

Woodland Trails Curriculum Guide



"To know something about trees – about even one tree – is to know something important, something fundamental, something profound about the nature of our world and our place in it." – Gerald Jonas

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Environmental Action Grants



Introduction

About Woodland Trails

Woodland Trails explores how seasonal changes influence the life cycle and benefits of trees. Groups will examine the processes and structure of trees and recognize the vital role that they play in our communities.

Goal

The goal of the Woodland Trails curriculum is to encourage participants to imagine a community forest they may plant, protect, and maintain for future generations to enjoy.

Purpose

The purpose of this guide it to provide teachers, leaders and community leaders with a:

- Selection of excellent Seasonal Project Learning Tree activities, as well as several from a variety of other sources.
- Foundation of strategies and activities that will foster curiosity and understanding as you explore and discover the outdoors.

Curriculum Guide Contents

- Indoor before Outdoor Tips things to consider before going outdoors in order to maximize your experience.
- **Outdoor Classroom Management Tips** for successful leadership of outdoor group experiences. The suggested guidelines have been collected from the experiences of multiple teachers and group leaders.
- Activities organized by season (Spring, Summer, Fall, Winter). Each season contains 8 - 9 lessons that lend themselves to a particular time of year; however, these may be used during any season that the leader determines to be meaningful for the group experience. Some activities may include suggestions and resources that may be used to extend the learning opportunity.
- **Games** that may be used as stand-alone activities or as an extension to any lesson that the leader determines will benefit.
- A glossary of terms provided to assist in the understanding of unfamiliar concepts and terms that may appear throughout the guide.
- A "Bookcase" containing titles of suggested books and readings on the topic of trees and nature. Listed alphabetically, each title is referenced to related activities.
- IN Science and Engineering Process Standards (SEPS) provides information to assist teachers with decisions related to curriculum.
- Appendix handouts correlating to specific lessons are provided for leaders to copy if desired.

Indoor before Outdoor Tips

Overview

Consider the following tips before adventuring outdoors to ensure you have an organized, well planned and engaging experience. The suggested tips have been collected from the experiences of multiple teachers and group leaders.

Materials

- □ Collect and have all materials ready before hand.
- Distribute re-usable clipboards (if using them for outdoor desks), prior to going outside and describe their proper use.
- □ Provide pencils and portable pencil sharpener.
- Distribute nature journals ahead and assure that they are clearly labeled. Discuss how they will be used during the activity; (required sketches, collecting data, observations, etc.)



 Create a backpack that includes: cell phone, first aid kit, whistle, field guides, wipes and other tools that are essential for your activity.

Space

Describe high risk areas that require extra attention or

should be avoided.

- Discuss where areas for hydration will be available throughout programming.
- Tell participants that an outdoor "gathering spot" has been determined and that this is where they will assemble for initial instructions, mid-lesson check-ins, or a closing discussion.
- Clearly set expectations: respect for the site, leave it the way you found it, and collect then release. Models of respect for nature



Activities



Outdoor Classroom Management Tips

Overview

Use the following tips for successful leadership of outdoor group experiences. The suggested guidelines have been collected from the experiences of multiple teacher and group leaders.

Space

- Use natural divides such as trees, foliage, creeks etc. to create boundaries.
- High risk areas should be highlighted and strategies to manage these areas should be in place.
- You should be able to observe all groups from a central area.
- The sun should be in your eyes so that all participants can see you.
- Use sunny-sheltered areas in winter and shady-breezy areas in hot weather.
- Wind should carry sound to participants.
- Identify areas for hydration throughout programming.
- Use cones or bright markers to create small area boundaries.
- Identify an outdoor "gathering spot" where participants assemble for initial instructions, mid-lesson check-ins, or a closing discussion.
- Remind students of ground rules.
- Provide a comfortable circular or semi-circular seating area(s).

Groups

- Large groups should be broken into smaller groups. Remember the 1 adult to 8 children ratio.
- Stations can be used to create smaller groups.
- Designate rotation of tasks for "Discovery Teams" that focus on gathering information and explain any tasks associated with each individual team.
- Count the number of students/participants before and after activity.







Activities

- Use reusable clipboards as outdoor desks and trash bags as seats.
- Provide additional pencils and a portable pencil sharpener.
- Use quiet/silent listening activities that sharpen observation skills.
- Use nature journals that require sketches, measurements, observations, etc.
- Start slow. Spend a couple of sessions walking the site; mapping schoolyard areas; practicing routines; identifying harmful plants; and making some observations.
- Let students poke around, freely explore and "play" with the outdoor materials.
- Keep it short. An outdoor experience may be only ten minutes, just long enough to collect the needed data. Begin with short trips out and increase the time spent outside as students' skills and stamina increase.
- Learning looks different outdoors. Recognize that voices may be louder, and body movements larger outdoors. Excitement is likely to be high, and expressed more physically.
- Use visual, hands on demonstrations that promote a sense of doing.
- Position adult helpers at the back of the line or group.
- Build inn opportunities for free exploration as a routine at the end of your visit that participants look forward to.





