questions list the full pool they draw from. Games built live from local data or random recordings have no fixed key, so the teaching point is given instead. A printable set of all keys is at https://www.pollinatehappiness.com/educators/answer-keys.

Read-aloud picture quiz (Native or Invasive, kids mode)

Photos are drawn at random from the site's native and invasive plant lists, so there is no fixed key. The screen shows the answer after each tap. Teaching point: friend-to-bees plants are the ones our insects and birds can eat; trouble plants came from far away and crowd them out.

Feed the Bird

Each round draws from these bird-and-plant pairs.

Bird	Plant that feeds it	How
American robin	Winterberry holly	Robins strip winterberry's red fruit in late winter when little else is left.
Eastern bluebird	Winterberry holly	Bluebirds switch from insects to berries in winter; winterberry and bayberry carry them through.
American goldfinch	Purple coneflower	Goldfinches work coneflower cones for seed from August into February. Leave the stems standing.
Black-capped chickadee	White oak	A chickadee pair needs thousands of caterpillars to raise a brood, and oaks host more than any other tree.
Ruby-throated hummingbird	Scarlet bee balm	The tubular red flowers are built for hummingbird bills; cardinal flower and columbine work too.
Cedar waxwing	Serviceberry	Waxwings arrive in flocks and strip a serviceberry of June fruit in days.
Wood thrush	Northern spicebush	Spicebush's fat-rich red berries fuel thrushes on fall migration.
Gray catbird	Black cherry	Catbirds, along with 30 other bird species, feast on black cherry fruit in August.
Northern cardinal	Blue vervain	Cardinals and sparrows eat vervain seed through fall and winter.
Dark-eyed junco	Little bluestem	Juncos and sparrows glean little bluestem seed from the standing stems all winter.
Baltimore oriole	Serviceberry	Orioles time their arrival to early fruit like serviceberry and to caterpillars on oaks and cherries.
Blue jay	White oak	Blue jays carry and bury thousands of acorns a year, planting the next forest.
Eastern towhee	Highbush blueberry	Towhees scratch in leaf litter under blueberry and eat the fruit in July.

Bird	Plant that feeds it	How
Downy woodpecker	Goldenrod	Downy woodpeckers open goldenrod galls in winter to eat the fly larva inside.
House wren	Sweet pepperbush	Wrens hunt the insects that pepperbush and other native shrubs attract, and nest in the boxes we install.
Wild turkey	White oak	Acorns are a turkey's main fall and winter food.
Song sparrow	Switchgrass	Sparrows shelter and feed in standing native grasses all winter.
Northern mockingbird	Winterberry holly	A mockingbird will defend a fruiting winterberry against every other bird in the yard.

Name That Song

Birds and recordings are chosen at random, so there is no fixed key. The game names the bird after each answer. Teaching point: every bird has its own song, and listening is a way to find birds you cannot see.

Life Cycle in Order

Round 1 is the monarch. Rounds 2 and 3 are the spotted lanternfly and spongy moth, two invasive pests. Months are typical for Long Island.

Monarch butterfly

1. Eggs (Jun, Jul, Aug)
2. Caterpillars (Jun, Jul, Aug, Sep)
3. Chrysalises (Jul, Aug, Sep)
4. Adults (Jun, Jul, Aug, Sep, Oct)

Spotted lanternfly

1. Egg masses (Sep, Oct, Nov, Dec, Jan, Feb, Mar, Apr, May, Jun)
2. Early nymphs (Apr, May, Jun, Jul)
3. Red nymphs (Jul, Aug, Sep)
4. Adults (Jul, Aug, Sep, Oct, Nov, Dec)

Spongy moth (formerly gypsy moth)

1. Egg masses (Aug, Sep, Oct, Nov, Dec, Jan, Feb, Mar, Apr)
2. Caterpillars (May, Jun)
3. Pupae (Jun, Jul)
4. Moths (Jul, Aug)

Color and talk

No answer key. Read each page's one sentence together and ask children to repeat it to a buddy.

Go outside (Backyard bingo)

No answer key. Any square a child can show or describe counts.

LESSON PLAN PACKET

Grades 1 to 5

Grades 1 to 5, ages 6 to 11

Ages 6 to 11. Readers who can work in pairs on a shared device.

> **Big idea:** Every native plant has a job: it feeds a specific insect or bird. Invasive plants take up space without doing that job.

This packet holds a 45-minute lesson, a reproducible student handout, and answer keys. It is built from the same data as the free games and tools on pollinatehappiness.com, a student-led project on Long Island where brothers Aidan and Ben Ellis have installed five native pollinator planters.

Lesson at a glance (45 minutes)

Time	Activity	What students do
0-5 min	**Hook: whose lunch is this?**	Look at a milkweed photo with chewed leaves. Predict who ate it and why only that plant.
5-15 min	**Who Eats This?**	In pairs, match each native plant to the animal that depends on it. Read each fact aloud after a match.
15-23 min	**Bee, Fly, Wasp, or Moth?**	Sort striped insects into bee, fly, wasp, or moth. Name the body clue that gave it away.
23-33 min	**Simple Bloom Builder**	Pick four plants that keep something blooming every summer month. Explain any gap to a partner.
33-40 min	**Bird ID Near You**	Enter the school's zip code and identify birds reported near the school this month.
40-45 min	**Exit ticket**	Answer three questions on the student page and hand it in.

Extensions (another day, or early finishers)

- **Name That Song:** Play a recording, pick the bird. Try it with eyes closed, then discuss what feature gave it away.
- **Field Bingo at a planter:** A card for each of our five installations, built from the plants growing there.
- **Flashcards for review:** The monarch life cycle and the planter plants decks.

Learning objectives

By the end of the lesson, students will be able to:

1. Match at least five native plants to the insect or bird that depends on them, and explain one match in a complete sentence.
2. Identify a bee, fly, wasp, or moth from a photo using at least one body feature (wings, antennae, eyes, or waist).

