

Penn State Arboretum

WPSU Virtual Field Trip Teacher Guide



For Grades: 3rd – 7th

Duration: 3 class sessions

Objectives:

- Describe the interactions between pollinators and plants.
- Explain the importance of plants, animals, and rocks and their impact on the ecosystem.
- Summarize how water flows through a watershed.

Contents:

Plan Your Trip
Standards Alignment
Kit Activities
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Experience Penn State's Arboretum where beauty, science, and nature come together. Learn about pollinators, migratory birds, native plants, water conservation, and the geography of central Pennsylvania.

The Arboretum at Penn State is a place of beauty and renewal, a venue for the arts, and a pathway to discovery and enrichment.

Plan Your Virtual Trip!

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Discovery Chart [Assessment]: Use the included Discovery Chart to help students assess “What do we THINK we know about this topic?,” “What EXPERIENCES do we have that are related to this topic?,” “Why does this MATTER? Who does it affect?,” and “What do we WONDER about this topic?” about Pennsylvania flora and fauna. Use their answers to help guide a discussion prior to the field trip and identify areas of interest to explore and research together.

Guiding Questions:

- Describe the plants, animals, and rocks you see outside.
- How do the seasons change the plants and animals you see outside?

Scavenger Hunt [Activity]: We can observe all kinds of plants and animals outside in nature. Some of them are native to Pennsylvania, some of them help birds and pollinators, and some of them feed animals or people.

Take your students on a walk around your school building. Have them take notes or draw pictures of plants, animals, or rocks around your school. When back in the classroom, have them compare notes regarding the characteristics of the plant, animals, and rocks. Then have them discuss why it is beneficial to have different kinds of plants, animals, and rocks around the school.

Save the discussion notes for your field trip to the Arboretum to compare with what they see and learn from the videos.

It’s Field Trip Day! Start your trip by going over the different locations of the Arboretum with your students and having them predict what they will see. Then as a class, or in small groups, travel through the locations to see images, read descriptions, and watch videos. Have your students take notes and draw observations based on the questions below:

- What kinds of pollinators do you see?
- How would you describe the rocks and non-living parts of the gardens?
- Are there any special kinds of rock features? What is special about them?
- How do rocks impact water and water flow?
- How does the season impact pollinators and flowers?
- Are the leaves different colors? What kinds of colors do you see?

Once you have explored the Arboretum, discuss as a class what you observed about plants, animals, and the rocks and how they impact each other. How do these observations impact the questions made before the field trip? In their Discovery Chart, have them fill out the “What do we SEE when we look at these materials?”

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Plan Your Trip!

A F T E R

Discovery Chart [Assessment]: Complete the Discovery Chart you began before the trip by having students fill-in the “What are some MISCONCEPTIONS we realized about this topic?” and “What do we KNOW now?” columns.

- Discuss as a class what new things they learned.
- Discuss if there was anything that they thought they knew before the field trip that was not quite correct and how the field trip helped to clear up the misconceptions.
- Discuss any questions that students may still have.

Classroom Extensions

Exploration: Identify a Pennsylvania State Park in your community by visiting the [Pennsylvania Department of Conservation and Natural Resources website](#) to see what is near you.

Expert: Contact the Penn State Arboretum to schedule a Distance Learning Experience or an in-person field trip:

Jennifer Hooven
Childhood Education Coordinator
Email: jtb149@psu.edu
Phone: (814) 867-4813



Experience: Request your WPSU [Penn State Arboretum Classroom Activity Kit](#) from your local Intermediate Unit (IU) Lending Library to extend the Field Trip experience.

At-Home Extension

Watch & Create [Activity]: Learn about [insects](#), and then create your own insect with different parts of plants.

- Create a frame using toothpicks or other straight materials.
- Use food or pieces of plants from outside to create the head, torso, and appendages of different kinds of insects.

Attach your insect to the frame with ties or just take a picture to share with friends and family.



Additional Resources

Grades K-5

- [Large Leafy Trees](#) [Activity]: Guide children through an exploration on trees and leaves. In this art activity, children will learn about the different parts of a tree and create a class tree.
- [Pollinators](#) [Activity]: Learn how animals spread pollen from one plant to another with this video from Cyberchase. This resource includes discussion questions, vocabulary, and a hands-on activity that models how pollinators spread pollen from flower to flower.
- [Teaching Early Science with the Changing Seasons](#) [Professional Development]: With tools from PBS KIDS, explore ways to integrate media-rich lesson plans in your classroom and empower students to expand their natural curiosity and understanding of the seasons.

Grades 6-8

- [Navigate a Watershed](#) [Interactive]: Students learn how the physical, chemical, and biological systems within watersheds work together to create a continuum of resilient interconnected ecosystems with this interactive website.
- [Reclaiming Habitat for Honeybees](#) [Interactive]: Explore the role of pollinators in the ecosystems they are a part of. In this interactive lesson, students will develop a written response to one of three questions about the importance of honeybees.