Leadership

- Be enthusiastic, attentive, interested, informed and knowledgeable.
- Explore the outdoor classroom before each visit.
- Establish ground rules in a positive way.
- Know the outcome of each activity.
- Stay focused on the direct aim of each activity.
- Provide clear instructions and constructive feedback.
- Don't start before the entire group is there.
- Check for understanding of directions.
- Be prepared for each activity have all materials ready.
- Carry a backpack with cell phone, first aid kit, magnifying lenses, bandanas, whistle, field guides, wipes and other teaching tools such as pencil sharpeners and extra pencils.
- Remember: Safety first!
- Model and expect:
 - Respect for the site
 - Leave it the way you found it
 - Collect then release
- Dress appropriately so as to model this to participants (shoes, layering, etc.)
- Teach and reteach how to recognize poison ivy.
- Know which students have asthmas or are allergic to insect stings and make sure they have their medication.
- Take time to train students how to use tools.
- Review and evaluate what was accomplished.
- Keep a notebook that notes logistics and changes as well as links to other activities.
- Provide frequent, time reminders.
- Establish signals:
 - One whistle = Look at person in charge
 - Two whistles = Go to established meeting place
 - Three whistles = Emergency line up



□ Plan age appropriate activities that match the skill level of participants.

Provide initial instructions, checking for understanding of these directions.

- □ State ground rules and how these are to be adhered to.
- Determine what dress will be appropriate for the outdoor adventure: long sleeves, pants, jackets, shoes, and advertise this before the day of the event.
- Prepare and keep a notebook that outlines logistics and includes helpful notes for future adventures.

Groups

- □ Recruit adult volunteers to help when needed. Keep in mind the adult to children ratio.
- □ Create smaller groups and determine who will be in each group. A, 1 adult to 8 children, ratio is suggested.
- If using "learning stations" assign each group to its first station and discuss the rotation that will take place during the event.
- Create "Discovery Teams" that focus on gathering information and specific tasks. Rotate these tasks. Check for understanding of tasks and rotation.
- Count the number of students before you begin the activity.
- Determine if there are any students with asthma or are allergic to insect bites/stings and make sure that necessary medication is available.





Fall Activities

Overview

This component includes activities relating to fall. Review the directions prior to completing the activity with your audience. The **Outdoor Classroom Management** component of the guide also provides tips to successfully complete each activity.



Activities

Activity Title	Brief Description	Approximate Time to Complete	Suggested Grade Level
The Shape of Things	Students identify shapes found in both natural and built environments	45 minutes	K-2nd grade
Apple Pie Tree	Students learn how valuable trees are as a food source	30 minutes	K-3rd grade
From a Tiny Acorn, a Mighty Oak May Grow	Students learn about a tree's growth stages and grow a tree from an acorn	15 -45 minute sessions throughout the seasons	2-6th grade
Signs of Fall	Students look for signs of fall by observing seasonal changes, and they investigate why some leaves change color	45 -60 minutes	2-4th grade
Trees in Trouble	Students learn the signs of poor tree health and how they can help	60 minutes	3-6th grade
Every Tree for Itself	Students learn about what different species of trees need to survive	50 minutes	K-5th grade
Meet a Tree	Students use the sense of touch to identify trees	60 minutes	K-5th grade
Silent Sharing Walk	Students discover nature's wonders while on a walk	45 minutes	4-6th grade

The Shape of Things

Description

We depend on each of our senses – touching, tasting, hearing, smelling, and seeing – to gather impressions of our environment. For instance, in nature, we see various shapes and colors. In this activity, students use sight to identify shapes in nature.

Objective

• Match basic geometric shapes (square, circle, triangle, etc.) to objects found in nature.

