



NATURE'S PARTNERS

A COMPREHENSIVE POLLINATOR CURRICULUM FOR
GRADES 3-6 OFFERED BY

**POLLINATOR
PARTNERSHIP**

EDUCATOR'S CURRICULUM GUIDE OFFERED BY

**THE BEE CAUSE &
WHOLE KIDS FOUNDATION**





WELCOME LETTER FROM THE BEE CAUSE

Pollinator Partnership's mission is to promote the health of pollinators, critical to food and ecosystems, through research, conservation, and education. Along with numerous awards and publications, Pollinator Partnership is responsible for initiating National Pollinator Week. A designated week in June, National Pollinator Week is more than a celebration of the importance of bats, beetles, butterflies, and bees, it is a call to action for declining pollinator populations on a global scale. Pollinator Partnership are actively funding research grants globally and impacting millions of acres of agricultural landscape for the benefit of pollinators -- pollinators who are responsible for one out of every three bites of food humans eat!

Pollinator Partnership is committed to providing extensive and valuable resources for educators on their website. One of the most notable resources is the complete curriculum offering, **Nature's Partners**, a free, downloadable document found on their website. Whether you are a classroom teacher or a homeschooling parent, this full-scope curriculum gives you the tools to get students excited about All Things Pollinator. This curriculum features:

- Six Modules -- including background information, multiple activities, reproducible materials, and going further opportunities
- Organized, sequential lessons that can be completed in order or taken out of the unit of study to meet the specific needs of a class
- Pre and post assessment activities
- Stimulating discussion topics and open discussion opportunities
- Pollination simulation labs and other engaging labs for hands-on learning experiences
- Specific lessons to learn the anatomy of pollinators and anatomy of flowers as well as their special relationship
- Emphasis on the Scientific Thinking Processes

- Opportunities for students to observe, collect, and record data like true scientists
- STEM concepts for students to design and build their pollinators and flowers
- Beautiful, full-color printable photos and posters
- Who Am I? Pollinator Game to introduce students to many types of pollinators and their interesting characteristics

The Bee Cause Project, a non-profit organization dedicated to All Things Bees, has a similar mission; to promote protection, conservation, and education for our most important pollinator, the honey bee! To build a future for the next generation, a sturdy foundation of pollinator curriculum must come first. Our bee-based curriculum, educational observation hives, and international network build learning opportunities in classrooms and communities to inspire the next generation of environmental stewards.

As part of our continued commitment to education, the team at The Bee Cause Project has created this companion document, Educator's Curriculum Guide, to supplement the Nature's Partners curriculum. Our **Tips from the Hive** are designed to add layers of concept extensions, optional digital methods of delivering content, and support to educators that are either brand new or experienced environmental educators. The **Buzz Worthy Resource Materials** are video links, notable articles, and more printable resources, while the **Bee Cause Book Club** highlights recommended readings for students of all ages. Several titles have quality read-aloud links as well.

- The Educator's Curriculum Guide features:
 - Pre and post assessments 10 question quiz
 - KWL Chart
 - Standards mapping for Next Generation Science Standards
 - Support documents and video links for starting a successful service learning project
 - Extensions of concepts that can be added to the original lesson plans
 - Suggestions on delivering lessons digitally
 - Suggested apps for plant and flower identification for school or virtual classroom use
 - Thinking maps to help students sort and categorize new information
 - Video links with specific topic tie-ins to encourage student excitement or to build on curriculum concepts
 - Video links as alternatives to field trips for remote learning

- Arts and crafts extensions for students to design and construct
- Suggestions for ways to get students outside, learning with purpose in nature
- Read aloud suggestions
- A secondary method of gameplay for Who Am I? Pollinator Game, with full-color photos to go with game cards
- An interactive Jeopardy Game
- Bee Cause Resource Roundup for links to national and local state agencies for teacher support

INSTRUCTIONS FOR HOW TO USE THIS GUIDE: TEACHER TO TEACHER

All organized classroom or homeschool teachers begin with the primary source, in this case, [Nature's Partners](#). This document should be downloaded and printed from the Pollinator Partnership website at [Pollinator.org](#).

The **Educator's Curriculum Guide** should also be printed and can be interchanged with the Outline: Table of Contents from the primary source. This document will follow the Outline: Table of Contents with **Tips from the Hive, Buzz Worthy Resource Materials**, and **Bee Cause Book Club** woven in at the appropriate stages for use. Refer back to this document throughout instructions to optimize the many features created and curated by the Bee Cause Project.

Special thanks to our friends at Pollinator Partnership for creating and sharing this dynamic and valuable resource with us, with educators, and most importantly of all, with the kids!