3. Plan a four-plant garden with something in bloom each summer month, and explain why gaps in bloom are a problem for pollinators.

Materials and prep

Materials

- One device for every two students (Chromebook, tablet, or laptop), or one projector for whole-class play.
- Headphones or speakers for the bird songs (Name That Song, extension).
- Student handout from this packet, one per student, and pencils.
- Optional: printed Field Bingo cards for a planter or schoolyard visit, and the bloom calendar guide.

Before class

- Open each game link on one device and play a round so you know the controls.
- Have the school's zip code ready for Bird ID Near You. Results change month to month, so check it the day before.
- Pair students so that a stronger reader is with a newer reader for the matching game.
- Print the handout and, if visiting a planter, the field-trip sheet and bingo card for that installation.

Online activities (free, no sign-up)

- **Who Eats This?:** https://www.pollinatehappiness.com/games/who-eats-this
- **Bee, Fly, Wasp, or Moth?:**https://www.pollinatehappiness.com/games/bee-fly-or-wasp
- **Simple Bloom Builder:** https://www.pollinatehappiness.com/games/bloom-builder?level=simple
- **Bird ID Near You:**https://www.pollinatehappiness.com/games/bird-id
- **Name That Song:** https://www.pollinatehappiness.com/games/name-that-song
- **Field Bingo at a planter:** https://www.pollinatehappiness.com/games/field-bingo
- **Flashcards for review:** https://www.pollinatehappiness.com/games/flashcards
- **Answer keys (printable):** https://www.pollinatehappiness.com/educators/answer-keys
- **Bloom calendar guide (printable):** https://www.pollinatehappiness.com/guides/long-island-pollinator-bloom-calendar

Vocabulary

Word	Meaning
Native plant	A plant that grew in this area before people brought plants from other places. Local insects and birds depend on it.
Invasive species	A plant or animal brought from somewhere else that spreads fast and harms the plants and animals that live here.
Pollinator	An animal that carries pollen from one flower to another so the plant can make seeds. Bees, butterflies, moths, flies, and hummingbirds are pollinators.
Pollen	Yellow dust made by flowers. Plants need it moved to another flower to make seeds.
Nectar	Sugary liquid in flowers that pollinators drink for energy.

Word	Meaning
Host plant	The plant a caterpillar must eat to grow. Milkweed is the host plant for monarchs.
Habitat	The place where an animal finds food, water, shelter, and a place to raise its young.
Life cycle	The stages a living thing goes through as it grows, such as egg, caterpillar, chrysalis, and butterfly.
Mimic	An animal that looks like another animal. Many harmless flies look like bees so birds leave them alone.

Discussion questions

Each question is followed by what a strong answer sounds like.

1. **Why can a monarch caterpillar not just eat any leaf?**
   Strong answer: Its body is made to eat milkweed only. Milkweed is its host plant, so if there is no milkweed nearby, monarchs cannot raise young there.
2. **What is one way to tell a hover fly from a bee?**
   Strong answer: A fly has one pair of wings, short stubby antennae, and huge eyes that almost touch. A bee has two pairs of wings and longer bent antennae.
3. **Your garden has flowers in June and September but not in July. Why is that a problem?**
   Strong answer: Pollinators need food all summer. In July they would have to go somewhere else or go hungry, so the garden needs a July bloomer.
4. **An invasive plant is green and leafy. Why is it still a problem?**
   Strong answer: Most local insects cannot eat it, so it does not feed caterpillars or birds, and it crowds out native plants that would.
5. **Which bird near our school surprised you, and what might it eat here?**
   Strong answer: Names a real bird from the quiz and connects it to a food: seeds, berries, or insects from plants.
6. **Why are some insects striped like bees?**
   Strong answer: Looking like a stinging insect protects them. Birds learn to avoid black and yellow stripes.
7. **If you could add one native plant to our schoolyard, which would you pick and who would it feed?**
   Strong answer: Names a plant from the games and the animal it supports, like goldenrod for migrating monarchs or black-eyed Susan seeds for goldfinches.

Standards touchpoints

- NGSS 2-LS2-2 (plants depend on animals for pollination and seed dispersal)
- NGSS 3-LS4-3 and 3-LS4-4 (organisms and habitat; environmental change)
- NGSS 5-LS2-1 (movement of matter among plants, animals, decomposers, and the environment)

Informal mapping to the Next Generation Science Standards; not a formal alignment. New York State's P-12 Science Learning Standards are built on the same framework; check your district's curriculum for exact codes.

STUDENT HANDOUT | free to copy

Plant Jobs: Who Depends on Whom?

Name _____ **Date** _____

Native plants have jobs. Each one feeds a certain insect or bird. Use what you learned in the games.

1. Pick one match from Who Eats This? Write the plant, the animal, and how the plant helps it.

_____

_____

_____

2. Name one clue that tells a fly apart from a bee.

_____

_____

3. Draw your four-plant garden. Label the months each plant blooms. Is there a flower every month from May to September?

EXIT TICKET

What is a host plant? Give one example.

_____

_____

Circle the pollinators.

Bee Hummingbird Robin Moth Earthworm

Why is an invasive plant a problem even if it is green and pretty?

_____

_____

Answer keys

Games that draw random questions list the full pool they draw from. Games built live from local data or random recordings have no fixed key, so the teaching point is given instead. A printable set of all keys is at https://www.pollinatehappiness.com/educators/answer-keys.

Who Eats This?

Each round draws from these plant and animal pairs.