Indiana Science and Engineering Process Standards

- SEPS.2: Developing and Using Models and Tools
- SEPS.3: Constructing and Performing Investigations
- SEPS.8: Obtaining, Evaluating and Communicating Information

Type of Activity

• Individual or small groups of 5-10 students

Audience

• K-2nd grade

Materials Needed

The following materials are needed for each student or each small group of students:

- Different fall colored construction paper
- Scissors
- Piece of string or pipe cleaners
- Pencil/marker/crayons
- Chinese Tangram Puzzle template (duplicated on cardboard or construction paper)
- Hole punch

Vocabulary

Discuss the following vocabulary before conducting the activity:

• Senses

- Geometric shapes
- Nature

Tangram puzzle
Par

• Parallelogram

Prepare for the Activity

Prior to conducting this activity, consider the following:

- Ensure understanding of basic geometric shapes.
- Discuss with the students where they see shapes in the classroom.
- Discuss the relationship of geometric shapes to each other (e.g., two triangles can make a square, rectangles and squares both have four sides).
- Use visuals to show how shapes can be found in nature (e.g., the branches of pine trees might form a triangle).

Conduct the Activity

 Have students create "shape necklaces" by cutting out circles, squares, triangles, rectangles, ovals, and hearts from different colored construction paper.



- TIP: Depending on the age of the students, number of students, and time constraints, you might want to have the shapes already cut out.
- Have students write the shape names on the cutouts, and punch a hole in each.
- Thread a piece of string or a pipe cleaner through each shape. Form a loop fitting easily over a child's head.
- Go outside to investigate and discuss:
 - What is your favorite shape?
 - What objects can you find that are the same shape and color as those on your necklace?
 - Play the "I Spy" guessing game: "I spy something shaped like a _____. Can you find it?"
 - Hold up each shape and have children name all the outdoor items they can find to match.

Enhance the Activity

Once back inside:

Introduce children to the Chinese Tangram puzzle (see below).

- The puzzle is made of seven geometric pieces: five triangles, one square, and one parallelogram. The pieces can be arranged to create different objects, including people, animals, flowers, boats, and more.
- Have the children cut the tangram apart to make their own puzzle pieces.
- Have the children work together to see what new objects they can create!
- Challenge them to use as many shapes as possible to create new objects.
- Have children identify the shapes they put together to make the new object.

TIP: Depending on the age of the children, number of children and time constraints, you might want to show them what the original tangram looks like but have the shapes already cut out.



Apple Pie Tree

Description

Who doesn't enjoy a sweet treat? Students connect to trees and nature and how we get food from trees. Students will use critical thinking skills to connect what they eat with where it comes from in order to encourage them to explore what other gifts trees give us.

Objective

 Connect children to trees and nature so they can understand how we get food from trees

Indiana Science and Engineering Process Standards

- SEPS.1: Posing questions (for science) and defining problems (for engineering)
- SEPS.3: Constructing and Performing Investigations
- SEPS.8: Obtaining, Evaluating and Communicating Information

Type of Activity

• Small groups of 5-10

Audience

• K-3rd grade children

Materials Needed

- Apple Pie Tree by Zoe Hall
- Chart paper and markers

Vocabulary

Discuss the following vocabulary before conducting the activity:

fruit

• blossoms

• bud

stem

leaf

Conduct the Activity

• Read The Apple Pie Tree by Zoe Hall and Shari Halpern

- Ask the students and make a list of what other food comes from trees.
- Take a walk to find the trees in your community.
- Ask students the following questions:
- Do these trees provide food for us? Nut or fruits?
- What other things does the tree provide? For animals?
- How else are these trees important?

Enhance the Activity

- Suggested reading:
 - Fall Leaves Fall by Zoe Hall
 - o Red Leaf, Yellow Leaf by Lois Ehlert
 - Leaf Man by Lois Ehlert
 - Why Do leaves Change Color by Betsy Maestro
- These books offer an excellent opportunity to discuss the changes the different seasons bring. Begin by identifying the seasons and writing their names on a chart. Ask children to describe what happens in each season. What are some of the things they do in each season? What changes take place in the weather? Add the story of the apple tree to your chart. Keep the chart on display throughout the year and continue to add details to it as the seasons pass.
- Make a Pie: If you have cooking facilities available, you might use the recipe in the book to make apple pies. Enlist the help of parent volunteers to donate ingredients, loan cooking utensils, and assist in working with the children. As an alternative, you might send home copies of the recipe explaining that the class has just read a book called the *Apple Pie Tree*.
- Make an Apple Web: To help children understand the many ways people use apples, make a web on poster paper with a large apple picture in the center. Add other pictures around the web to show that apples are used in applesauce, as candy apples on a stick, in apple tarts, apple pies, apple brown betty, apple jelly, apple dumplings. You can find pictures in adds and in food magazine articles.

Signs of Fall

Description/Background

With fall's colder temperatures and shorter days, the cells of deciduous tree leaves begin to die. The dead cells block water and nutrients from the leaf. Chlorophyll, the green pigment in the leaves, breaks down and the yellow and red pigments begin to show through.