TABLE OF CONTENTS

SECTIONS	Page No.
Pre and Post-Assessment	7
Getting Started with Nature’s Partners and The Bee Cause	10
<ul style="list-style-type: none"> • Why Care About Pollinators? • Scientific Thinking Processes • Implementing the Curriculum • Assessment 	
Module 1: The Who, What & Why of Pollinators	12
<ul style="list-style-type: none"> • Pre-assessment Activity: What kids know and think right now about plants and flowers and the animals and insects around • Activity A: Discovering the Partnership between Plants and Insects • Activity B: Why Pollination and How it Works • Activity C: Without Pollinators: What We Would Do “Without” 	
Module 2: Pollinators and Plants in Partnership	17
<ul style="list-style-type: none"> • Activity A: Understanding Flower Structure & Plant Reproduction • Activity B: Designing a Flower • Activity C: Creating a Reference Catalog of Flowers: Identifying and Preserving Flowers • Activity D: A Rainbow of Choices: How Flowers Use Color to Attract Pollinators 	
Module 3: The Other Half of the Partnership: Pollinators	22
<ul style="list-style-type: none"> • Activity A: The Anatomy of Bees, Butterflies, & Moths • Activity B: Designing a Pollinator • Activity C: Pollinator Real Estate • Activity D: Look Who’s In the Neighborhood! 	
Module 4: Pollinator-Friendly Habitat in Your Area	27
<ul style="list-style-type: none"> • Activity A: “Who Am I” Game: Reviewing Characteristics of Bees & Butterflies • Activity B: Native Pollinators and Their Habitat: A Guided Field Trip 	

TABLE OF CONTENTS

SECTIONS	Page No.
Module 5: Creating Pollinator-Friendly Habitat	30
<ul style="list-style-type: none">• Activity A: Welcome Home: Plants & Landscaping for Pollinators• Activity B: Is Your Neighborhood Pollinator-Friendly?	
Module 6: Community Service Project and Celebration	33
<ul style="list-style-type: none">• A: Planning a Community Service Project	
Next Generation Science Standards Mapping	35
Resource Roundups	36
Who Am I? Game Supplemental Card Work	37



PRE/POST ASSESSMENT

1. Circle all of the animals below that ARE pollinators:

A.



B.



C.



D.



E.



F.



2. Pollination is when

- A. Animals sip the nectar out of a plant for food and energy
- B. You can see yellow pollen on a flower
- C. Animals spread pollen from one plant to another
- D. Animals eat pollen

3. True or False: Pollinators only visit flowers to see the pretty colors and to smell the fragrance.

- A. True
- B. False

4. True or False: Without pollinators, we would not have foods like watermelons, cherries, strawberries, pumpkins, coffee, and even chocolate!

A. True

B. False

5. True or False: Pollinators will drink colored sugar water for energy.

A. True

B. False

6. Circle all of the parts below that are on a flower:

A. Petal

B. Stamen

C. Antennae

D. Pistil

E. Ovary

F. Stinger

7. Butterflies are different from moths because they

A. Have wings, legs, and antennae

B. Fly only during the day when it is warm

C. Are pollinators

D. Drink nectar using a proboscis

8. True or False: All bees live in a beehive and make honey.

A. True

B. False

9. True or False: Pollinators can also be carnivorous and eat other insects

A. True

B. False

10. What are some ways that humans can help pollinators?

A. Planting native flowers in our communities

B. Building “pollinator condos” for native bees.

C. Promoting pesticide-free zones on our school campus or own backyard

D. All of the above

PRE/POST ASSESMENT ANSWER KEY FOR TEACHER

1. B., C., E., F.
2. C.
3. False
4. True
5. True
6. A., B., D., E,
7. B.
8. False
9. True
10. All of the above

Getting Started with Nature's Partners and The Bee Cause



WHY CARE ABOUT POLLINATORS?

Tips from the Hive: Before the students can begin buzzing with excitement about pollinators, the educator needs to be inspired. The world of pollinators is fascinating and can easily be accessed on the playground, school campus, or in a student's backyard. This curriculum provides purposeful, compelling, and well-researched background information for each module ensuring that the teacher is well prepared to educate. The educator should consider the following resources to entice the mind to grow in preparation for pollinator education.

BUZZ WORTHY RESOURCE MATERIALS

- [The Critical Importance of Pollinators](#) - video
- [The First 21 Days of a Bees Life](#) - video
- [This Vibrating Bumblebee Unlocks A Flowers Hidden Treasure](#) - video
- [I Speak for the Bees](#) - video
- [Pollinator Partnership](#) - website
- [Pollinator Partnership: Exploring the World of Pollinators](#) - webinar
- [Monarch Biology and Ecology](#) - webinar

SCIENTIFIC THINKING PROCESSES

Tips from the Hive: The Scientific Thinking Process can be challenging to teach, as most elementary educators are whole curriculum specialists rather than science specialists. The curriculum guides the educator with discussion questions, reflection/review guidance, as well as Going Further opportunities to lead students successfully through the scientific thinking processes. The following links give the educator further reading and support for setting the groundwork for the scientific thinking process.

BUZZ WORTHY RESOURCE MATERIALS

- [4H Stem and Agriculture](#) - website
- [Scientific Thinking Step By Step](#) - article
- [Tips for Nurturing a Child's Love of Science](#) - article

IMPLEMENTING THE CURRICULUM

Tips from the Hive: A service-learning project is a wonderful way for students to support the community, but it can be overwhelming to know where to begin. The resource from Project Learning Tree will help any educator get started with Six Steps to Successful Service Learning. Consult the **Resource Roundup**, located at the end of this document, for national and local chapters of state government agencies for ideas and support. Also, other schools in the district or in your area may be participating in successful Service Learning Projects that the students could join until there is a clearer plan for creating a specific project.

