

Where would we **BEE** without Pollinators?

Level 1 Grades K-1

Where would we **BEE** without Pollinators?

Level 2 Grades 2-3

Where would we **BEE** without Pollinators?

Level 3 Grades 4-6

Where would we **BEE** without Pollinators?

Level 4 Grades 6-8



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### Educator's guide information

You can download this PDF educators guide from the NACD Conservation Education Hub. You can access information by clicking on the links and it will take you directly to the web page. You may also print out a page that you need.

[www.conservationlearn.org/](http://www.conservationlearn.org/)

This booklet will be updated as needed to bring you the most current information.

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**Cindy Pierce**, Skagit Conservation District, WA

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*And the many educators in the development and reviewers of the materials.*

Please submit information to share with others on your successful stewardship programs or conservation education activities.

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The National Association of Conservation Districts is the non-profit organization that represents the nation's nearly 3,000 conservation districts, their state associations and the 17,000 men and women who serve on their governing boards. For almost 70 years, local conservation districts have worked with cooperating landowners and managers of private working lands to help them plan and apply effective conservation practices.

Conservation districts are local units of government established under state law to carry out natural resource management programs at the local level.

NACD's mission is to serve conservation districts by providing national leadership and a unified voice for natural resource conservation. The association was founded on the philosophy that conservation decisions should be made at the local level with technical and funding assistance from federal, state and local governments and the private sector. As the national voice for all conservation districts, NACD supports voluntary, incentive-driven natural resource conservation programs that benefit all citizens.

NACD maintains relationships with organizations and government agencies; publishes information about districts; works with leaders in agriculture, conservation, environment, education, industry, religion and other fields; and provides services to its districts. NACD is financed primarily through the voluntary contributions of its member districts and state associations.

The association's philosophy is that conservation decisions should be made by local people with technical and funding assistance from federal, state and local governments and the private sector. The association's programs and activities aim to advance the resource conservation cause of local districts and the millions of cooperating landowners and land managers they serve.

Visit [www.nacdnet.org](http://www.nacdnet.org) for additional information.

To find your local district contact information, go to

[www.nacdnet.org/general-resources/conservation-district-directory/](http://www.nacdnet.org/general-resources/conservation-district-directory/)



**National Association of  
Conservation Districts**

## **STEWARDSHIP WEEK INFORMATION**

NACD has sponsored Stewardship Week since 1955. **2020 marks the 65th year** to celebrate NACD Stewardship Week.

Education is a critical element of the conservation effort at the local, state and national levels. Educating youth ensures that the next generation will be wise stewards of America's natural resources. Helping today's adults understand the need for effective conservation practices builds on the conservation legacy. Through NACD's Stewardship and Education efforts, we help districts, educators and communities extend the reach of their education programs.

Stewardship Week, celebrated annually between the last Sunday in April and the first Sunday in May, reminds us of our individual responsibilities to care for the natural resources upon which we all depend.

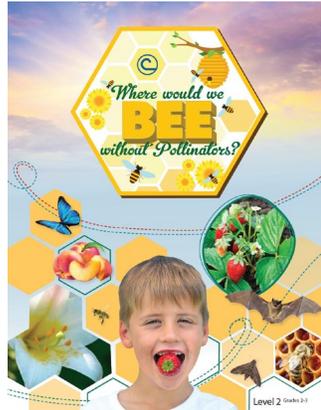


NACD Education Materials available at the  
 NACD Conservation Education Hub, visit  
[www.conservationlearn.org](http://www.conservationlearn.org)

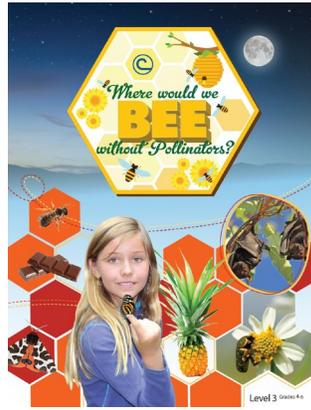
Booklet Level 1



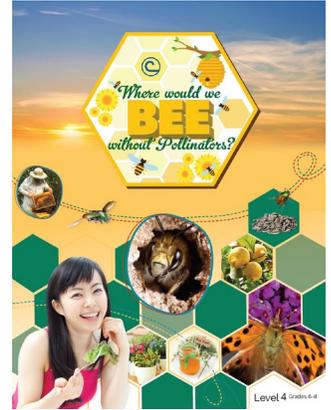
Booklet Level 2



Booklet Level 3



Booklet Level 4



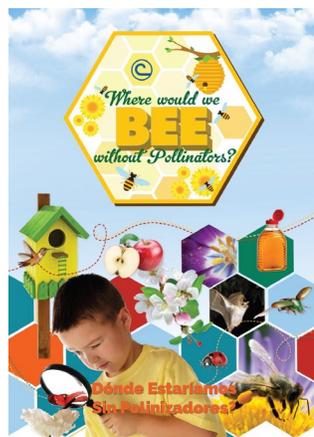
Placemat



Bookmark



Big Book



Poster



# Level 1 - Grades K-1

## Where Would We BEE Without Pollinators?

### Booklet Objectives

Students will:

- Realize that humans need food in order to live and grow and that a large portion of their food comes from plants.
- Gain an awareness of the dependence of plants upon pollination.
- Deduct which items utilized in their daily lives are dependent upon pollination.
- Explain the steps in animal pollination.
- Recognize that humans can have a positive impact their environment by making changes beneficial to pollinators.