Native plant	Who depends on it	Why
Common milkweed	Monarch caterpillar	Monarch caterpillars can eat nothing but milkweed.
Violets	Great spangled fritillary	Fritillary caterpillars feed at night on violet leaves and nothing else.
Spicebush	Spicebush swallowtail	The snake-mimic caterpillar eats only spicebush and sassafras.
White oak	500+ caterpillar species	Oaks host more caterpillars than any other North American plant, which feeds nesting songbirds.
Goldenrod	Migrating monarchs	September goldenrod fuels the monarch migration down Long Island's shores.
Bee balm	Ruby-throated hummingbird	The tubular scarlet flowers are shaped for hummingbird bills.
Cardinal flower	Ruby-throated hummingbird	Cardinal flower is pollinated almost entirely by hummingbirds; bees can't see red.
White turtlehead	Baltimore checkerspot	Turtlehead is the main native host of Maryland's state butterfly, though it also lays eggs on English plantain and a few other plants.
Golden Alexanders	Black swallowtail	Black swallowtail caterpillars prefer it to your garden parsley.
Little bluestem	Skipper butterflies	At least nine skipper species lay eggs on little bluestem.
Highbush blueberry	Southeastern blueberry bee	A specialist bee that buzz-pollinates blueberry bells by vibrating at just the right pitch.
Swamp rose mallow	Rose mallow bee	Ptilothrix bombiformis collects only hibiscus pollen.
Evening primrose	Sphinx moths	The flowers open at dusk, in seconds, for the night shift.
Coneflower seed heads	American goldfinch	Leave the cones standing and goldfinches feed on them all winter.
Winterberry holly	Robins and bluebirds	More than 40 bird species eat the red berries in late winter.
Black cherry	Eastern tiger swallowtail	Black cherry hosts over 400 caterpillar species, including the tiger swallowtail.
Red columbine	Returning hummingbirds	Columbine blooms in late April, timed to the hummingbirds' arrival.

Native plant	Who depends on it	Why
Mountain mint	Wasps, bees, and flies by the hundreds	The most-visited plant in Penn State's 2012 to 2014 pollinator trial.
Serviceberry	Cedar waxwings	Waxwings strip a serviceberry of June fruit in days.
Wild bergamot	Dufourea monardae	A specialist bee that collects only Monarda pollen.
New England aster	Last bumble bee queens	October asters feed the queens that will found next year's colonies.
Buttonbush	Swallowtails and wood ducks	Butterflies mob the flower balls; ducks eat the seed balls.
Woodland sunflower	Silvery checkerspot	Sunflowers host about 70 caterpillar species in the Northeast.
Eastern redbud	Leafcutter bees	They cut neat circles from redbud leaves to line their nests.

Bee, Fly, Wasp, or Moth?

Photos are drawn at random from these four groups. Use the tells to check answers.

Group	The tell
Bee	Bees have two pairs of wings, long elbowed antennae, and usually branched body hair that holds pollen. Eyes on the sides of the head.
Fly	Hover flies have one pair of wings, stubby antennae, and huge eyes that nearly meet on top of the head. They hover in place.
Wasp	Wasps are smooth and shiny with a pinched waist, long legs that dangle in flight, and little body hair.
Moth	Clearwing and hummingbird moths have feathery or clubbed antennae, a fuzzy fan tail, and hover with a long tongue like a hummingbird.

Simple Bloom Builder

Many gardens are correct. Check that every month from May through September has at least one plant in bloom, using no more than four plants. Teaching point: a gap month means hungry pollinators, so a good garden plans for the whole season, not just the prettiest month.

Bird ID Near You

Built live from birds reported near the zip code this month, so there is no fixed key. The game shows each answer. Teaching point: the birds outside your school change with the seasons, and real people's observations show it.

Name That Song (extension)

Random recordings, so no fixed key. Teaching point: listen for pitch, speed, and repeated phrases; many birds are easier to hear than to see.

Field Bingo at a planter (extension)

No answer key. Any square students can show, sketch, or describe counts.

Flashcards: monarch life cycle (extension)

The order and the months each stage is usually seen on Long Island.

Monarch butterfly

1. Eggs (Jun, Jul, Aug)
2. Caterpillars (Jun, Jul, Aug, Sep)
3. Chrysalises (Jul, Aug, Sep)
4. Adults (Jun, Jul, Aug, Sep, Oct)

LESSON PLAN PACKET

Grades 6 to 12

Grades 6 to 12, ages 11 to 18

Ages 11 to 18. Real data, cause and effect, and argument from evidence.

> **Big idea:** Ecosystems are networks. Removing or adding one species changes others several steps away, and the data to see it is public.

This packet holds a 45-minute lesson, a reproducible student handout, and answer keys. It is built from the same data as the free games and tools on pollinatehappiness.com, a student-led project on Long Island where brothers Aidan and Ben Ellis have installed five native pollinator planters.

Lesson at a glance (45 minutes)

Time	Activity	What students do
0-3 min	**Warm-up question**	Write for one minute: can planting a shrub raise Lyme disease cases? Share one prediction.
3-18 min	**Cascade Stories**	Play one Cascade Story as a class. At each decision, discuss in pairs, vote, then read the feedback. Record the chain of effects.
18-30 min	**Investigate with the tools**	In small groups, use one tool for the school's zip code. Write a claim with at least two numbers as evidence.
30-37 min	**Who Got Here First? and Origin Stories**	Order invasive species by arrival year. Note which were introduced on purpose and why.
37-42 min	**Myth or Fact, Over/Under**	Play a quick round of Myth or Fact or Over/Under and read the source on any answer you missed.
42-45 min	**Exit ticket**	Answer the three exit-ticket questions on the handout.

Extensions (another day, or early finishers)

- **Project brief: design a planting:** Use the full Bloom Builder, the Native Plant Finder for the school's zip, and the planter bench guide to propose a real installation. Our own project started this way.
- **Project brief: fund it:** The student-funding guide covers youth grants, Eagle and Gold Award projects, and how to pitch a host site.

Learning objectives

By the end of the lesson, students will be able to:

1. Trace a cause-and-effect chain of at least three links from one introduced species to an effect elsewhere in the ecosystem.
2. Use community-science data from a site tool to make a claim about the school's zip code, support it with at least two numbers, and name one limitation of the data.