BUZZ WORTHY RESOURCE MATERIALS

- [Project Learning Tree - Six Steps for Successful Service Learning](#) - website
- [Pollinator Field Journal](#) - recommended for purchase for your students to support this curriculum by Nature's Partners Curriculum

ASSESSMENT

Tips from the Hive: Nature's Partners states a clear goal to change the knowledge, attitudes, and behavior of the students who complete any or all of these lessons. To have measurable data for these goals, Nature's Partners provides pre-assessment and post-assessment suggestions. In addition to these, a KWL chart can be used to guide a group discussion as a pre and post-assessment tool for the teacher to organize previous knowledge and knowledge gained. The provided KWL chart can be used digitally through screen sharing, allowing students to chime in with their thoughts and ideas.

A pre and post-assessment quiz has been provided as well for further documentation and information gathering for the educator. This can also be sent to students through a digital platform for completion.

Nature's Partners provides open discussion topics as part of the post-assessment. Teaching Channel has free accounts for educators and videos demonstrating how to have successful scientific discussions with students. Science Talk Management is another great resource to support the educator throughout the entire curriculum.

BUZZ WORTHY RESOURCE MATERIALS

- KWL Chart - reproducible
- Pre - Post Assessment - reproducible
- [Teaching Channel](#) - video, PDFs, articles
- [Science Talk Management](#) - video, articles



MODULE 1

THE WHO, WHAT & WHY OF POLLINATORS

Pre-assessment Activity: What kids know and think right now about plants and flowers and the animals and insects around them.

TIPS FROM THE HIVE:

As part of the action steps, the educator should bring parts from local trees and plants that are easily accessible like pine cones, pine needles, oak leaves, holly leaves, acorns, flowers, and/or fruit to encourage conversation about types of plants students already know. Source these items from areas students visit like the playground, the front entrance of the school, edge of the soccer field, or a local park in your community. If a class is participating digitally, the educator can ask the students to bring a plant leaf or part from their backyard to a digital meeting for further discussion.



BUZZ WORTHY RESOURCE MATERIALS :

- [LeafSnap](#) - app
- [Picture This](#) - app
- [Seek by iNaturalist](#) - app
- [Google Lens](#) - app
- [PlantNet](#) - app
- [Amazing Nature](#) - video
- [Watch Flowers Bloom Before Your Eyes](#) - video
- [The Beauty of Pollination](#) - video

BEE CAUSE BOOK CLUB:

- [The Reason for a Flower](#)
- by Ruth Heller - [Read Aloud](#)
- [Jack's Garden](#)
- by Henry Cole - [Read Aloud](#)
- [The Amazing Life Cycle of Plants](#) by Kay Barnham - [Read Aloud](#)
- [The Flower Alphabet Book](#)
- by Jerry Pallotta - [Read Aloud](#)

Students who are touching these natural items will be more engaged and connected to the natural world. The act of gathering these items gives the students further talking points: Was your plant part found on a tree or a bush? Did you need help reaching it because it was high up? Why does this part grow on the top, the bottom of that plant? Was your plant in a shady part of the yard or sunny?

An extension of this lesson could be a nature walk to gather other plant parts on a school campus or take a clipboard to write down plants that they see. The resources lists apps for leaf and plant identification for the educator or the students to use. Digital students could video themselves taking a walk and point out plants that they know along the way.

The educator can hook the students into the lesson with the video resources. The goal is to get the students thinking about their connection to their world and encourage a sense of wonder of nature. The two video resources for flowers can be used at action step two. The final video can be used near the conclusion of the lesson with action step six.

The Bee Cause Book Club are suggested titles to support this specific lesson or learning objectives. However, the titles can be used throughout the full curriculum at any time. The educator should work with the media specialist and/or families who are willing to donate book titles to provide a Pollinator Library in the classroom for the students. A link will be attached for titles that have a quality read-aloud available through YouTube.

ACTIVITY A

Discovering the Partnership between Plants and Insects

Estimated Time: 30-45 minutes



BUZZ WORTHY RESOURCE MATERIALS :

- [Bees and Flower Pollination Video](#)
- [Bees and Butterflies Pollinating Flowers Video](#)
- [Male Hummingbirds Compete for Flowers Video](#)
- [Flies As Carrot Pollinators Video](#)
- [Flies, the Often Overlooked Pollinator Video](#)
- [Benefits of Planting Flowers for Bees Video](#)
- [Imagine A World Without Bee and Other Pollinators Video](#)

BEE CAUSE BOOK CLUB:

- [Trees, Leaves, Flowers, and Seeds: A Visual Encyclopedia of the Plant Kingdom](#) by DK Smithsonian
- [Bees, Bugs, and Butterflies: A Family Guide to Our Garden Heroes and Helpers](#) by Ben Raskin
- [Kaia and the Bees](#) by Meribeth Boelts - [Read Aloud](#)

TIPS FROM THE HIVE:

The purpose of this lesson is to observe the relationship between many different types of pollinators and different types of host plants. If the educator is face to face with the class, option 1 is the most desirable way to accomplish this task, provided that the resources are available. However, some educators may not have the ability or resources to provide an outdoor field opportunity for their students. Some school campuses may not have a pollinator garden with flowering plants to host native pollinators at this point. The group of students who are completing this curriculum may be the group that establishes a pollinator space on campus for future classes.