### Next Generation Science Standards

#### Disciplinary Core Ideas

*K. Interdependent Relationships in Ecosystems: Animals, Plants, and Their Environment*

LS1.C: Organization for Matter and Energy Flow in Organisms

ESS2.E: Biogeology

ESS3.A: Natural Resources

ESS3.C: Human Impacts on Earth Systems

ETS1.B: Developing Possible Solutions

*1. Structure, Function, and Information Processing*

LS1.A: Structure and Function

LS1.B: Growth and Development of Organisms



### Vocabulary Words

Nectar - the sweet liquid that flowering plants produce as a way of attracting the insects and small birds that assist in pollination.

Pollen - a powdery substance produced by flowering plants that contains male reproductive cells. It is carried by wind and insects to other plants, which it fertilizes.

Pollination - to transfer pollen grains from the male structure of a plant anther to the female structure of a plant stigma and fertilize it.

# Pollinators and Me

## Activity Objectives

Students will:

- Realize the correlation between the food they eat and pollinators.
- Relate the ways in which they function to the ways in which pollinators function.

## Materials

- Pollinators and Me hand out (pg 8)
- Food items that are a result of pollination (apple slices, grapes, cheese cubes, cherry tomatoes, strawberries, etc.)
- Pictures of pollinators: - page 24
  - bee eating pollen
  - butterfly using proboscis to drink nectar
  - hummingbird



## Discussion

- ◆ Define pollinator for students: Pollinators are small animals like birds, bats, bees and bugs that eat the pollen or nectar found in flowers. Show picture of bee eating pollen, pg 24.
- Discuss how we eat with our mouths and pollinators eat with different body parts; mouth, beak, proboscis, etc. Show picture of butterfly drinking nectar with proboscis (the long or tubular mouthparts of some insects, worms, and spiders, used for feeding, sucking, and other purposes) pg 24.

## Instructions

1. After discussing how pollinators eat, place the food items you have chosen around the room. Tell the students what items are available. Invite the students either individually or in small groups to go and get a food item and return to their seat.
2. While the students eat have a discussion on what body parts they used to collect their food. Discuss what body parts pollinators use to collect their food; legs, wings. Show students picture of hummingbird, pg 24
3. Explain to students how pollination occurs: pollen is moved from one flower to another. Flowers use this pollen to make seeds that grow into fruits, vegetables and grains that we can eat.
4. Distribute copies of the “**Pollinators and Me**” handout for students to complete.

# Pollinators and Me

Pollinators get hungry and must eat just like we do. Pollinators eat pollen. Draw a circle around the body part that you use to eat. Draw a circle around the body parts that the pollinators use to eat.

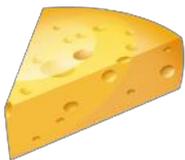
Pollinators must move around to find food just like we do. Draw a square around the body parts you use to move around and find food. Draw a square around the body parts that the pollinators use to move around and find food.



Pollinators help us have many good foods to eat. Draw a circle around the foods that you like to eat. Write the name of the food on the line by the picture.



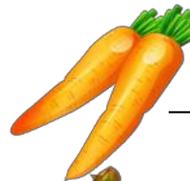
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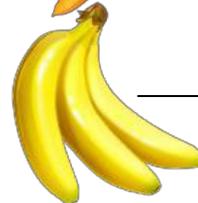
\_\_\_\_\_

apple

cheese



\_\_\_\_\_



\_\_\_\_\_

carrot

banana

## Level 2 Grades 2-3

### Where Would We BEE Without Pollinators?

#### Booklet Objectives

Students will:

- Understand that most plants depend on animals for pollination.
- Distinguish the connection between the physical properties of plants, pollen and pollinators and successful pollination.
- Realize the role pollination plays in plant reproduction.
- Appreciate the vital role pollinators play in their everyday lives.
- Recognize that changes made in the environment can affect the availability of resources for pollinators which in return affects the availability of resources for humans.
- Identify actions that can be taken to improve and provide habitat for pollinators.

#### Next Generation Science Standards

##### Disciplinary Core Ideas

##### *2. Interdependent Relationships in Ecosystems*

PS1A: Structure and Properties of Matter

##### *2. Interdependent Relationships in Ecosystems*

LS2.A: Interdependent Relationships in Ecosystems

##### *3. Interdependent Relationships in Ecosystems*

LS2.C: Ecosystem Dynamics, Functioning, and Resilience

LS4.C: Adaptation

LS4.D: Biodiversity and Humans

##### *3. Inheritance and Variation of Traits: Life Cycles and Traits*



#### Vocabulary Words

Anther - a male flower part forming the top part of a stamen and bearing the pollen in sacks.

Migrate - to move from one habitat or environment to another in response to seasonal changes and variations in food supply.

Nectar - the sweet liquid that flowering plants produce as a way of attracting the insects and small birds that assist in pollination.

Pollen - a powdery substance produced by flowering plants that contains male reproductive cells. It is carried by wind and insects to other plants, which it fertilizes.

Pollination - to transfer pollen grains from the male structure of a plant anther to the female structure of a plant stigma and fertilize it.

Stigma - a flower's female reproductive organ that receives the male pollen grains. It is generally located at the tip of a the style.

## Level 2 Activity

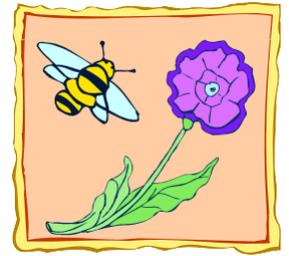
# Bees, Birds, Bugs & Butterflies



## Activity Objectives

Students will:

- Recognize the diversity present in pollinators.
- Understand the value of pollinators and pollination.



## Materials

- One *Bee, Bird, Bug & Butterfly Catcher* activity sheet, pg 11

## Discussion



◆ Discuss with students how important pollinators and pollination is to their everyday lives: one out of every three bites of food we eat has been pollinated, plants that reproduce through pollination help provide the oxygen we need to breathe, some of the clothing we wear is made from plants that were pollinated, etc.