Objective

- Recognize signs of fall
- Observe the annual changes of the season
- Investigate why leaves of deciduous trees change colors

Indiana Science and Engineering Process Standards:

- SEPS.2: Developing and using models and tools
- SEPS.3: Constructing and performing investigations
- SEPS.6: Constructing explanations (for science) and designing solutions (for engineering)

Type of Activity

• Individual or small groups of 8-10

Audience

• 2nd-4th grade students

Materials Needed

The following materials are needed for each student or each small group of students

- Paper
- Rubbing crayons

Directions

Take children on a walk through a wooded area, schoolyard, local park or neighborhood sidewalk to look for signs of fall. Point out the differences between deciduous and evergreen trees. Have children find at least five of each and collect sample leaves. Create leaf rubbings by covering a leaf with a piece of paper and rubbing a crayon over it. Use crayons to match the fall colors found in the leaves. Encourage critical thinking by asking:

- What signs of fall can you see in the trees and on the ground?
- How many different leaf colors can you find?
- What will happen to the leaves?

Have children use the colorful fall leaves to create a picture. For ideas, see *Leaf Man* by Lois Ehlert.

Evergreen Everareen trees keep their leaves (needles) year-round. Example: Pine Deciduous Deciduous trees lose their

Deciduous trees lose their leaves annually. Example: Oak

Why Do Leaves Change Color?

With fall's colder temperatures and shorter days, the cells of deciduous tree leaves begin to die. The dead cells block water and nutrients from the leaf. Chlorophyll, the green pigment in the leaves, breaks down and the yellow and red pigments begin to show through.

Native Americans had legends to explain the fall colors. Invite children to create their own imaginative stories.

Trees in Trouble

Description

Trees require water, nutrients, and space to grow and thrive. When these needs are not met, like humans and other animals, trees become weak and unhealthy. Signs of trees in trouble are discolored or shriveled leaves, insect holes, rotten spots, or seeping wounds. Learning to be aware of these signs and understanding their causes will help keep trees healthy.

Objective

- Learn the signs of trees in stress
- Determine the possible causes of stress and identify ways to help keep trees healthy

Indiana Science and Engineering Process Standards (SEPS)

- SEPS.1: Posing Questions and defining problems
- SEPS.2: Developing and Using Models and Tools
- SEPS.3: Constructing and Performing Investigations
- SEPS.4: Analyzing and interpreting data
- SEPS.6: Constructing explanations and designing solutions
- SEPS.7: Engaging in argument from evidence
- SEPS.8: Obtaining, Evaluating and Communicating Information

Type of Activity

• Individual or small groups of 3-8

Audience

• 3rd-6th grade

Materials Needed

The following materials are needed for each student or each small group of students:

- Copies of Tree-tective Trouble Guide (See page 12)
- Measuring tape or ruler
- Camera (optional)
- Insect-damaged leaves

Vocabulary

Discuss the following vocabulary before conducting the activity:

• symptoms

• weakened

• illness

• cure

Prepare for the Activity

Prior to conducting the activity with the students, consider the following:

- Collect insect damaged leaves for students to examine before going outdoors.
- Have pencils and clipboards with paper or small notebooks available for students.
- Copy Tree-tective Trouble Guides for teams/individual students.

Conduct the Activity

- Discuss what causes people to become sick or unhealthy and compare these to trees. Have students examine insect-damaged leaves and predict what may happen to the tree.
- Have the students become Tree-tectives by taking a walk in a familiar area looking for healthy and unhealthy trees.
- Use the Tree-tective Trouble Guide to help identify symptoms of unhealthy trees.
- Have students sketch what they see.
- Help them to hypothesize what caused the tree to become in a weakened state.

Enhance the Activity

Once back inside, have students share their sketches and discuss/diagnose the overall health of the community of trees they saw.



From a Tiny Acorn a Mighty Acorn May Grow

Description

Students will learn about the growth stages of a tree and will grow a tree from an acorn (seed).