The video links provided will give educators content for option 2, introducing students to the unique relationship between plants and pollinators. The Nature's Partners: Pollinators and Plants Observation Sheet offers spaces for observation of bees, butterflies, hummingbirds, flies, and others, all of which are represented in at least one of the videos. The educator who has chosen option 1 may also want to supplement the field observation with the video links to further the student's notes.

The videos and observation sheets can all be completed digitally by students as well. The educator could assign one or two videos to a small group of students with the requirement to complete the appropriate portion of the observation sheet within a breakout room. As the students finish, they can present their found information to the other groups in a whole class meeting.

The Book Club recommendations for this activity are resource materials to be used throughout the upcoming lessons. The read-aloud suggestions from the pre-assessment activity could be used for all of the subsequent lessons.

The educator needs to introduce the **Bee Courteous, Bee Safe** document found in this section of the curriculum. The students need to begin to understand that pollinators can sting but observations can happen safely with a few precautions. The book *Kaia and the Bees* is a reading recommendation to help quell fears about potential stings.

ACTIVITY B

Why Pollination and How it Works

15 minutes



BUZZ WORTHY RESOURCE MATERIALS :

- [Why Pollination and How it Works](#) - Google slideshow
- [Pipe Cleaner Bee](#) - step by step instructional video link
- [Explain Everything](#) - app
- [Book Creator](#) - app

BEE CAUSE BOOK CLUB:

- [How Did That Get In My Lunchbox?](#) by Chris Butterworth - [Read Aloud](#)

TIPS FROM THE HIVE:

This activity is an opportunity for students to simulate pollination via a hands-on lab. The first step is to review the previous concepts about pollinator's relationship to plants and then move into their contribution to plants. The Google slideshow, *Why Pollination and How It Works*, can support the exploration portion of this activity by leading the students through the discussion. The educator should lead this discussion as the slideshow will provide talking prompts. The educator may be delivering digital content or may not have the resources or time to prepare sample fruit and vegetables for the discussion. This should not deter this discussion from happening with the students in preparation for the lab.

If a student is completing the concept application from home, she could set up several cups with different colored powder or different colored glitter in each cup. The student's insect can then visit multiple "flowers" so she can see the exchange of "pollen" happening.

Explain Everything and *Book Creator* are both educational apps that students can use to explain the process of pollination as a follow up activity either at school or from home. This can be used as an assessment tool for the educator or could be discussed in a group meeting.

The Book Club recommendation encourages conversation about the farm to table process. The text addresses the job of the farmer and how his/her work helps us get the foods that we need in our stores, farmer's markets, and eventually into our lunch boxes. While the book does not focus on the job of the pollinator, the process is extremely relevant at this point in the curriculum.

ACTIVITY C

Without Pollinators: What We Would Do “Without”



BUZZ WORTHY RESOURCE MATERIALS :

- [Pumpkin Growth Time Lapse](#)
- video
- [Jeopardy - Pollinator or No
Pollinator](#) - game

BEE CAUSE BOOK CLUB:

- [You Wouldn't Want to Live
Without Bees](#) by Alex Woolf

TIPS FROM THE HIVE:

Prior to starting the exploration portion of the activity, the educator can review the information from the previous lesson by showing the Pumpkin Growth Time Lapse video. The educator should introduce the Melon Flowers and Fruits reproducible in this section of the curriculum. The video helps remind the student that the flower must die back and pollination must happen for the plant to bear fruit. The educator should point out to the students the changes in the light daily as the sun rises and sets as the pumpkin grows as well as the fact that the process takes 108 days and nights to reach maturity. The creator of the video places a coin on the pumpkin to show ratio, a discussion point might be why this would be important for a scientist who is observing the growth of the pumpkin.

The purpose of this activity is to explore how humans depend on pollinators for many of the foods that we eat. If the educator is teaching digitally or cannot provide the suggested food items, the Jeopardy - Pollinator or No Pollinator Game is a great solution for the exploration portion of the activity. The purpose of the game is to give the students a visual prompt to help them decide if the food is connected to a pollinator. Some of the answers may surprise the students and the educator!

The Jeopardy Game could be played in teams with the educator as the “host” of the game. To play, the educator can use the link to access the game, choose Play Now, choose how many teams will play, and decide if play will be in buzzer mode. The next step is to allow the team captains to select their avatars, and start the game. The students can select which category and point value but the educator should be the one who clicks on the box in the game board. The students should ring in or raise their hand when they have the answer, the teacher or the students can select the green check mark under their avatar in order to see the correct answer to the question. The teacher has the option of removing points if the student gets the question wrong. Clicking on the Continue button will take you back to the main question board.

The Book Club selection may be a good resource to teach students that bees are responsible for one in every three bites of food that we eat.