3. Explain, using at least two historical examples, why many invasive plants were introduced on purpose, and name a native alternative to one of them.

Materials and prep

Materials

- One device per student or per group of three, with internet access.
- Projector for the class Cascade Story.
- Student handout from this packet, one per student.
- Optional for the project briefs: the planter bench guide, the student-funding guide, and graph paper.

Before class

- Read the Cascade Story you plan to use and decide where to pause. The barberry story is the most local for Long Island.
- Run the Monarch Tracker, Garden Calendar, and Invasive Species tools for the school's zip code the day before, so you can spot surprising results.
- Remind students that tool results come from public observations and change daily. Have them note the date and radius they used.
- Print the handout and the answer keys in this packet.

Online activities (free, no sign-up)

- **Cascade Stories:** https://www.pollinatehappiness.com/games/cascade
- **Investigate with the tools:** https://www.pollinatehappiness.com/tools
- **Who Got Here First? and Origin Stories:** https://www.pollinatehappiness.com/games/timeline
- **Myth or Fact, Over/Under:** https://www.pollinatehappiness.com/games/myth-or-fact
- **Project brief: design a planting:** https://www.pollinatehappiness.com/guides/how-to-build-a-native-pollinator-planter-bench
- **Project brief: fund it:** https://www.pollinatehappiness.com/guides/how-students-can-fund-a-community-environmental-project
- **Answer keys (myths, timeline, pairs) (printable):** https://www.pollinatehappiness.com/educators/answer-keys
- **Invasive species library (printable):** https://www.pollinatehappiness.com/invasives
- **Native plant library (printable):** https://www.pollinatehappiness.com/natives

Vocabulary

Word	Meaning
Native species	A species that occurred in a region before European colonization, without human introduction.
Introduced species	A species moved by people, on purpose or by accident, to a region outside its native range.
Invasive species	An introduced species that spreads and causes harm to ecosystems, the economy, or human health.

Word	Meaning
Pollinator	An animal that moves pollen between flowers, allowing plants to reproduce.
Host plant	A plant that a particular insect's larvae must eat to develop. Specialists, like the monarch on milkweed, have very few.
Habitat	The area and conditions where an organism finds food, shelter, and space to reproduce.
Ecosystem	A community of living things interacting with each other and with their physical environment.
Trophic cascade	A chain of effects that moves through a food web when one species is added, removed, or changes in number.
Biodiversity	The variety of life in an area, from genes to species to ecosystems.
Research-grade observation	An iNaturalist record with a photo or sound, a date, a location, and a species ID agreed on by the community.

Discussion questions

Each question is followed by what a strong answer sounds like.

1. **In the barberry story, list every link between the shrub and a Lyme case.**
   Strong answer: Birds spread berries into woods; deer avoid barberry so it forms thickets; thickets stay humid; ticks survive and mice nest there; more infected ticks contact people.
2. **Why does an insect that is harmless in its native range become a serious pest here?**
   Strong answer: Its natural predators, parasites, and diseases did not come with it, and local trees did not evolve defenses against it.
3. **Your tool result shows fewer monarch reports this year than last. What are two possible explanations, and how could you tell them apart?**
   Strong answer: A real decline, or fewer people observing. Compare with other species' report counts or with longer-term data before drawing a conclusion.
4. **Why would invasive species reported within 10 km differ from those within 50 km?**
   Strong answer: A larger area includes more habitat types and more observers, and some invaders are still spreading, so they appear at the edges first.
5. **Most invasive plants on the timeline were planted on purpose. What did people believe at the time?**
   Strong answer: That they were attractive, useful for erosion control, hedges, or wildlife food. Gives at least one real example, like barberry or multiflora rose.
6. **Pick a myth you or a classmate believed. What evidence changed your mind?**
   Strong answer: States the myth, the correction, and the source cited in the game, such as ragweed rather than goldenrod causing hay fever.
7. **If the school planted a pollinator garden, what data would you collect to show it worked?**
   Strong answer: Before-and-after counts of pollinator visits, iNaturalist observations at the site, bloom months covered, and a plan for repeat measurements.

8. **Who should pay to control an invasive species: the seller, the landowner, or the public? Argue one side.**
   Strong answer: Takes a position and supports it with evidence about costs, who benefits, and who caused the spread.

Standards touchpoints

- NGSS MS-LS2-1, MS-LS2-2, MS-LS2-4, MS-LS2-5 (interdependence, ecosystem dynamics, biodiversity)
- NGSS MS-ESS3-3 (human impacts on the environment)
- NGSS HS-LS2-6, HS-LS2-7 (ecosystem stability and change; solutions to human impact)
- NGSS HS-LS4-5, HS-LS4-6 (environmental change and biodiversity)

Informal mapping to the Next Generation Science Standards; not a formal alignment. New York State's P-12 Science Learning Standards are built on the same framework; check your district's curriculum for exact codes.

STUDENT HANDOUT | free to copy

Following the Chain

Name _____ **Date** _____

Use the Cascade Story and one data tool. Write in complete sentences and cite numbers where you can.

1. Draw the cause-and-effect chain from the Cascade Story as boxes and arrows. Include at least four links.

2. Tool used, zip code, radius, and date:

3. Claim: what does the data show? Evidence: give at least two numbers. Limitation: what could make the data misleading?

4. Name one invasive species that was introduced on purpose. Why was it brought here, and what native plant could replace it?

EXIT TICKET

Define trophic cascade in your own words.

Give one reason community-science data might undercount a species.

Which myth or fact surprised you most, and why?

Answer keys

Games that draw random questions list the full pool they draw from. Games built live from local data or random recordings have no fixed key, so the teaching point is given instead. A printable set of all keys is at https://www.pollinatehappiness.com/educators/answer-keys.

Cascade Stories

Each decision has one choice the game marks as the wise answer. The wise answer is listed for every question.