- ◆ Allow students the opportunity to name pollinators they have observed in their neighborhoods.
- ◆ Point out the diversity of pollinators: some walk, some crawl, some fly, some are hairy, etc..

## Instructions

Distribute *Bee, Bird, Bug & Butterfly Catcher* activity sheet to students and instruct them to answer the questions based on your classroom discussion.

Demonstrate how to fold the *Bee, Bird, Bug & Butterfly Catcher*. The following on-line link provides step-by-step directions for folding:  
[http://www.ehow.com/how\\_4558938\\_fold-cootie-catcher.html](http://www.ehow.com/how_4558938_fold-cootie-catcher.html)



Divide students into pairs to play the *Bee, Bird, Bug & Butterfly Catcher* game.

1. For “round one”, one student will hold the *Bee, Bird, Bug & Butterfly Catcher* and one will be the player. With the *Bee, Bird, Bug & Butterfly Catcher* closed, have the player choose one of the four pollinators pictured.
2. Count the number of letters in the name of the pollinator. The student holding the *Bee, Bird, Bug & Butterfly Catcher* then opens and closes it once for each letter.
3. The player chooses one of the true/false questions and answers it. The student holding the *Bee, Bird, Bug & Butterfly Catcher* opens the flap and reads the answer.
4. Round two—the students switch roles.
5. Continue playing and switching roles until the facts regarding all four pollinators have been revealed.

# Bee, Bird, Bug & Butterfly Catcher

What is a pollinator? \_\_\_\_\_

What is pollination? \_\_\_\_\_

Why do we need pollinators? \_\_\_\_\_

**bee**

True or False? Bees carry pollen in a pouch under their head.

True! Bees have hair all over their bodies. Even their eyes are covered with tiny hairs.

True or False? Bees are hairy!

False! Bees carry pollen in pollen baskets on their hind legs.

True or False? Beetles have no sense of smell.

**beetle**

True or False? Beetles are messy eaters.

True! In fact, beetles have been nicknamed the "mess and soil" pollinators!

True! Butterflies have skinny legs and pick flat shaped flowers that help give them a landing pad.

True or False? Butterflies taste nectar with a proboscis.

**hummingbird**

True or False? Hummingbirds weigh about the same as a small dog.

True! When hummingbirds fly, their wings often make a humming sound.

True or False? Hummingbirds get their name from their wings.

False! Many hummingbirds weigh about the same as a penny!

False! Butterflies taste with their FEET.

True or False? Butterflies taste nectar with a proboscis.

**butterfly**

True or False? Butterflies taste nectar with a proboscis.

True or False? Butterflies taste nectar with a proboscis.

True or False? Butterflies taste nectar with a proboscis.

True or False? Butterflies taste nectar with a proboscis.

National Association of Conservation Districts (NACD)  
nacdnet.org/education

## Level 3 Grades 4-5

### Where Would We BEE Without Pollinators?

#### Booklet Objectives

Students will:

- Observe that plants have external structures that serve various functions in both pollination and reproduction.
- Relate the role of pollinators to plants and the supply of food for human consumption.
- Differentiate between vertebrate/invertebrate, mammal/insect pollinators.
- Investigate the necessity of pollinators to their everyday lives.
- Comprehend that pollinators can survive only in environments in which their needs are met.
- Identify ways in which human activities impact the environment and ways to help protect resources and habitats.

#### Next Generation Science Standards

Disciplinary Core Ideas

*4. Structure, Function, and Information Processing*

LS1.A: Structure and Function

*5. Matter and Energy in Organisms and Ecosystems*

LS2.A: Interdependent Relationships in Ecosystems

*5. Earth's Systems*



#### Vocabulary Words

Anther - a male flower part forming the top part of a stamen and bearing the pollen in sacks.

Ecosystem - a localized group of interdependent organisms together with the environment that they inhabit and depend on.

Hibernate - to be in a dormant state resembling sleep over the winter while living off reserves of body fat, with a decrease in body temperature and pulse rate and slower metabolism.

Insect - A six-legged, air-breathing invertebrate with a body that has well-defined segments, including a head, thorax, abdomen, two antennae, and usually two sets of wings.

Invertebrate - an animal that does not have a backbone.

Mammal - A warm-blooded vertebrate characterized by a covering of hair on some or most of the body, a four-chambered heart, and nourishment of offspring with milk from maternal mammary glands.

Nectar - the sweet liquid that flowering plants produce as a way of attracting the insects and small birds that assist in pollination.

Pollen - a powdery substance produced by flowering plants that contains male reproductive cells. It is carried by wind and insects to other plants, which it fertilizes.

Pollination - to transfer pollen grains from the male structure of a plant anther to the female structure of a plant stigma and fertilize it.

Stigma - a flower's female reproductive organ that receives the male pollen grains. It is generally located at the tip of a the style.

Vertebrate - an animal with a segmented spinal column and a well-developed brain.

## Who Needs Who?

### Activity Objectives

Students will:

- Realize the beneficial relationships that exist between living organisms.
- Recognize the benefits of pollinators to humans.
- Take action to benefit endangered pollinators.



### Materials

- A sticky note for each student.
- “Who Needs Who?” worksheet

### Discussion

- ◆ Discuss with the students the fact that most living organisms depend upon other living organisms for survival.
- ◆ Focus on the ways in which animals depend upon plants; food, oxygen, shelter, clothing, etc.
- ◆ Introduce the fact that about 80% of the world's flowering plants rely on pollinators. These plants include crop plants and need pollinators to produce seeds and fruit. One of every three bites of food consumed in the United States is dependent upon animal pollination.