MODULE 2

POLLINATORS AND PLANTS IN PARTNERSHIP

ACTIVITY A

Understanding Flower Structure & Plant Reproduction

15-20 minutes



BUZZ WORTHY RESOURCE MATERIALS :

- [Close up of a Flower](#) - video
- [Free Printable Venn Diagram](#) - reproducible
- [Parts of a Flower](#) - video
- [Flower Dissection](#) - video

BEE CAUSE BOOK CLUB:

- [Parts of a Flower](#) by Candice Ransom
- [Flowers](#) by Gail Gibbons - Read Aloud

TIPS FROM THE HIVE:

This activity is designed to teach students flower structure and basic plant reproduction with a flower dissection lab. The educator begins the lesson by handing out the flower anatomy sheet and fresh cut flowers for the students to observe. It would be appropriate at this time to share the [Close up of a Flower](#) video link whether in person or digitally. The educator could stop the video at any point and ask the exploration questions: What parts of the flower are visible? How are the flowers different? How are they similar? These questions could be discussed as the video clip continues to play, encouraging comparison and contrast in different types of flowers.

Before or after dissection, the students can use the printable Venn Diagram for gathering and organizing their observations of the different types of flowers. Students should observe shape, color, petal size, texture, scent, composite or simple flower structure when gathering data. The educator can ask students to use their notes to write a simple compare and contrast writing sample at this point in the activity or as a follow up work.

For digital or classroom educators, the [Parts of a Flower](#) video is a valuable resource for explaining the anatomy of the flower. The host of the video covers the parts found on the lily, the flower used on the Flower Anatomy Sheet. The host also explains that some flowers have both male and female parts, some flowers only have one type, and the basics of pollination including cross-pollination and self-pollination.

The final video link could be used in three ways. The educator can watch the video to be able identify the flower parts prior to the lab in class. If someone has never dissected a flower, it can be tricky to identify all of the parts. The educator can use the video to help students identify their flower parts during their own dissections. If the students are learning from home and do not have access to flowers, the video can be used in place of the lab.

ACTIVITY B

Designing a Flower



BUZZ WORTHY RESOURCE MATERIALS :

- [How Bees Can See the Invisible](#) - video

BEE CAUSE BOOK CLUB:

- [Flower Talk: How Plants Use Color to Communicate](#) by Sara Levine - [Read Aloud by the author](#)

TIPS FROM THE HIVE:

This activity is a great opportunity to encourage students to further their understanding and fine tune their approach to STEM concepts. Educators should encourage the students to think about their design approach with the pollinator in mind. The size, shape, colors, and texture should be considered when designing how the flower will invite the pollinator within the structure. The educator should remind the students that the animals do not do the work of pollination for free, the plants offer rewards as part of the mutualistic relationship.

The video link will explain more about mutualism to get the students thinking about flower design. The educator should use the video as part of the review/concept development. The host will explain how flowers, when seen by pollinators, look completely different. Ultraviolet light allows them to see a very different flower! The language used by flowers to communicate is a fascinating concept.

The Book Club recommendations further explain how plants get animals to carry out the process to help them with their offspring.

ACTIVITY C

Creating a Reference Catalog of Flowers: Identifying and Preserving Flowers



BUZZ WORTHY RESOURCE MATERIALS :

- [LeafSnap](#) - app
- [Picture This](#) - app
- [Seek by iNaturalist](#) - app
- [Google Lens](#) - app
- [PlantNet](#) - app
- FlowerChecker app
- [Make a Quick and Easy Plant Press](#) instructional video

BEE CAUSE BOOK CLUB:

- [The Big Book of Blooms](#) by Yuval Zommer
- [Flowers](#) by DK books

TIPS FROM THE HIVE:

This activity helps the students review the concepts from the first activity through observing pollinators and plants. As the students prepare to go out into the field to collect flowers, the educator should remind them to notice the pollinators that are attracted to the flower. This can be done year round as native plants in the area may bloom at different times of the year. The same apps can be used to help the students identify the plants. Flower Checker is another app for identification purposes. The educator should also consider using the Resource Roundup to contact possible experts who would be willing to help the students identify native plants in the area.

Make a Quick and Easy Plant Press is an instructional video if the school has access to a wood shop and can have a few plant presses made, or a parent volunteer who can make and donate plant presses to the school.

The Book Club recommendations are resource materials for the students to use while exploring flowers.

ACTIVITY D

A Rainbow of Choices: How Flowers Use Color to Attract Pollinators



BUZZ WORTHY RESOURCE MATERIALS :

- [Insecta Spectra](#) - video

TIPS FROM THE HIVE:

As the students begin the exploration and concept introduction portion of the activity, the educator should remind the students that pollinators see color differently than humans. When the students are making predictions about color preference of pollinators, they should take this into account. When recording the predictions on a large sheet of paper in the review activity, the educator can add notes the students have about how this difference in color perception may alter the predictions. The video link will show three different views of how humans, bees, and butterflies see the flowers in ultraviolet tones.