Objective

- Conduct germination experiments with acorns
- Grow an oak tree from an acorn (seed)
- Document the stages of the growth of a tree
- Take leaf rubbings from a variety of leaves and compare and contrast their properties

Indiana Science and Engineering Process Standards

- SEPS.1: Posing Questions and defining problems
- SEPS.2: Developing and Using Models and Tools
- SEPS.3: Constructing and Performing Investigations
- SEPS.4: Analyzing and interpreting data
- SEPS.6: Constructing explanations and designing solutions
- SEPS.8: Obtaining, Evaluating and Communicating Information

Type of Activity

• Individual or small groups of 3-8

Audience

• $3^{rd} - 8^{th}$ grade

Materials Needed

The following materials are needed for each student or each small group of students:

- Acorns or access to a small grove of oak trees for students to gather their own
- Hand lens
- Bucket or container to hold water for testing acorns
- Containers and soil to plant acorns into
- Plastic freezer bags

Vocabulary

Discuss the following vocabulary before conducting the activity:

• seedling

• germinate

• germination

- fertilization
- seed

Prepare for the Activity

Prior to conducting the activity with the children, consider the following:

- Locate several oak trees and determine if there are enough acorns for students to collect.
- Determine an area that will provide enough sunlight for the acorn seedlings to grow and that will allow students to observe and record growth.
- Have tree guides available for students to use for research and identification.

Conduct the Activity

Fall:

In the fall, take students outdoors to gather acorns.

Help students inspect the seeds, and discard any that are obviously damaged, moldy or wormy.

Place acorns in a container of water. Discard those that float, and place back in storage.

Record observation/predictions

Winter:

Open bags periodically during storage and examine and record observations.

About 30 days prior to planting, place acorns in moist, well-drained sand and keep at a temperature of 32-41 degrees.

Early spring: (March 1)

After about 30 days, check acorns to see if germination has begun (seed coat broken and shoot development is occurring.)

If germination has started the acorns should be planted.

Help students fill milk cartons with the potting medium, and place two or three acorns in each mild carton.

Place cartons in a sunny, south facing window.

Students will turn the plants daily to keep them from bending toward the light. Continue to record observations.

Early April

After a few weeks students will remove one of the seedlings. Record observations. This is a good opportunity to discuss overcrowding and to go outdoors to look for overcrowding.

One month after germination, students will fertilize their plants with diluted liquid house plant fertilizer.

Students will measure seedlings using standard and metric rulers or non-standard measures.

Continue to record observations/revisit and discuss predictions.

Summer

Seedlings may remain in pots for a year but should be set out from spring to fall. Or, send seedlings home with students for planting, or make arrangements to plant some of the seedlings.

Enhance the Activity

Have students plant other tree seeds. An excellent resource can be found at: nature-watch.com. Nature Watch's "Forests Forever Activity Kit" contains all the materials necessary to learn about and grow pine trees.

Every Tree for Itself

Description

This activity will give children an understanding of the conditions trees need to live and grow and also teach students that trees must often compete for their needs.

Indiana Science and Engineering Process Standards

- SEPS.1: Posing Questions and defining problems
- SEPS.3: Constructing and Performing Investigations
- SEPS.4: Analyzing and interpreting data
- SEPS.6: Constructing explanations and designing solutions
- SEPS.8: Obtaining, Evaluating and Communicating Information

Type of Activity

• Individual or small groups of 3-8

Audience

• K-5th grade

Materials Needed

The following materials are needed for each student or each small group of students:

- String or sidewalk chalk
- Construction paper (for extended activity)
- 50' tape measure

Vocabulary

Discuss the following vocabulary before conducting the activity:

root spread

species

• nutrients

diameter

Prepare for the Activity

Prior to conducting the activity with the students, consider the following:

- Locate several trees for the students to observe
- Research the water and nutrient needs for 5-6 different species
- Have tree guides available for students use for research and identification

Conduct the Activity

Challenge students to think about the things they need to live and grow. Then ask about the things trees need to survive. What are a tree's needs and how does it get them? What happens to trees when these needs are not met? Explain how trees use leaves to capture sunlight and roots to access water and nutrients.

Did you know that for many species, a tree's height is roughly equal to the diameter of its root spread? This concept is illustrated in the diagrams below.



Explain to children that this information can be used to determine the root spread of a tree their size... or the size of their own root spread if they were a tree! Ask:

- How tall are you?
- What is the diameter of your root spread? (the same as their height!)
- How can we make a circle large enough to show the size of your root spread? (help them do so, using string or sidewalk chalk)

Have children stand in the middle of their root spread circle and pretend they are a tree. Remind children that trees are rooted to the ground and cannot move or talk in order to get what they need. Ask children to demonstrate how a tree might act if sunlight only reached one side. What might a tree look like if it is hungry, thirsty, or cold? What might happen if a tree's root spread overlapped with those of other trees?

Thee Height and Root Spread

Questions

After the students have completed the activity ask the following question:

• How do trees compete for survival?

Enhance the Activity

Older students may want to measure a tree using the following method:

Ask students to fold the corner of a piece of construction paper into a right triangle. Take students outside to select a tree to measure height. Beginning at the base of the tree, students walk to a place that they believe is the same height as the tree. While holding the triangle with its base (right angle at bottom) down, students adjust their distance until the point of the hypotenuse is aligned with the top of the tree. They then measure the distance from the tree and add their height to determine the tree height.