### Instructions

1. Give each student a sticky note to take to lunch. Assign the students the task of counting how many bites of food they eat during one meal.
2. After the students have made their counts have a class discussion on # of bites taken, average # of bites, etc. Have students complete the “Lunch Munch” chart contained in the “Who Needs Who?” worksheet. Follow with a discussion on what food they would have had to do without if there were no pollinators.
3. Using a taco as an example, have students complete Bats...Bees...Tacos? activity.

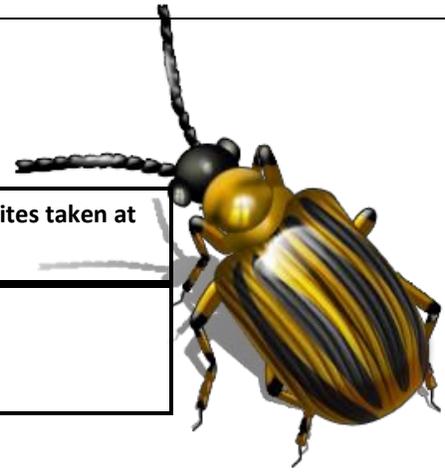
### Answer Key:

*Bats...Bees...Tacos? Beef & Cheese: beef and cheese comes from cows, cows eat alfalfa hay which is pollinated by bees. Tomato: pollinated by bees. Avocado: pollinated by bees, flies and bats. Onion: pollinated by bees. Chili pepper: pollinated by bees and flies.*

# Who Needs Who?

## The Lunch Munch

The # of bites I took at lunch:	Total # of bites taken by the class at lunch:	Average # of bites taken at lunch:



What foods would you have had to do without at lunch if there were no pollinators?



# Bats... Bees... Tacos?

Draw lines connecting the taco ingredient to the pollinator or pollinators responsible for it.

- beef**
- cheese**
- tomato**
- avocado**
- onion**
- chili pepper**

- bees**
- flies**
- bats**



Draw a on the map where you live. List three pollinators that are common in your state:

\_\_\_\_\_

Many pollinators are threatened or endangered. Go to

<http://www.fws.gov/pollinators/Programs/Endangered.html>

to see if pollinators in your area need help!

## Level 4 Grades 6 and up Where Would We BEE Without Pollinators?

### **Booklet Objectives**

Students will:

- Explain the connection between the specialized physical structures of both pollinators and the plants that are their food sources and successful pollination.
- Recognize the role of the sense receptors of pollinators to their choice of food.
- Grasp that pollinators are dependent on their environmental interactions both with other living organisms, including humans, and with nonliving factors that affect their access to resources.
- Identify the ways humans are dependent upon pollinators.
- Describe actions that can be taken to increase pollinator population.

### **Next Generation Science Standards**

*MS. Structure, Function, and Information Processing*

LS1.A: Structure and Function

LS1.D: Information Processing

*MS. Matter and Energy in Organisms and Ecosystems*

LS2.A: Interdependent Relationships in Ecosystems

LS2.C: Ecosystem Dynamics, Functioning, and Resilience



### **Vocabulary Words**

**Anther** - a male flower part forming the top part of a stamen and bearing the pollen in sacks.

**Avian** - relating to, belonging to, or characteristic of birds.

**Biodiversity** - the existence of a wide variety of plant and animal species in their natural environments.

**Crosspollination** - pollen is moved from plant to plant rather than on the same plant.

**Ecosystem** - a localized group of interdependent organisms together with the environment that they inhabit and depend on.

**Nectar** - the sweet liquid that flowering plants produce as a way of attracting the insects and small birds that assist in pollination.

**Ovary** - the lower part of a pistil that bears ovules and ripens into a fruit.

**Pollen** - a powdery substance produced by flowering plants that contains male reproductive cells. It is carried by wind and insects to other plants, which it fertilizes.

**Pollination** - to transfer pollen grains from the male structure of a plant anther to the female structure of a plant stigma and fertilize it.

**Stigma**—a flower's female reproductive organ that receives the male pollen grains. It is generally located at the tip of a the style.

## Level 4 Activity

# I've Got Pollen WHERE?



### Activity Objectives

Students will:

- Identify the location of pollen on a native flower.
- Recognize the connection between pollination and reproduction.
- Realize the correlation between their daily lives and pollinators.

### Materials

- Flowers from local native flowering plants or donated “day old” flowers from a florist.
- Magnifying glasses
- Quart size plastic bags
- Flour
- Small individual candies such as M&M's
- “I've Got Pollen WHERE?” student worksheets (pg. 17)

### Discussion

- ♦ Discuss with students why flowering plants and pollinators/pollination are of vital importance to them. Pollinated crops make up a high percentage of our diet, flowering plants produce oxygen, some of our clothing comes from flowering plants, etc.
- ♦ Review and diagram flowering plant parts with students; anther, ovary, ovule, petal, pistil, sepal, stamen, and stigma.
- ♦ Discuss the pollination process. Pollination involves pollen grains being transferred from the male structure of the plant (anther) to the female structure of a plant (stigma) in order for fertilization to occur.
- ♦ Generate a list as a class of local pollinators.
- ♦ Discuss the fact that pollinators as a whole are threatened and how their reduction in numbers can affect our way of life.