MODULE 3

THE OTHER HALF OF THE PARTNERSHIP: POLLINATORS

ACTIVITY A

The Anatomy of Bees, Butterflies, & Moths



BUZZ WORTHY RESOURCE MATERIALS :

- [Parts of a Bee](#) - video
- [Parts of a Butterfly](#) - video
- [Photo of a Butterfly and it's parts](#) - photo
- [Butterfly and Moth Body Parts](#) - photo
- [Butterfly or Moth](#) - video
- [Butterfly: A Life](#) - video
- [Double Bubble Thinking Map](#) - reproducible

BEE CAUSE BOOK CLUB:

- [Butterfly and Moth](#) by DK Eyewitness Books
- [Moth: An Evolution Story](#) by Isabel Thomas - [Read Aloud](#)
- [Monarch Butterfly](#) by Gail Gibbons - [Read Aloud](#)
- [The Night Flower](#) by Lisa Hawthorn
- [Butterfly or Moth?: How do you Know?](#) by Lisa Stewart - [Read Aloud](#)
- [Butterfly or Moth](#) by Christina Leaf

TIPS FROM THE HIVE:

Module 3 is all about the pollinators! Activity A builds on the student's knowledge of anatomy of insects. The students are most likely familiar with wings, stingers, legs, and other basic body parts. In this activity, the educator can use several specimens of bees and butterflies to teach anatomy per the curriculum. If the educator does not have these items, the video links and photos can be substituted to teach face to face and digital learners.

The Butterfly and Moth Fact Sheet and the Butterfly or Moth video can be used together for the students to complete an extension activity by comparing the two insects. A Double Bubble Thinking Map is a great tool for helping students organize thoughts. This can be taken a step further into an informational writing assignment for the students to demonstrate understanding about the anatomy of the moth compared to the butterfly.

An extension lesson could be raising and releasing live butterflies. There are kits for purchase such as [Butterfly Garden](#). Educators should also contact the STEM coordinator at the school or district level to ask about live specimens that accompany the kits from [FOSS](#), a science based learning system that is used in all 50 states.

The Nature's Partners "WHO AM I" Game is a fantastic way to help students learn vital information about pollinators. The original card material for the lesson is available in the original Nature's Partners primary source. The Bee Cause Project has created and provided a second set of card materials offering full-color pictures of each type of pollinator. The students can play the game according to the instructions given, but adding the picture helps the student begin to identify and associate information with the image of the pollinator.

All of the Book Club titles support the concepts about behaviors, anatomy, and characteristics of the moth and butterfly. "The Night Flower" is a uniquely different book that addresses the animals and pollinators that are attracted to this cactus flower that opens only at night.

ACTIVITY B

Designing a Pollinator



BUZZ WORTHY RESOURCE MATERIALS :

- [Pollinator Lifecycle](#) - reproducible
- [Alien Empire](#) - live link

BEE CAUSE BOOK CLUB:

- [Know Your Pollinators](#) by Tim Harris
- [Monarch and the Milkweed](#) by Helen Frost and Leonid Gore - [Read Aloud](#)

TIPS FROM THE HIVE:

The educator should review the concepts previously addressed when the students were designing and constructing their own flowers with regards to mutualism. The design of the pollinator could be an extension of the students existing flower. The Book Club title *Monarch and Milkweed* could be a great resource for students to start thinking about certain plant and pollinator relationships that are more exclusive. The female Monarch butterfly will only lay eggs on the milkweed plant, the provider of nutrition for the hatching caterpillars.

Discussion questions can help the students begin to draw those parallels: If the nectar of the flowers is deep inside of the flower, what special characteristics does the pollinator have to get to the nectar? If the flower is small, should the pollinator also be small? What kind of eyes would your pollinator need to see the color of your flower? Is your pollinator one who goes through a metamorphosis and needs a specific plant for egg laying?

The *Pollinator Lifecycle* reproducible is for the student who wants to take their imagination further in this activity. The student can design, draw, color, and name each other phases of the pollinator they have created. This extension could work well for students who may be designing and crafting digitally for a follow-up activity.

The *Alien Empire* link is a PBS site recommended by Nature's Partners for further exploration and activities related to bees.

ACTIVITY C

Pollinator Real Estate



BUZZ WORTHY RESOURCE MATERIALS :

- [Native Bee Diversity in North America](#) - video
- [Ground nesting Native Bees](#) - video
- [Mason Bees vs. Honey Bees](#) - video
- [Mason Bees are a Gardener's Best Friend](#) - video

BEE CAUSE BOOK CLUB:

- [Next Time You See a Bee](#) by Emily Morgan - [Read Aloud](#)
- [Mason Meets a Mason Bee](#) by Dawn V. Pape

TIPS FROM THE HIVE:

This activity educates the students about different types of nesting solutions for pollinators beyond bees in a hive. Most students are familiar with how honey bees live, but what about other types of pollinators? The video links can be used at the beginning of the Action stage to help the students understand native bee diversity and bee dwellings.

ACTIVITY D

Look Who's In the Neighborhood!



BUZZ WORTHY RESOURCE MATERIALS :

- [A Moment of Science: Insect Color Vision](#) - video
- [Why Do Flowers Have Different Colors?](#) - video

BEE CAUSE BOOK CLUB:

- [Pollinators: Animals Helping Plants Thrive](#) by Martha London

TIPS FROM THE HIVE:

This is a good opportunity for the educator to remind the students about the importance of flowers. Flowers are the plant's reproductive organs and the only way that a plant can make more of its kind. Flowers and pollinators are vital for the foods that we eat, concepts that the students learned in the first and second modules. The two video links provide more information on how insects see the color of the flowers, as well as the importance of flowers to the plant.