Grades 9-12

- [Watersheds in Kentucky](#) [Interactive]: This interactive, adapted from Kentucky's Natural Heritage: An Illustrated Guide to Biodiversity, provides a video clip that explains what watersheds are, and where they can be found. Students are introduced to the different waterways located in a watershed area: headwater stream, watershed divide, and river mouth.
- [Exploring Pigments in Flowers](#) [Lesson]: Are all red flowers the same? Students will investigate if the pigments from one red flower are the same as another red flower.

Standards Alignment

PA Academic Standards | Science, Technology & Engineering, Environmental Literacy and Sustainability (STEELS):

- 3.1 – Life Science – Growth and Development of Organisms
- 3.1 – Life Science – Interdependent Relationships in Ecosystems
- 3.1 – Life Science – Ecosystem Dynamics, Functioning, & Resilience
- 3.1 – Life Science – Inheritance of Traits
- 3.1 – Life Science – Variation of Traits
- 3.3 – Earth & Space Science – Earth Materials & Systems
- 3.3 – Earth & Space Science – The Roles of Water in Earth's Surface Processes
- 3.3 – Earth & Space Science – Biogeology

Field Trip Kit Contents

To accompany your field trip to the Penn State Arboretum, check out the [Seasonal Phenomena Kit from your local IU Lending Library](#). The following pages provide an overview of potential activities you can do with your students with the contents of the kit along with some extension activity resources.

Winter: Germination

Phenomena: What do plants do in winter?

Activity: Winter Garden Planning



Spring: Watershed

Phenomena: Where does all the water go?

Activity: Design a Watershed



Summer: Pollinators

Phenomena: What is pollination?

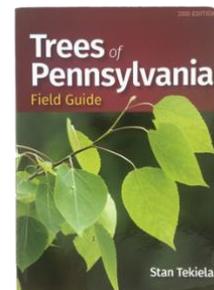
Activity: Pollinate like a Pollinator



Fall: Leaf Identification

Phenomena: Why do leaves look different?

Activity: Leaf Rubbing



Winter: Garden Planning

Phenomena: What do plants do in winter?

Scenario: A gardener is doing work in their garden during winter, even though there are no plants growing. They keep mapping out spaces and writing things down.

Objective: Students will understand how plants grow at different speeds and require different care.

Materials

Provided:

- Seed Square
- Garden Planning Worksheet
- Germination Worksheet

Activity: Plan a Garden

- Have students plan a garden using the garden planning and germination worksheets (attached at end of guidebook).
- Use the following resources to direct students for planning a particular type of garden.
 - [Vegetable Garden](#)
 - [Herb Garden](#)
 - [Pollinator Garden](#)
 - [Indigenous Garden](#)
- Make a class garden using the seed square to map out where to put different seeds in the soil.

Extension Resources

- [Start Seeds in Winter](#) (Activity)
- [Winter Jug Sowing](#) (Activity)
- [Farming in a Glove](#) (K-12 lesson)
- [How Does Your Garden Grow](#) (3-5 lesson)
- [Three Sisters Garden](#) (3-5 lesson)
- [Seedlings for Schools](#) (Website)
- [Rain Garden](#) (Website)
- [Water Blues Green Solutions](#) (Video)

Spring: Watershed

Phenomena: Where does all the water go?

Scenario: While out walking in the rain, a student notices that the water either puddles or flows downhill. Sometimes there's a strong enough flow to carry leaves.

Objectives: Students will understand how water flows through a watershed. Students will understand how pollutants impact a watershed.

Materials

Provided:

- Foil pans
- Foil roll
- Spray bottle
- Food dye tablets

Teacher Provides:

- Debris
- Water
- Markers

Activity: Design a Watershed

1. Have students gather debris like sticks, rocks, pinecones, and other natural items around the school.
2. In groups, students place the debris in a foil pan so that there is a slope from one end to the other.
3. Cover the debris with a sheet of foil and press it down to mold over the debris.
4. Have students draw with markers how they predict water will flow through their watershed.
5. Once a group is ready, the teacher will spray water (emulating rain) and the students will compare how the water flows with their prediction.

Extension: The teacher will place one food dye tablet in a teacher-picked location as a "pollutant." Have the students predict what will happen to the water flow. Teacher will spray the pan and the students will discuss how this compares with their prediction.

Extension Resources

- [What Is a Watershed?](#) (Website)
- [Spring Creek Watershed Atlas](#) (Website)
- [Chesapeake Watershed Project](#) (Website)
- [WikiWatershed](#) (Website)
- [Watershed Resources at The Arboretum](#) (PDF)
- [Watersheds in Kentucky](#) (3-12 Interactive)
- [Rock Your Watershed!](#) (Game)

Summer: Pollinators

Phenomena: What is pollination?

Scenario: While out walking by a garden, a student likes to watch the bees and hummingbirds fly around and land on the different colored flowers.