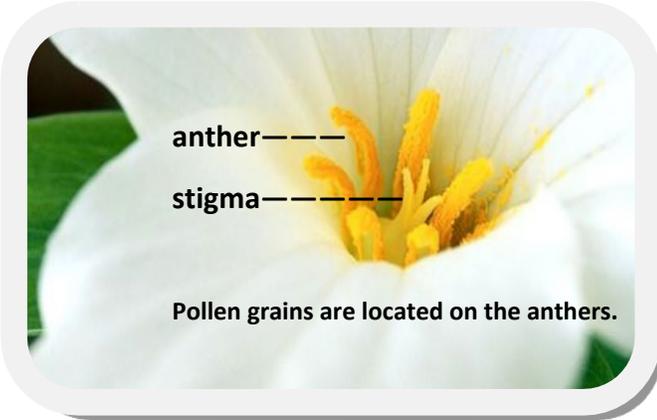
### Instructions

1. Divide students into groups of 3 to 4 and distribute worksheets to be completed as individuals or as a group.
2. Let each group choose a flower and assign them the task of drawing a diagram of the flower and labeling the plant parts discussed during the class discussion that they can see.
3. Instruct students to take note of where pollen is located on their flower and describe it on their worksheets. Magnifying glasses should be used to observe the pollen.
4. Distribute a baggie with flour and small candies inside it, one baggie per group. Explain to the students that they will be pretending to be pollinators foraging for food. They are to compare the flour to pollen and the candies to nectar. The students are to describe what happens with the pollen as they “forage”.
5. Students are to conclude the activity by identifying characteristics of a highly efficient pollinator and then naming any local pollinators displaying those characteristics.

# I've Got Pollen WHERE?

Name: \_\_\_\_\_

Draw a diagram of your flower and label any of the following parts that you can see: anther, ovary, ovule, petal, pistil, sepal, stamen, stigma.



Describe where pollen is located on your flower:




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Describe what the pollen looks like, its size and texture:

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What happened when you put your hand in the baggie to get the candy? How is it similar to a pollinator foraging for food?

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List 5 characteristics of a pollinator that would make it the most efficient in collecting and transporting pollen from one flowering plant to another.

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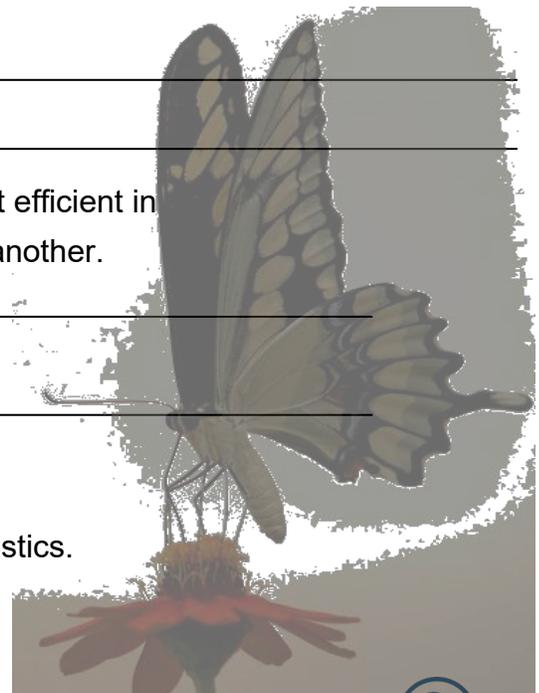
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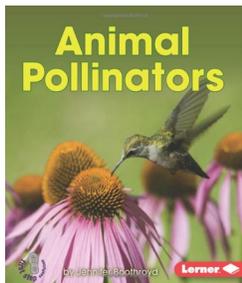
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Name a local pollinator that has some or all of these characteristics.

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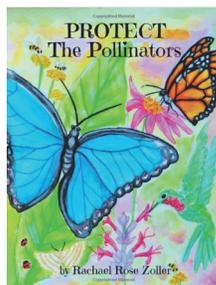