©American Forest Foundation. Adapted from Activity 27: Every Tree for Itself from Project Learning Tree's PreK-8 Environmental Education Activity Guide.

Meet a Tree

Description

Trees are as unique as people—no two trees look or feel the same. Most of us go through our lives merely observing trees with our eyes, but rarely do we use the sense of touch to connect with a tree on a more personal level. Trees can be calming and uplifting, as well as a source of inspiration and creativity as we connect with nature. This activity will help children connect with how a tree feels instead of just how it looks.

Objective

- Explore trees using touch
- Develop sensory awareness and empathy for nature and forestry

Indiana Science and Engineering Process Standards

- SEPS.1: Posing Questions and defining problems
- SEPS.3: Constructing and Performing Investigations
- SEPS.6: Constructing explanations and designing solutions
- SEPS.8: Obtaining, Evaluating and Communicating Information

Type of Activity

• Individual or small groups of 3-6

Audience

• K-5th grade

Materials Needed

The following materials are needed for each student or each small group of children:

- Blindfold
- Recording materials (optional)

Vocabulary

Discuss the following vocabulary before conducting the activity:

• characteristics

- senses
- unique
- trunk (tree)

Prepare for the Activity

Prior to conducting the activity with the students, consider the following:

- Locate a wooded area or several trees for the students to observe
- Review five senses with students
- Secure additional adult helper(s) if needed

Conduct the Activity

Divide the children into pairs and supply each pair with a blindfold. One student will wear the blindfold and the other will guide them to a tree that exhibits unique and interesting characteristics. Once there, the blindfolded student will examine the tree using tactile feedback such as hugging the tree (to ascertain size), feeling the bark pattern, touching its leaves and branches, and so on. The other student (the guide) can silently help the blindfolded child discover interesting features and locations on the tree, such as knots and bark patterns, by guiding their hands to these areas on and around the tree.

Here are some recommended questions and observations:

- 1. How big around is the tree? Can you get your arms all the way around the trunk?
- 2. How does the bark feel? Is it relatively smooth? Rough? Bumpy?
- 3. What do the branches feel like? Are they small, medium or large? Are they sticky at all (i.e. sap)?
- 4. What do the leaves feel like? Are they thick or thin? What shape(s) do they feel like? (Note: This particular attribute can help considerably with locating the tree later)

After making a "tactile memory" of the tree, the guide should lead the blindfolded student back to the starting/gathering point and remove their blindfold. The students that were blindfolded should then try to locate their tree. Most school age children that have walked 30+ yards to a tree while blindfolded will be able to find their way back with eyes open later, though some adjustment may be necessary to account for age, physical capability, and skill level.

Observe the reactions on the children's faces as they are amazed by their ability to locate a tree they never saw with their eyes before!

Questions

After the students have completed the activity ask the following questions:

- How difficult was it to identify your tree once the blindfold was removed?
- What characteristics enabled you to find your tree?
- What senses did you use to describe your tree?

Enhance the Activity

You may find that other variations/accommodations are recommended depending on the group and age levels of the children. For children under the age of twelve, an adult may make a better partner. Young children may prefer to partner with an adult, which can also provide a great

opportunity for the adult to observe the area for safety purposes.

Silent Sharing Walk

Description

Students will quietly walk in nature to observe its beauty and wonders. Silent Sharing Walkers experience a beautiful rapport among themselves and with nature. Keeping silent and sharing nonverbally, the walkers become fully present with nature and with one another. It is moving to observe the serene, childlike love of the walkers as they gather around newly discovered flora, bird nests, and other natural wonders.

Objective

• Observe features of nature

Indiana Science and Engineering Process Standards

- SEPS.3: Constructing and Performing Investigations
- SEPS.6: Constructing explanations and designing solutions
- SEPS.8: Obtaining, Evaluating and Communicating Information

Type of Activity

- Individual or small groups of 2-3
- The ideal number for a Silent Sharing Walk is two or three walkers. If the group is larger, divide into sharing teams of two or three people.

Audience

• 4th-6th grade

Vocabulary

Discuss the following vocabulary before conducting the activity:

- characteristics
- senses

• unique

• trunk (tree)

Prepare for the Activity

Prior to conducting the activity with the children, consider the following:

• Locate a wooded area/trail for students to walk

Conduct the Activity

Choose an attractive trail or open area that's easy to wander through. Since sharing teams move slowly, the distance they travel won't be great. If there are several sharing teams, agree on a time and place to gather afterwards.