Objective: Students will explain what pollination is. Students will model how different pollinators cause different cross-pollination.

Materials

Provided:

- Poms: light pink, red, purple, white, yellow
- Plates: light pink, red, purple, white, yellow
- Velcro sticks
- Pollinator Profiles
- PA Butterflies & Pollinators Pocket Guide

Activity: Pollinator Chaos

1. Place plates with matching poms scattered throughout room. Place some on desks and some on the ground.
2. Give students a pollinator profile card and a Velcro stick.
3. Have students walk around the room and visit each flower. Using the profile card, determine if they pick up pollen (pom) and take it with them. The color of the flower (plate) matters but the color of the pom does not.
 - a. If they already have a piece of pollen, they leave the pollen they are carrying and pick up a new piece.
4. Turn the lights on and off to represent day and night time pollination.
5. After 10 minutes, have students look at how the color poms are now not matching the colors of the flowers (plates). Have them discuss what happened.

Extension: Use sticky notes to mark if some flowers are sweet smelling, rotten smelling, or have no strong smell. Add this to the activity and further discuss cross-pollination.

Extension Resources

- [Bird Checklist at The Arboretum](#) (PDF)
- [Flowers Seeking Pollinators](#) (2-7 lesson)
- [Cyberchase – Pollinators](#) (K-2 video)
- [Slo-Mo Footage of a Bumble Bee Dislodging Pollen](#) (Video)
- [What Do Bumblebees Do All Day?](#) (Video)
- [Center for Pollinator Research](#) (Website)
- [BugGuide](#) (Website)
- [Bumble Bee Watch](#) (Website)
- [Pollinator Partnership Learning Center](#) (Website)
- [World's First Bee Vaccine](#) (Article)

Fall: Leaf Identification

Phenomena: Why do leaves look different?

Scenario: On the hillside, some trees have green leaves. Some trees have needles. Some leaves are big and some are little.

Objective: Students will understand the different kinds of leaves for different trees.

Materials

Provided:

- Trees of Pennsylvania Guide

Teacher Provides:

- Leaves
- Paper
- Crayons
- Tape

Activity: Leaf Rubbings

1. Take students on a walk around their school to collect different types of leaves.
2. Have each student tape a leaf to the back of a piece of paper.
3. On the side of the paper opposite the leaf, gently rub the side of a crayon (take the paper label off) over the leaf.
4. Have students discuss the characteristics like the stem and any veins they see with the different rubbings.

Extension: Using different colored leaves, tape them to piece of paper to make a rainbow.

Extension Resources

- [Arboretum Tree Walk book](#) (PDF)
- [Trees and Climate Change](#) (Website)
- [Large Leafy Tree](#) (PreK-K activity)
- [Why do Leaves Change Color Experiment](#) (Activity)
- [Tree Identification](#) (3-5 video)
- [Nobel Laureate, Wangari Maathai, on Planting Trees](#) (6-12 podcast)
- [Leaves](#) (3-5 video)

Feedback



We would greatly appreciate your feedback as we continue to develop and improve upon this program. Please consider taking this short survey.

Thank you!

<https://wpsumm.wufoo.com/forms/qakrwaf11gjt7/>



Career Readiness Artifact Worksheet

Name _____ Grade _____

Teacher _____ School _____

Virtual Field Trip Taken:

Which Career Education and Work Standard did the Field Trip or related activity align with?

(Check all that apply)

- Career Awareness and Preparation (learning about a new skill or type of work or career)
- Career Acquisition (learning skills to attain a career)
- Career Retention and Advancement (learning how to run a business, market, and/or create a new idea to solve a problem)
- Entrepreneurship (learning how to run a business, advertise, and have a new idea)

What did you learn or find interesting on this field trip?

Something I want to learn more about:

This field trip was: Awesome!

Somewhat interesting

Not the best

Discovery Chart

Name:

Date:

What do we SEE when we look at these materials?	What do we THINK we know about this topic?	What EXPERIENCES do we have that are related to this topic?	Why does this MATTER? Who does it affect?	What do we WONDER about this topic?

What are some MISCONCEPTIONS we realized about this topic?	What do we KNOW now?

Kolb, A.G. (In Press). Teaching with primary sources to engage multilingual learners in culturally responsive dialogic inquiry. In S. Waring (Ed.), *Teaching with primary sources for cultural understanding, civic mindedness, and democracy*. Teachers College Press.



Germination & Planting Worksheet

Planting Zone: _____ Last Frost Date: _____ First Frost Date: _____

Plant Name	Method (direct/indirect)	Sow Date	Seed Planting Depth	Seed Spacing	Days to Germination	Days to Maturity



THE ARBORETUM AT PENN STATE

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Square Foot Garden Planning Worksheet

Planting Zone: _____ Last Frost Date: _____ First Frost Date: _____



THE ARBORETUM AT PENN STATE

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