# Literature Connections



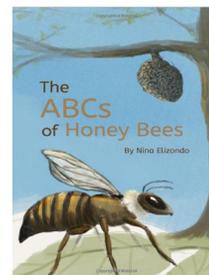
## Animal Pollinators

By Jennifer Boothroyd  
(Author) Age 5-8  
ISBN-13: 978-1467760690



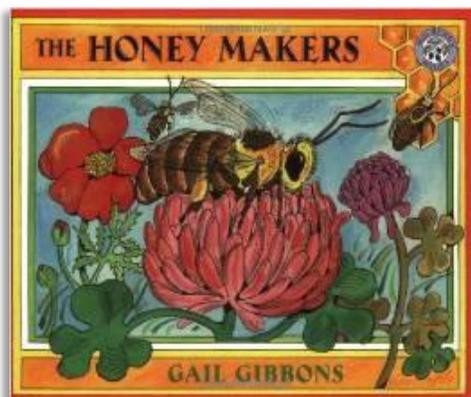
## Protect The Pollinators

By Rachael Zoller (Author)  
Age 5-6  
ISBN-13: 978-1545257777



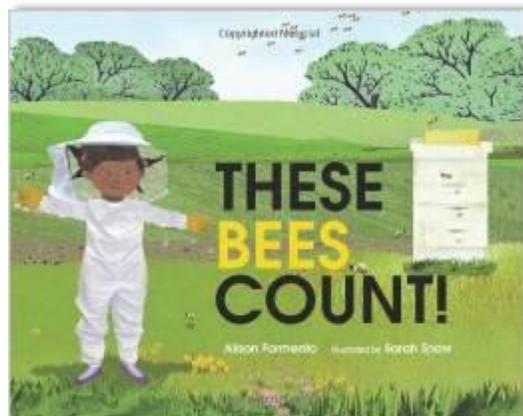
## The ABCs of Honey Bees

By Nina Elizondo (Author)  
Age 5-8  
ISBN-13: 978-0999729311



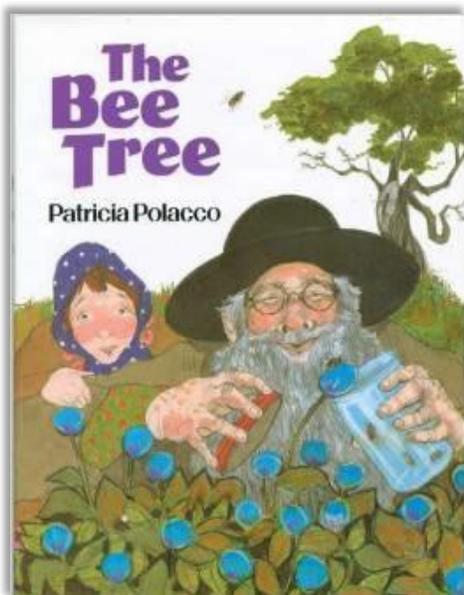
## The Honey Makers

By Gail Gibbons  
(Author, Illustrator)  
Age 4-8  
ISBN-13: 978-0688175313



## These Bees Count

By Alison Formento  
(Author)  
Age 4-7  
ISBN-13: 978-0807578681

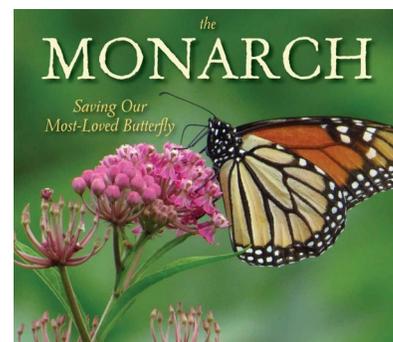


## The Bee Tree

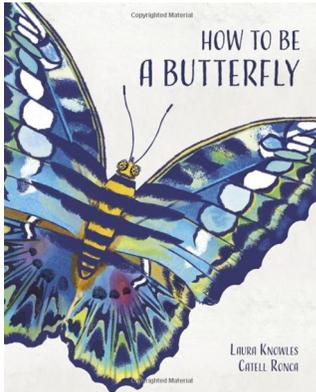
By Patricia Polacco (Author)  
Age 6-10  
ISBN-13: 978-0399219658

## The Monarch: Saving Our Most Loved Butterfly

By Kylee Baumle  
Age 5 - 10  
ISBN-13: 978-1943366170



# Literature Connections



## How to be a Butterfly?

By Laura Knowles  
Age 4-8  
ISBN-13: 978-1786038845



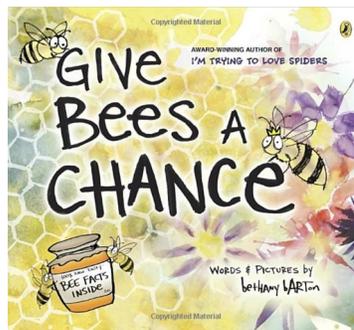
## Love Bees

By Vanessa Amaral-Rogers  
Age 5-12  
SBN-13: 978-1782406648



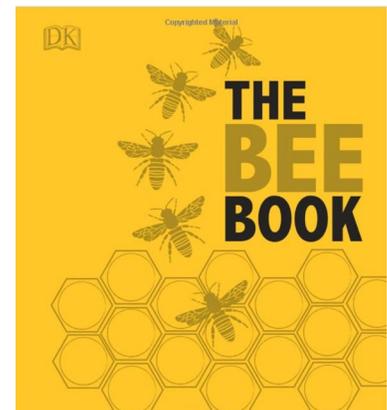
## The Honeybee

By Kirsten Hall  
Age 4 -8  
ISBN-13: 978-9781481469975



## Give Bees a Chance

By Bethany Barton  
Age 4 - 8  
ISBN-13: 978-0593113721



## The Bee Book

By Emma Tennant  
Age 10 and up  
ISBN-13: 978-1465443830

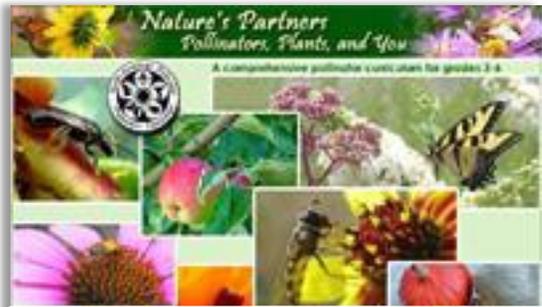
# Where Would We BEE Without Pollinators?

## Resources and Information

### Eco-Regional Pollinator Planting Guides

Great resource to learn about your area and what is best to plant for pollinators. From the Pollinator Partnership.

<https://www.pollinator.org/guides>



### Nature's Partners— Pollinators, Plants and You Curriculum for grades 3-6

<https://www.pollinator.org/pollinator.org/assets/generalFiles/curriculum.pdf>

### University of Illinois Pollinator Buzzy Activity Book

<https://www.life.illinois.edu/pollinatorweek/docs/Pollination%20Activity%20Book.pdf>

### NACD/Auxiliary POSTER CONTEST

2020 Poster Contest Theme is  
**Where Would We BEE Without  
Pollinators?**

You can find a Promotional PowerPoint and all the forms, rules and ideas for the 2020 theme at:



[www.nacdnet.org/  
general-resources/  
stewardship-and-  
education-  
materials/contests](http://www.nacdnet.org/general-resources/stewardship-and-education-materials/contests)

### NACD/Auxiliary

### PHOTOGRAPHY CONTEST

Entries are due December 1st of each year

Photo entry contest form and rules can be found online at:

[www.nacdnet.org/  
general-resources/  
stewardship-and-  
education-materials/  
contests](http://www.nacdnet.org/general-resources/stewardship-and-education-materials/contests)



# Where Would We BEE Without Pollinators?

## Resources and Information

### Pollinator Partnership

What is pollination/pollinator?  
Why are pollinators important to us?