At this point the educator and the students have probably discovered through background information and from the video links that many pollinators cannot see the color red. This experiment could be a good time to test that theory as the class constructs their pan traps for observation.



MODULE 4

POLLINATOR- FRIENDLY HABITAT IN YOUR AREA

ACTIVITY A

**“Who Am I”
Game: Reviewing
Characteristics of
Bees & Butterflies**



BEE CAUSE BOOK CLUB:

- [The Bee in the Yellow Jacket](#) by Mr. AJ Jaquith
- [The Bumblebee Queen](#) by April Pulley Sayre - [Read Aloud](#)
- [Sunshine and Pollen](#) by Monika Grunberg
- [A Wasp Builds a Nest](#) by Kate Scarborough
- [Bats: Native Pollinators](#) by Roberta Baxter
- [Seeds, Bees, Butterflies, and More!: Poems for Two Voices](#) by Carole Gerber

TIPS FROM THE HIVE:

The educator may be looking for an alternate method of playing the Who Am I Game at this point in the curriculum. The students can work in pairs or small teams to complete this alternate method of game play. The educator may give the students a due date to play the game with a partner in preparation for Activity B. The educator will want the students to be familiar with the physical characteristics of the pollinator so he/she should consider using the cards with the pictures provided.

Alternate Method of “Who Am I” Game:

- Student A holds the “Facts About Pollinators Cards”
- Student B has the “Pollinator Name Tags” cards laid out where all can be seen
- Student A reads the card aloud with the intro, “I am” or “I have” for each bullet point followed by “Who Am I?”
- Example: “I look like a social bee or wasp. My antennae are short with a bristle on the end. I have one pair of wings. I cannot sting or bite and I am hairy. I am considered a significant pollinator. Who am I?” “You are a Flower Fly!”
- Student B selects the correct “Pollinator Name Tag” as soon as he/she can identify by the hints
- The two matching cards should be placed on the floor or table together to indicate a match
- Students A and B can switch places to play again

The Book Club titles are further reading based on the pollinators in the game. Even if the educator is not reading each title aloud, they are all quality books to add to the class Pollinator Library.

ACTIVITY B

Native Pollinators and Their Habitat: A Guided Field Trip



BEE CAUSE BOOK CLUB:

- [We are the Gardners](#) by Joanna Gaines - [Read Aloud](#)
- [The Hive Detective: Chronicle of a Honey Bee Catastrophe](#) by Loree Griffin Burns
- [The Clover and the Bee](#) by Anne Ophelia Dowden

TIPS FROM THE HIVE:

This activity is a guided field trip to a destination where the students can learn more about native plants and pollinators. If the educator can take students off campus for this type of field trip, consider local state parks, plant nurseries, neighborhood parks, and community gardens as options. Some of these may even be within walking distance of the school campus.

If the educator is limited in off campus field trips, consider YouTube clips of garden tours in your area. (Garden tour + your state in the YouTube search bar). Be sure to watch the clip prior to showing students.

The Resource Roundup provides websites that can lead to more options with regards to speakers. If the educator is able to contact someone local, the students could host an interview session via FaceTime, Skype, or Zoom. The students should be prepared to ask the Exploration/Concept Development questions within the activity. If the guest speaker has access to a garden or park, she could use his/her phone to walk through their garden or park to show the students plant and pollinator interactions as they are happening. This could be as simple as contacting someone that the educator knows who has a garden area.

The book recommendations are further reading options.



MODULE 5

CREATING POLLINATOR- FRIENDLY HABITAT

ACTIVITY A

Welcome Home: Plants & Landscaping for Pollinators



BUZZ WORTHY RESOURCE MATERIALS:

- [How to Plant a Pollinator Garden](#)
- [Let's Design a Pollinator Garden](#)
- [Xerces Society](#)
- [Park Seed](#)

BEE CAUSE BOOK CLUB:

- [Sip, Pick, and Pack: How Pollinators Help Plants Make Seeds](#) By Polly Cheney
- [Summer's Flight, Pollen's Delight](#) By Flora Caputo
- [The Pollinator Victory Garden](#) By Kim Eierman

TIPS FROM THE HIVE:

This activity is great for helping the students facilitate action steps as an extension of their learning experiences. The Resource Roundup can provide suggestions for guest speakers. The Xerces Society also hosts webinars that could be options for your class in place of an expert from the community if that is not an option.

To complete this activity, the student can create a checklist of important garden elements in designing a landscape with a few creative steps. The educator should start by explaining that the students are going to work to create or improve an existing landscape. Remote learning students and classroom students can work in teams to improve a fictionalized space or one that exists at their home or school. The educator should instruct the students to either take a photo or sketch the space they will be working to improve.

The students can prepare for the video portion by folding an 8 ½ by 11 sheet of paper into three equal sections, oriented as landscape. The three sections should be labeled plants, shelter, and water. As the students watch the first video link, they should take notes about what is needed to create a successful pollinator space. As they watch the second video link, they should consider how they plan to organize, plant, and water their space.

Working in groups, the students should access the Park Seed website and search My Growing Zone in the top right corner. Students can make notes of suitable plants for their growing zone that are pollinator-friendly for the exploration/concept development portion of the activity. This research will lead the students into the next activity.