The Hedge and the Tick

1. **What happens to the barberry's berries over the next few winters?**
   Wise answer: Birds eat them and drop seeds in the woods next door. Within a decade there are barberry seedlings scattered through the understory, and the deer that browse everything else leave them alone.
2. **What does a dense, humid barberry thicket do to the ground beneath it?**
   Wise answer: It shades the soil and keeps it moist, creating a humid microclimate. Barberry leafs out early and grows dense. The air under it stays humid, which matters to the next character in this story.
3. **What did researchers in Connecticut find when they compared barberry thickets with native shrub areas?**
   Wise answer: Several times more Lyme-infected ticks in the barberry. Humid thickets keep ticks alive; mice thrive in the cover; more ticks feed on more mice; more ticks end up infected.
4. **Which action reduces tick risk the most?**
   Wise answer: Remove the barberry and replant native shrubs like blueberry, bayberry, and winterberry. The same Connecticut studies found that clearing barberry cut tick numbers by more than half within a year. Native shrubs are open and drier underneath, and they feed birds and insects too.
5. **What comes back first, and why does it matter?**
   Wise answer: Native wildflowers and shrub seedlings the deer had suppressed, if deer are managed too. Barberry removal works best alongside deer management and replanting. Otherwise deer eat the recovery and the barberry seed bank returns.

The Beetle and the Trout Stream

1. **Why does a beetle that is harmless in Asia become a killer here?**
   Wise answer: Asian ash trees evolved with it and have chemical defenses; North American ash did not. Our ash trees never met this beetle, so they have no defense, and the beetle's natural enemies stayed behind in Asia.
2. **How does the larva kill the tree?**
   Wise answer: It tunnels S-shaped galleries under the bark, cutting the pipes that carry water and sugar. The tree starves from the top down. Woodpeckers strip the bark hunting larvae, the crown thins, and in two to four years the ash is dead.
3. **What happens to the stream?**
   Wise answer: It warms by several degrees in summer. Shade is temperature control. A few degrees is the difference between water brook trout can breathe in and water they cannot.
4. **What else did the ash provide besides shade?**
   Wise answer: Leaves that fed stream insects, and dozens of insect species that live only on ash. Ash leaf litter breaks down quickly and feeds the aquatic insects trout eat. And about 40 insect species in the Northeast eat nothing but ash; they go extinct locally with the trees.
5. **Which choice keeps the stream cold?**
   Wise answer: Have an arborist treat it with a trunk injection every two to three years, and plant other native shade trees beside it now. Treatment protects a healthy ash for as long as the beetle pressure lasts, and the young oaks

and sycamores will be ready to take over the shade.

The Garden That Stopped the Migration

1. **What is it?**
   Wise answer: Tropical milkweed, a non-native annual.It is easy to grow and monarchs will lay eggs on it, which is exactly why it is popular and exactly why it is a problem.
2. **What does fresh milkweed in late September signal to a monarch?**
   Wise answer: Keep breeding here instead of migrating. Some of the last generation break diapause and lay eggs instead of storing fat for Mexico. Those late caterpillars rarely survive, and the adults miss the window to leave.
3. **Why does native milkweed limit OE while tropical milkweed concentrates it?**
   Wise answer: Native milkweed dies back every year, which clears the spores; tropical milkweed keeps the same leaves for months, so spores pile up. Every extra generation breeding on the same leaves raises the spore load. Monarchs on year-round tropical milkweed in the South carry OE at several times the rate of migrants.
4. **What should the family do this week?**
   Wise answer: Cut the tropical milkweed to the ground now, and plant native milkweed for next year.Cutting it removes the false signal and the spore load. Common, swamp, and butterfly milkweed go dormant on schedule and host monarchs just as well.
5. **What does the fall garden do now?**
   Wise answer: Feeds the migrants on their way to Mexico, then goes dormant and lets them leave.That is a garden working with the migration instead of against it.

Investigate with the tools

Results are live and change daily, so there is no fixed key. Look for claims backed by specific numbers, a stated date and radius, and at least one limitation (observer effort, season, radius, misidentification).

Who Got Here First?

Arrival order with the year and how each species arrived. Origin Stories draws random trivia from the species profiles, so it has no fixed key; the game cites the profile after each answer.

Year	Species	How it arrived
1756	Norway maple	Sold by John Bartram in Philadelphia
1784	Tree-of-heaven	Planted in Philadelphia as a shade tree
1806	Japanese honeysuckle	Introduced through a Long Island nursery
1810	Purple loosestrife	Arrived in ship ballast on the Northeast coast
1816	Chinese and Japanese wisteria	Imported for porch arbors
1830	Autumn olive	Introduced as an ornamental
1860	Oriental bittersweet	Imported for autumn decorations
1866	Multiflora rose	Imported as rose rootstock
1867	Japanese knotweed	Growing in American gardens, one plant sent straight from Japan
1868	Garlic mustard	First recorded on Long Island as a potherb
1869	Spongy moth (formerly gypsy moth)	Escapes from a silk breeder's window in Massachusetts

Year	Species	How it arrived
1870	Porcelain berry	Planted for its speckled berries
1875	Japanese barberry	Seeds arrive at the Arnold Arboretum
1876	Kudzu	Shown at the Philadelphia Centennial Exposition
1908	Callery (Bradford) pear	Grown from Chinese seed at the Arnold Arboretum
1919	Japanese stiltgrass	Spills from porcelain packing crates in Tennessee
1930	Mile-a-minute weed	Arrives in a holly seed shipment to Pennsylvania
1951	Hemlock woolly adelgid	Found in Virginia on imported hemlocks
1996	Asian longhorned beetle	Discovered in Brooklyn maples
1998	Brown marmorated stink bug	Collected in Allentown, Pennsylvania
2002	Emerald ash borer	Found killing ash near Detroit
2014	Spotted lanternfly	Hatches from stone shipment in Berks County

Myth or Fact

The game draws fifteen cards from this pool.