<https://www.pollinator.org/pollinators#what-is>

#### List of additional resources

<https://www.pollinator.org/learning-center>

### Xerces Society

Pollinator Conservation: <https://xerces.org/pollinator-%20conservation/>

Fact Sheets: <https://xerces.org/fact-sheets/>

#### Butterfly Conservation

<https://xerces.org/butterfly-conservation/>



### USDA—Natural Resource Conservation Service

#### How Farmers Help Pollinators

<https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/plantsanimals/pollinate/farmers/>

#### How Gardeners Can Help Pollinators

<https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/plantsanimals/pollinate/gardeners/>

#### How NRCS is helping Pollinators

<https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/plantsanimals/pollinate/help/>

#### More information on Pollinators

<https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/plantsanimals/pollinate/info/>

### DID YOU KNOW?

Worldwide, approximately 1,000 plants grown for food, beverages, fibers, spices, and medicines need to be pollinated by animals in order to produce the goods on which we depend.

### Get Certified

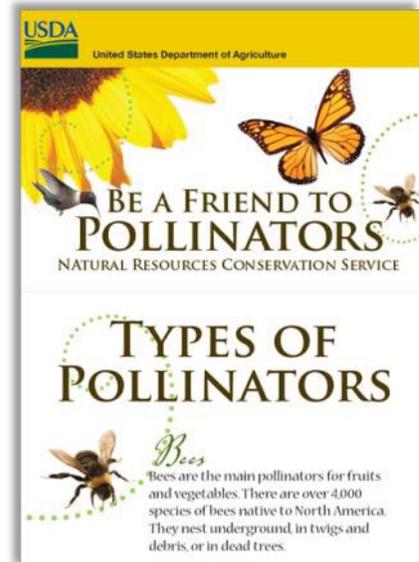
<https://www.pollinator.org/bff/get-certified>

### Crop Life

<https://croplife.org/wp-content/uploads/2017/04/Protecting-Pollinators-Through-Good-Stewardship-Practices-v7.pdf>

### America's Heartland

<http://www.americasheartland.org/pollinators/index.htm>



# Where Would We BEE Without Pollinators?

## Resources and Information

### US Forest Service Fun Facts

- ◇ More than half of the world's diet of fats and oils come from animal-pollinated plants (oil palm, canola, sunflowers, etc.).
- ◇ More than 150 food crops in the U.S. depend on pollinators, including almost all fruit and grain crops.
- ◇ The USDA estimated that crops dependent on pollination are worth more than \$10 billion per year.
- ◇ Corn is mostly a wind-pollinated crop. Native peoples were the first to recognize the role of pollination and to plant corn in such a way that they could hybridize certain types of corn for particular characteristics and purposes. Native Americans are known as the "first hybridizers" for their scientific talents in cross-pollination and hybridization.

### The Power of Pollinators Ohio State University

3 downloadable Power Point's and additional resources

1) Why Pollinators Matter



2) Bee Biology & ID



3) Gardening for Pollinators

<http://u.osu.edu/beelab/gardenin-g-for-pollinators-2/>

### **Plants and Animals – Partners in Pollination—Smithsonian** 4 lesson plans

[http://www.smithsonianeducation.org/educators/lesson\\_plans/partners\\_in\\_pollination/lesson1\\_main.html](http://www.smithsonianeducation.org/educators/lesson_plans/partners_in_pollination/lesson1_main.html)

### **EPA's Pollinator Information**

<https://www.epa.gov/pollinator-protection>

### **USDA Forest Service** **Pollinator Resources**

<https://www.fs.fed.us/wildflowers/pollinators/>

### **Gardening for Pollinators**

<https://www.fs.fed.us/wildflowers/pollinators/gardening.shtml>

### **Pollinator Live**

#### **Archived Webcasts, Lesson Plans and Resources**

<https://pollinatorlive.pwnet.org/>

### **Monarch Live**

#### **Archived Webcasts, Lesson Plans and Resources**

<https://monarch.pwnet.org/>

### **US Fish and Wildlife**

#### **PowerPoints, Fact Sheets, Articles and more**

<https://www.fws.gov/pollinators/PollinatorPages/Outreach.html>



### **Ohio State University Bee Lab**

[https://osu.libguides.com/friendly.php?s=agnic\\_bees\\_pollination](https://osu.libguides.com/friendly.php?s=agnic_bees_pollination)

### **Citizen Science Sites**

<https://xerces.org/educational-resources/#citizen>



# Where Would We BEE Without Pollinators?

## Resources and Information

### Bats Are Pollinators, Too

Bat Conservation

International

<http://www.batcon.org/pdfs/stories/PollinatorBrochure2010Web.pdf>

### Nectar Bats

Nectar bats make several hundred flower visits nightly to fuel their roaring metabolism. In the tropical forests of Central and South America, plants have found unique ways to attract bats. The flowers of these plants shape the echoes of bats' calls, providing sound cues that streamline foraging—a strategy that pays off in improved pollination for the plant.

<https://www.nationalgeographic.com/magazine/2014/03/bat-echo/>

### Interactive Pollinator Activity from PBS

<https://www.pbs.org/wgbh/nova/nature/pollination-game.html>

**VIDEO:** Dino Martins Explains the Importance of Bees and Insects



<https://www.nationalgeographic.org/media/people-plants-and-pollinators/>

### Projects

Build Your Own Bee Hotel

<https://www.nationalgeographic.org/media/build-your-own-bee-hotel/>



Photo by Crouch, UT

### ACTIVITIES/ CURRICULUM

#### Project Learning Tree (PLT)

<https://www.plt.org/>

PLT K-8 Guide (visit website for state coordinator and workshop listings)

Habitat Pen Pals (#7)

Trees as Habitats (#22)

Web of Life (#45)

Are Vacant Lots Vacant (#47)

#### Improve Your Place—

[https://monarch.pwnet.org/pdf/PLT\\_Activity\\_96.pdf](https://monarch.pwnet.org/pdf/PLT_Activity_96.pdf)