Tell the participants to walk in silence. When one walker sees something captivating, instead of speaking aloud about it, he should gently tap the shoulder of one or more teammates, then point to the object and silently share the enjoyment.

Upon returning to the gathering place, have students discuss what they observed.

Questions:

After the students have completed the activity ask the following questions:

• How would this experience be different if you were allowed to talk?

Enhance the Activity

Revisit the area at a later date and ask students to repeat the activity and compare their experiences.

Winter Activities

Overview

This component of the guide includes activities that relate to Winter. Review the directions prior to completing the activity with your class. The **Outdoor Classroom Management** component of the guide also provides tips to successfully complete each activity.



Activities:

Activity Title	Brief Description	Approximate Time to Complete	Suggested Grade Level
Tree Cookies	Students examine cross sections of trees, "tree cookies", to find age, and patterns of growth.	45 minutes	K – 4th grade
To Be a Tree	Students become better aware of the parts of a tree by designing a "tree vest".	(30 mins. Prep) 50 minutes	K – 1st grade
Tree Factory	Students learn about tree structure and function through acting.	45 minutes	K-2nd grade
Evergreens in Winter	Students take a walk, through nature in winter experiencing it through sound, smell, and touch.	45 minutes	K – 5th grade
Trees as Habitats	Students learn to appreciate a tree as a home to wildlife and many living things.	50 minutes	3 – 4th grade
The Closer You Look	Taking a "Closer Look" students will learn more about the structure of trees and their differences.	50 minutes	3 – 5th grade
Camouflage Trail	Why is it difficult for us to see many animals? Students will learn about adaptation and protective coloration in this fun activity.	35 minutes	K – 5th grade
Sound Map	Sit quietly and create a map of the surrounding sounds of nature.	45 minutes	3– 6th grade

Tree Cookies

Description

One way to learn about tree growth is to look at annual rings. Tree rings show patterns of change in a tree's life as well as changes in the area where it grows. In this activity, you can trace environmental and historical changes using a cross section of a tree, or "tree cookie."

Objective

• Determine find age and patterns of growth by examining cross-sections of trees.

Indiana Science and Engineering Process Standards

- SEPS.2: Developing and using models and tools
- SEPS.3: Constructing and performing investigations
- SEPS.6: Constructing explanations (for science) and designing solutions (for engineering)

Type of Activity

- Individual or small groups of 5-10 students
- K 6th grade children

Materials Needed

The following materials are needed for each student or each small group of students:

- Cross sections of a tree or "tree cookies" (available on Nature-watch.com or Amazon.com)
- Several hand lens
- Drawing paper or notebooks and pencils

Vocabulary

Discuss the following vocabulary before conducting the activity:

- growth rings
- heartwood

• cambium

phloem

- sapwood/xylem
- outer bark

Resources

• Project Learning Tree: [<u>https://www.plt.org</u>]

Prepare the Activity

Prior to conducting the activity with the children, consider the following:

• Read the book: *The Giving Tree* by Shel Silverstein

Conduct the Activity

Have you ever counted tree rings? Every growth season a tree adds a new layer of cells, called annual growth rings to its trunk and limbs. This means you can determine the age of a tree by counting its layers or rings. Have children learn more about a tree's life by examining a tree cookie and asking:

- How old was this part of the tree when the tree cookie was cut?
- Can you see different markings? Is there evidence of scars or narrow, misshapen rings?
- What might have happened to the tree to cause these different markings?
- Can you see any holes or channels that might allow water and nutrients to travel up to the tree?

Finally, have the children draw a tree cookie the same age as themselves. What can they do to show when important events in their lives took place?

Enhance the Activity

Check out *Outside and Inside Trees* by Sandra Markel.

To Be a Tree

Description

Children become better aware of the parts of a tree by designing a "tree vest".

Objective

Children make a tree costume and gain awareness of tree structure and functions

Indiana Science and Engineering Process Standards

• SEPS.2: Developing and using models and tools

Type of Activity

- Small group or classroom
- $K 2^{nd}$ grade

Materials Needed

The following materials are needed for each student:

- bark
- yarn

- coffee stirring straws
- scissors
- glue

- brown paper grocery bags
- drinking straws
- construction paper
- tape

Resources

American Forest Foundation (<u>www.forestfoundation.org</u> - adapted from Activity 62: To Be a Tree from Project Learning Tree).

Vocabulary

Discuss the following vocabulary before conducting the activity:

• bark

heartwood

• cambium

phloem

- sapwood/xylem
- cambiuroots

Conduct the Activity

Take a walk, select a tree and ask students to name and identify its component parts (trunk, branch, leaves, bark, roots, etc.). Collect a few leaves and head inside. Invite students to make leaf rubbings by placing leaves (vein side up) on white paper and rubbing over them with the sides of paperless crayons. Carefully cut out the leaf rubbings, punch a hole in each, and use yarn to string them together into a crown.