Statement	Answer	Why
Goldenrod causes fall hay fever.	**MYTH**	Goldenrod pollen is heavy and insect-carried. Ragweed, blooming unseen at the same time, is the culprit.
Butterfly bush is one of the best plants for butterflies.	**MYTH**	It feeds adults nectar but hosts no caterpillars, so it produces no butterflies. Sweet pepperbush and Joe Pye weed do both.
Tropical milkweed is fine to plant in New York because frost kills it.	**MYTH**	It stays green into fall and can delay monarch migration and concentrate the OE parasite. Plant common, swamp, or butterfly milkweed instead.
Most native bees do not live in hives.	**FACT**	About 70 percent nest alone in the ground and most of the rest in hollow stems. Honey bees, the hive builders, are not native.
Cutting down a tree-of-heaven gets rid of it.	**MYTH**	Cutting triggers dozens of root suckers, and treating the stump does not kill the roots. The standing tree needs a systemic herbicide in mid to late summer, then cutting about a month later, then follow-up on sprouts.
Monarch caterpillars can only eat milkweed.	**FACT**	Milkweed is their sole host plant. No milkweed, no monarchs.
Spotted lanternflies can bite and sting.	**MYTH**	They are planthoppers with sucking mouthparts for plant sap. They cannot bite or sting people.
Leaving dead stems and leaves in the garden over winter helps pollinators.	**FACT**	Hollow stems house small bees, leaf litter shelters butterfly pupae, and seed heads feed goldfinches. Cut back in April.

Statement	Answer	Why
Japanese barberry thickets hold more Lyme-carrying ticks than native shrubs.	**FACT**	Studies in Connecticut found several times more infected ticks in barberry stands. Removing it is tick control.
Double-flowered coneflowers feed pollinators as well as the wild type.	**MYTH**	The extra petals usually replace the nectar-bearing disk florets. In Mt. Cuba Center's coneflower trial, doubles drew fewer pollinators than single-flowered types.
Earthworms are native to Long Island.	**MYTH**	Glaciers removed native earthworms; every worm here is introduced. The Asian jumping worm is the destructive one.
Oaks support more caterpillar species than any other North American plant.	**FACT**	Over 500 species in the Northeast, which is what feeds nesting songbirds.
Pheromone traps are a good way to control Japanese beetles.	**MYTH**	They attract more beetles than they catch. Knock beetles into soapy water instead.
Hummingbirds are the main pollinators of cardinal flower.	**FACT**	Bees cannot see red well; ruby-throated hummingbirds carry cardinal flower pollen on their foreheads.
You should collect milkweed seed from nature preserves to spread the plant.	**MYTH**	Never collect in preserves or parks. Collect from your own garden, or buy local-ecotype seed.
Violets in a lawn are a weed with no wildlife value.	**MYTH**	Violets are the only host plant for fritillary butterflies. Leave them.
The Asian longhorned beetle has been wiped out everywhere on Long Island.	**MYTH**	Not yet. Islip was declared free of it in 2011 and Brooklyn and Queens in 2019, but when USDA lifted 7.4 square miles of quarantine in July 2026, the other parts of Nassau and Suffolk stayed under quarantine. Keep reporting.
Bumble bees die in winter except the queens.	**FACT**	Only mated queens overwinter, in leaf litter and loose soil. Spring flowers like blueberry and redbud feed them when they emerge.
Milkweed sap is harmless to touch.	**MYTH**	The latex can irritate skin and is dangerous in the eyes. Wash your hands after handling.
Most invasive plants arrived by accident.	**MYTH**	Most were planted on purpose: as ornamentals, erosion control, hedges, or wildlife food. Tree-of-heaven, barberry, multiflora rose, and autumn olive were all promoted.

Over/Under

The answer is over if the real value is above the line.

Question	Real value	Line	Answer
Caterpillar species hosted by oaks in the Northeast	**534 species**	300	Over
Seeds one purple loosestrife plant can make in a year	**2,000,000 seeds**	500,000	Over
Milkweed floss collected by schoolchildren in WWII	**11,000,000 pounds**	5,000,000	Over
Year tree-of-heaven was introduced to Philadelphia	**1784**	1850	Under
Year spotted lanternfly was first found in the U.S.	**2014**	2010	Over

Question	Real value	Line	Answer
Trees removed in Brooklyn and Queens to eradicate the Asian longhorned beetle	**5,208 trees**	2,000	Over
Pollen grains one ragweed plant releases in a season	**1,000,000,000 grains**	100,000,000	Over
Insect species recorded visiting common milkweed flowers	**450 species**	200	Over
Wild bee species recorded in New York State (Cornell count, 2015)	**416 species**	250	Over
Caterpillars a chickadee pair needs to raise one brood	**7,500 caterpillars**	2,000	Over
Depth a kudzu root can reach	**12 feet**	6	Over
Distance a wild geranium flings its seeds	**30 feet**	10	Over
Seeds a single tree-of-heaven can produce in a year	**300,000 seeds**	50,000	Over
Year of the first commercial harvest of cultivated highbush blueberries	**1916**	1850	Over
Caterpillars in one spongy moth egg mass	**750 caterpillars**	200	Over
Average last spring frost in Syosset, NY (day of April)	**April 18**	10	Over
Years a Japanese knotweed rhizome fragment can regrow from	**20 years dormant**	5	Over
Monarch sightings reported within 25 km of Syosset in 2025	**164 sightings**	100	Over

Project briefs: design it and fund it (extensions)

No answer key. A strong proposal names a real site and host, lists native species with bloom months covering April through October, includes a milkweed, gives a budget, and names a funding source and a care plan.

LESSON PLAN PACKET

College and beyond

Undergraduates, master gardeners, land managers, and anyone planning a planting.

> **Big idea:** The primary data is open. Use it.