#### Can it Be Real?

[https://monarch.pwnet.org/pdf/PLT\\_Activity\\_11.pdf](https://monarch.pwnet.org/pdf/PLT_Activity_11.pdf)

#### Project WET <https://www.projectwet.org/>

Project WET guide (visit website for state coordinator and workshop listings)

#### Project WILD <https://www.fishwildlife.org/projectwild>

Project WILD Aquatic Guide (visit website for state coordinator and workshop listings)

Improving Habitat in the Community (page 440)

Migration Barriers (page 308)

Planning for People and Wildlife (page 436)

Shrinking Habitat (page 310)

And more

#### Food Land and People (FLP)

<http://www.foodlandpeople.org/>

Schoolyard caretakers (page 35)

Buzzy, Buzzy Bee (page 139)

Your School Ground Through New Eyes (page 285)

And more

#### Ag In the Classroom

<https://www.agclassroom.org/teacher/matrix/>

<https://www.agclassroom.org/ny/programs/index.cfm>

National Resource Directory—curriculum

State Contacts and more

#### Junior Master Gardener Program

<http://imgkids.us/>

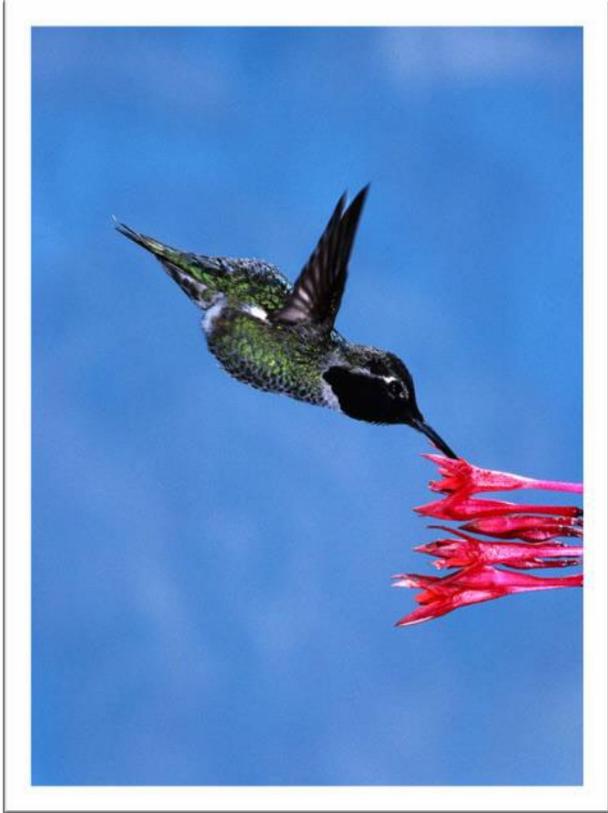
Curriculum and more



# Pollinators and Me

## Level 1 Activity Page 7—Pollinator Cards

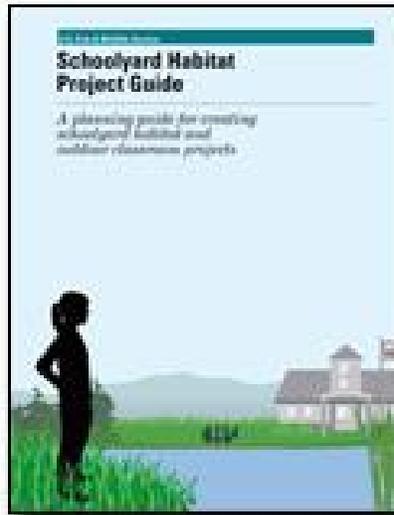
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# Community and Schoolyard Habitat Ideas

## U.S. Fish and Wildlife Service Schoolyard Habitat Project Guide

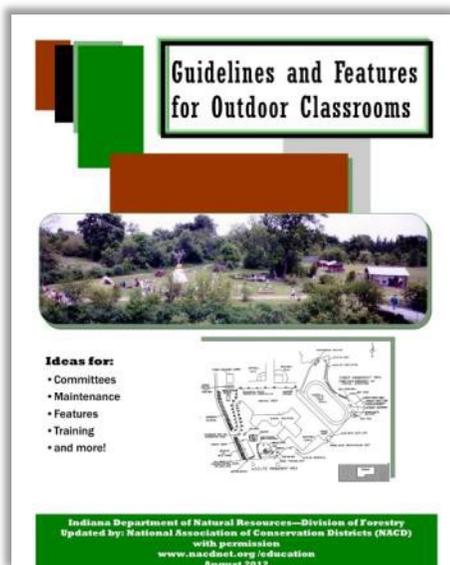
The Schoolyard Habitat program guidebook is a tool that takes teachers and administrators through the process and outlines the steps to creating a successful project where students go outside to experience nature. The guide has everything you need to go from concept to completion, and with a successful result: creating a natural spaces on school grounds where students will observe, draw, write, think, question



<https://www.fws.gov/cno/pdf/HabitatGuideColor.pdf>

## Guidelines and Features for Outdoor Classrooms

Interested in developing an outdoor classroom at a local school or area in your community? This guide was developed by the Indiana Department of Natural Resources - Division of Forestry and updated with permission by the National Association of Conservation Districts (NACD). It is only available in a PDF format that you can print as needed. This guide will give ideas for features in an outdoor classroom as well as setting up a community, funding ideas, curriculum resources and more.



<https://vegetableproject.org/wp-content/uploads/2017/04/Indiana-Dept-Natural-Resources-2012.pdf>

## National Association of Conservation Districts (NACD)

509 Capitol Court, NE

Washington, DC 20002-4937

P: (202) 547-NACD (6223)

E-mail: [stewardship@nacdnet.org](mailto:stewardship@nacdnet.org)

Web: [www.nacdnet.org](http://www.nacdnet.org)



National Association of  
Conservation Districts