The first two Book Club recommendations are read alouds for younger groups and the third book is for older students who are looking for quality research materials.

ACTIVITY B

Is Your Neighborhood Pollinator-Friendly?

**BUZZ WORTHY RESOURCE MATERIALS:**

- [How to Create a Pollinator Friendly Garden and Homestead](#)

TIPS FROM THE HIVE:

Now that the students have a landscape in mind for improvement, as well as a list of things to include, they are ready with the educator's guidance to move into making Your Neighborhood Pollinator-Friendly. The video link can be used to kick off the activity and remind students of the type of plants they want to include for pollinators.

For the concept application portion of the lesson, the educator can allow the students to draw out their action plan for plant materials, water features, and shelter ideas for their landscape on butcher paper. The educator should encourage the students to have elements for each basic need of pollinators. This is the culminating activity for this Module so the educators should allow the students to spend some time completing their drawings. Sharing their work can be done face to face and digitally.



MODULE 6

COMMUNITY SERVICE PROJECT AND CELEBRATION

ACTIVITY A**Planning a
Community Service
Project****BUZZ WORTHY RESOURCE
MATERIALS:**

- [Bee A Friend To Pollinators - lesson plan](#)
- [Bee A Friend To Pollinators - Video link](#)

TIPS FROM THE HIVE:

Planning a community service project can be a huge undertaking. It is a wonderful way to move into the community and connect the students to real world experiences. It is recommended that the educator work with principals, parents, and community helpers to create and execute a community service project at the level that Nature's Partners suggests.

If the educator needs an alternative pathway to wrap up the vast amount of learning done in these lessons, consider the Bee A Friend To Pollinators Lesson Plan and accompanying video link. This lesson will guide the educator through a manageable process to allow the students to create a pollinator friendly space with a few steps. This lesson could be used as a prototype on a smaller scale to build to a bigger community service project.

NEXT GENERATION SCIENCE STANDARDS MAPPING

3-LS1-1; 3-LS2-1; 3-LS3-1; 3-LS4-3; 3-LS4-4

4-LS1-1; 4-LS1-2

5-LS-1; 5-LS2-1; 5-ESS3-1

MS-LS1-4; MS-LS1-5; MS-LS2-1; MS-ESS3-3

THE BEE CAUSE: RESOURCE ROUNDUP

To find your native plant society for your state: google - “your state” + native plant society.

- [4H](#) resource
- [Soil and Water Conservation Society](#) resource
- [Cooperative Extension Service](#) resource
- [US Fish and Wildlife Service](#) resource
- [Extension Master Gardeners Programs](#) resource
- [National Association of Conservation Districts](#) resource
- [Agriculture in the Classroom](#) resource

Possible field trip options and/or guest speakers: local parks, state parks, local community gardens, local farms, butterfly or pollinator gardens, local nurseries, local wholesale plant sellers, local urban planning official.



SUPPLEMENTAL CARD GAME

WHO AM I GAME

FLOWER FLY

Photo Credit: "Common Flower Fly" by Peter Ras is licensed under CC BY-NC-SA 2.0

THE BEE CAUSE
PROJECT



YELLOW JACKET

Photo Credit: "Eastern Yellow Jacket Queen (Vespula maculifrons)" by sankax is licensed under CC BY-NC 2.0

THE BEE CAUSE
PROJECT



HONEY BEE

Photo Credit: "Honey bee and flower with extrafloral nectaries" by Derek Keats is licensed under CC BY 2.0

THE BEE CAUSE
PROJECT



BUMBLE BEE

Photo Credit: "Bumble bee on my lavender" by 2jaysjoju is licensed under CC BY-NC-ND 2.0

THE BEE CAUSE
PROJECT



BUTTERFLY

Photo Credit: "Butterfly" by anthonycramp is licensed under CC BY 2.0

THE BEE CAUSE
PROJECT



MOTH

Photo Credit: "Silk Moth" by Rum Bucolic Ape is licensed under CC BY-ND 2.00"

THE BEE CAUSE
PROJECT



LEAFCUTTER BEE

Photo Credit: "Leafcutter bee 2" by Nigel Jones is licensed under CC BY-NC-ND 2.0

THE BEE CAUSE
PROJECT



CARPENTER BEE

Photo Credit: "Carpenter Bee" by coniferconifer is licensed under CC BY 2.0

THE BEE CAUSE
PROJECT



HUMMINGBIRD

Photo Credit: "Male ruby-throated hummingbird" by Tibor Nagy is licensed under CC BY-NC 2.0

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PROJECT



BAT

Photo Credit: "Flying fruit bat II" by Tambako the Jaguar is licensed under CC BY-ND 2.0

THE BEE CAUSE
PROJECT



BEETLE

Photo Credit: "Trichodes flavocinctus * Elitros en amarillo" by jacilluch is licensed under CC BY-SA 2.0

THE BEE CAUSE
PROJECT



PAPER WASP

Photo Credit: "Paper Wasps tending to their larvae" by motleypixel is licensed under CC BY-ND 2.0

THE BEE CAUSE
PROJECT



ALKALI BEE

Photo Credit: "Norton's alkali bee" by
cricketsblog is licensed under CC BY 2.0

THE BEE CAUSE
PROJECT





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