This packet holds a 45-minute lesson, a reproducible student handout, and answer keys. It is built from the same data as the free games and tools on pollinatehappiness.com, a student-led project on Long Island where brothers Aidan and Ben Ellis have installed five native pollinator planters.

Lesson at a glance (45 minutes)

Time	Activity	What students do
0-5 min	**Framing**	Name a planting decision you face. What evidence would change your mind?
5-15 min	**Species profiles with sources**	Read one invasive and one native profile. Trace a claim to its cited reference and judge its strength.
15-30 min	**Raw data endpoints**	Pull one JSON endpoint (a dataset or a zip-code query) into a spreadsheet or notebook. Summarize one pattern.
30-40 min	**Seed saving and propagation**	Use the Seed Saving Calendar for your zip code to compute a stratification start date for one species.
40-45 min	**Share-out**	Each person states one finding, its source, and the date retrieved.

Extensions (another day, or early finishers)

- **Replicate the project:** The planter bench guide has real costs, dimensions, and a care sheet.

Learning objectives

By the end of the lesson, students will be able to:

1. Trace at least one factual claim in a species profile to its cited source and assess the source's reliability.
2. Retrieve a JSON dataset or zip-code endpoint and summarize one pattern, citing the source, radius, and retrieval date.
3. Calculate a cold-stratification start date or winter-sowing window for a native species from local frost dates.

Materials and prep

Materials

- Laptops with a spreadsheet program or a notebook environment (Python, R, or similar).
- The handout from this packet for notes.

- Optional: the planter bench guide for anyone planning a build.

Before class

- Confirm the JSON endpoints load on your network (for example, /api/data/natives).
- Choose a zip code for the group, or let each participant use their own.
- Decide whether participants will cite in APA or another style; the closing page gives a suggested citation.

Online activities (free, no sign-up)

- **Species profiles with sources:** https://www.pollinatehappiness.com/invasives
- **Raw data endpoints:** https://www.pollinatehappiness.com/educators#data
- **Seed saving and propagation:** https://www.pollinatehappiness.com/tools/seed-saving
- **Replicate the project:** https://www.pollinatehappiness.com/guides/how-to-build-a-native-pollinator-planter-bench
- **How to cite this site (printable):** https://www.pollinatehappiness.com/educators#cite

Vocabulary

Word	Meaning
Native species	A species present in a region before European colonization, without human introduction. Our planters favor straight species (wild types) over cultivars, with a few compact selections and, at the sensory and school planters, some non-invasive ornamentals.
Invasive species	An introduced species that spreads and causes ecological, economic, or health harm. New York maintains prohibited and regulated lists.
Cultivar	A plant variety selected and propagated for traits such as color or form. Some cultivars, like double-flowered coneflowers, offer less to pollinators.
Ecotype	A population adapted to local conditions. Local-ecotype seed is preferred for restoration.
Host plant	A plant on which a particular insect's larvae can develop.
Keystone plant	A plant genus that supports a disproportionate share of local caterpillar species, such as oaks, cherries, and goldenrods.
Cold stratification	A period of cold, moist conditions that some seeds need before they will germinate.
Research-grade observation	An iNaturalist record with media, a date, a location, and a community-agreed species ID.

Discussion questions

Each question is followed by what a strong answer sounds like.

1. **Which profile claim was hardest to verify, and why?**
   Strong answer: Names the claim, the reference, and whether the source is primary research, an agency, or secondary.

2. **What biases are built into community-science observation data?**
   Strong answer: Observer effort, accessibility, charismatic species, season, and identification difficulty all skew counts.
3. **How would you test whether a new planting increased pollinator visits?**
   Strong answer: Baseline counts, a comparison site, standardized timed observations, and repeat sampling across seasons.
4. **When is a cultivar acceptable in a pollinator planting?**
   Strong answer: When it keeps the flower structure and color pollinators use; avoid doubled flowers and altered leaf color in host plants.
5. **What would it take to replicate one of these installations in your community?**
   Strong answer: A host site, a funding source, a care plan, and a plant list matched to site conditions, as in the bench guide.
6. **How should frost-date estimates be used in planning?**
   Strong answer: As averages with uncertainty; plan with a margin and watch the forecast and soil temperature.

Standards touchpoints

This band is not mapped to K-12 standards. It suits college courses, master gardener training, and community workshops.

STUDENT HANDOUT | free to copy

Working with the Open Data

Name _____ **Date** _____

Notes for this session. Cite everything you use.

1. Profile read, claim checked, cited source, and your assessment of its strength:

2. Endpoint used (full URL), date retrieved, and the pattern you found:

3. Sketch a chart of your pattern.

4. Species, zip code, frost date, stratification days, and your computed start date:

EXIT TICKET

One finding and its source:

One limitation of the data you used:

One thing you will do differently in your own planting:

Answer keys

Games that draw random questions list the full pool they draw from. Games built live from local data or random recordings have no fixed key, so the teaching point is given instead. A printable set of all keys is at https://www.pollinatehappiness.com/educators/answer-keys.

No game answer keys

This band's sequence is open-ended research, so there are no game keys. For a quick field-identification check, the native and invasive lookalike tells from Spot the Lookalike follow.

Spot the Lookalike: the tell

Invasive species first, native lookalike second.

Invasive	Native lookalike	The tell
Tree-of-heaven	Staghorn sumac	Sumac leaflets are toothed all along the edge and the twigs are fuzzy; tree-of-heaven leaflets are smooth with a notch at the base and smell like rancid peanut butter.
Oriental bittersweet	American bittersweet	American bittersweet fruits only at the branch tips; the invader has fruit strung along the stem at every leaf.
Black swallow-wort	Common milkweed	Milkweed stands upright with thick leaves and big flower clusters; swallow-wort twines, with small glossy leaves and tiny dark flowers.
Purple loosestrife	Blue vervain	Vervain flowers are tiny, violet-blue, and open in a ring moving up the spike; loosestrife spikes are solid magenta.
Porcelain berry	Virginia creeper	Virginia creeper has five leaflets; porcelain berry has single grape-like leaves and speckled turquoise berries.
Japanese honeysuckle	Trumpet honeysuckle	The native has red tubular flowers and the top leaves fused around the stem; the invader has white-to-yellow paired flowers and black berries.
Multiflora rose	Virginia rose	Native roses have pink flowers and straight thorns; multiflora rose has clusters of small white flowers, hooked thorns, and fringed stipules.
Norway maple	Sugar maple	Snap a leaf stem: Norway maple bleeds milky sap, sugar maple runs clear. Norway maple's fall color is a late plain yellow.
Callery (Bradford) pear	Serviceberry	Serviceberry petals are narrow straps, the twigs have no thorns, and the June berries are dark purple; Callery pear petals are rounder, wild pears often have thorny spur shoots, and the fruit is small, hard, and brown. Scent varies: serviceberry can be lightly fragrant, while pear usually smells unpleasant.
Autumn olive	Northern bayberry	Bayberry leaves are aromatic and not silvery beneath; autumn olive leaves are silver-scaled underneath with silver-flecked red fruit.
Bush honeysuckles	Spicebush	Spicebush twigs are solid and smell of allspice when scratched; bush honeysuckle twigs are hollow and odorless.
Yellow flag iris	Northern blue flag	Blue flag is violet-blue; yellow flag is the only tall yellow iris in New York wetlands.

Invasive	Native lookalike	The tell
Lesser celandine	Marsh marigold	Marsh marigold has five to nine broad, petal-like yellow sepals (it has no true petals) and grows in wet ground; lesser celandine has eight or more narrow petals and invades lawns.
Asian longhorned beetle	Whitespotted sawyer	The native sawyer is bronzy with a single white spot at the top of the wing covers; the invader is glossy black with many white spots and banded antennae.
Emerald ash borer	Six-spotted tiger beetle	The tiger beetle is larger, runs on bare ground, and has white spots; emerald ash borer is a slender bullet found on ash.
Spongy moth (formerly gypsy moth)	Eastern tent caterpillar	Tent caterpillars have a white stripe down the back and build silk tents; spongy moth caterpillars have blue and red dots and no tents.
Common reed (non-native Phragmites)	Saltmeadow cordgrass	Cordgrass is knee-high and forms cowlicked meadows; invasive Phragmites is a 15-foot reed with plumes.
Chinese silver grass (Miscanthus)	Switchgrass	Miscanthus leaves have a white midrib stripe and silvery plumes; switchgrass has no stripe and airy golden seed heads.

Visit a real planter

Pollinate Happiness has five native pollinator planters on Long Island. Most of each planting is native perennials; the art museum's sensory planter and the high school planter also include some non-invasive ornamentals. All are at public or publicly accessible sites; check each site's hours before a visit. Bloom usually peaks July through September.

Wawapek Preserve

Cold Spring Harbor, NY 11724 | Suffolk County

Installed June 2021. Host: North Shore Land Alliance. Wawapek Preserve is open to the public from dawn to dusk. Park in the small lot off Shore Road and follow the meadow trail.

Field-trip sheet: https://www.pollinatehappiness.com/installations/wawapek/field-trip

Hicksville Public Library

169 Jerusalem Avenue, Hicksville, NY 11801 | Nassau County

Installed October 4, 2023. Host: Hicksville Public Library. The planter is in the front garden facing Jerusalem Avenue and can be seen any time the grounds are open.

Field-trip sheet: https://www.pollinatehappiness.com/installations/hicksville-library/field-trip

Theodore Roosevelt Sanctuary & Audubon Center

134 Cove Road, Oyster Bay, NY 11771 | Nassau County

Installed November 23, 2024. Host: Audubon New York. The sanctuary grounds and trails are open daily; the center building has posted hours.

Field-trip sheet:
https://www.pollinatehappiness.com/installations/theodore-roosevelt-sanctuary-audubon-center/field-trip

Nassau County Museum of Art

1 Museum Drive, Roslyn Harbor, NY 11576 | Nassau County

Installed Fall 2025. Host: Nassau County Museum of Art. The sensory planter is on the patio near the Manes Center; the nest boxes are along the meadow edge of the William Cullen Bryant Preserve.

Field-trip sheet: https://www.pollinatehappiness.com/installations/nassau-county-museum-of-art/field-trip

Syosset High School *(newest)*

70 South Woods Road, Syosset, NY 11791 | Nassau County

Installed September 28, 2026. Host: Syosset High School Environmental Club. The planter is at the front of the school beside the red Syosset High School sign on South Woods Road, visible from the sidewalk without entering the campus.

Field-trip sheet: https://www.pollinatehappiness.com/installations/syosset-high-school/field-trip

> **Field-trip sheets:** Each planter has a printable field-trip sheet at pollinatehappiness.com/installations/<slug>/field-trip with the address and host, what is planted, a look-for checklist that changes with the month, a five-question student worksheet, and a QR code back to the planter page.

Credit and sharing

You may copy and share this packet for classroom use. If you adapt it, please keep the credit line below.

How to cite

> Ellis, A., & Ellis, B. (2026). *Pollinate Happiness: native pollinator planters and tools for Long Island*. Retrieved from https://www.pollinatehappiness.com

For a specific species profile, add the page title and URL. For tool results, add the zip code, radius, and the date you retrieved them, since they change daily. Underlying observations should be credited to iNaturalist and its contributors; weather data to Open-Meteo.

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About Pollinate Happiness

Pollinate Happiness is a student-led project founded in 2021 by brothers Aidan and Ben Ellis, who started it in 5th and 6th grade. They have installed five native pollinator planters on Long Island and built free games and zip-code tools from public data so any class can use them.

Questions, corrections, or a request for a grade-specific version:
https://www.pollinatehappiness.com/contact

All activities by grade band: https://www.pollinatehappiness.com/educators