Next, use the pattern below to help students create a paper bag vest. This vest can be worn with the leaf crown above to make a tree costume that models real tree parts.

With a student's torso serving as a tree's trunk and their arms as branches, ask students to add these tree parts to their vests:

- Bark glue pieces of bark directly to OR try a bark rubbing on the outside of vest
- Roots tape long strands of yarn to the bottom of the vest
- Phloem glue stirring straws (smaller diameter) to the inside of vest
- Cambium attach tissue paper to the inside of vest
- Xylem tape drinking straws (larger diameter) to the inside of vest
- Heartwood create a paper chain to wear as a belt

Enhance the Activity

For a children's book that describes the various parts of trees and their functions, check out <u>Outside and Inside Trees</u> by Sandra Markel.
Tree Factory

Description

Students become a tree through acting and learn more about how it stays alive.

Objective

Learn about tree structure and function.

Indiana Science and Engineering Process Standards

- SEPS.2: Developing and using models and tools
- SEPS.8: Obtaining, evaluating, and communicating information

Type of Activity

- Small group or classroom
- $K 2^{nd}$ grade

Materials Needed

No materials are needed for this activity.

Resources

©American Forest Foundation. Adapted from Activity 63: Tree Factory from Project Learning Tree's PreK-8 Environmental Education Activity Guide

Vocabulary

Discuss the following vocabulary before conducting the activity:

bark

heartwood

• cambium

phloem

- sapwood/xylem
- roots

Conduct the Activity

Ensure that there is adequate space for children to perform. Engage children by asking them to think about what trees need to survive (food, sun, water, air, and space). Discuss how a tree might get these requirements, especially since they can't move the way animals can.

- How does a tree get the water it needs?
- How does a tree get the food it needs?
- How does water and food get around to all parts of the tree?

Explain that in addition to having leaves and roots, trees have special layers in their trunk and branches that help them move nutrients and water to every part of the tree. The trunk and branches also contain a growing layer of cells that create the tree's annual growth rings, making the trunk, branches, and roots thicker each year. Review the following tree parts and have children label the diagram.

- Heartwood forms the central core of the tree. It is made up of dense dead wood, and it provides strength.
- Xylem brings water and nutrients up from the roots to the leaves. Older xylem cells become part of the heartwood.
- Cambium a very thin layer of growing tree tissue. It makes cells that become new xylem, phloem, or cambium.
- Phloem carries sap from the leaves to the rest of the tree. At certain times of the year, phloem may also move stored sugars from the roots up to the rest of the tree.
- Outer Bark protects the tree from injury caused by insects, animals, plants, diseases, and fire.

Have children build a "Tree Factory" by coming up with their own actions and chants to represent the structure and function of the tree parts reviewed above. TIP: The chant helps to determine the function!

To reinforce learning and fire up this Tree Factory, have children shout the chant and perform the action chosen for each tree part.

STRUCTURE FUNCTION CHANT ACTION:

- Roots anchor the tree and absorb water and nutrients "We anchor!" Lay down and hold onto the ground tight.
- Leaves Make food through photosynthesis "We make food!" Flutter your hands.

- Heartwood "I support!" Flex your muscles.
- Xylem "I pump!"
- Cambium "I make new cells!"
- Phloem "I carry sap!"
- Outer Bark "I protect!" Hold up hands or cross arms to make a shield.

Enhance the Activity

For a children's book that describes the various parts of trees and their functions, check out <u>Outside and Inside Trees</u> by Sandra Markel.

Evergreens in Winter

Description

Students take a walk, through nature in winter experiencing it through sound, smell, and touch.

Objective

Evergreen trees offer a sensory overload! Through these experiences, children will touch, smell, see, hear, and taste the season of winter.

Indiana Science and Engineering Process Standards (SEPS)

- SEPS.3: Constructing and performing investigations
- SEPS.8: Obtaining, evaluating, and communicating information

Type of Activity

- Small group or classroom
- $K 5^{th}$

Materials Needed

No materials are needed for this activity.

Resources

©American Forest Foundation. Adapted from Activity 6: Evergreens in Winter from Project Learning Tree's Environmental Experiences for Early Childhood.

Vocabulary

Discuss the following vocabulary before conducting the activity:

- whorls
 smell
 hear
- touch

• taste

see

Conduct the Activity

Bundle up and enjoy a stroll around your yard, neighborhood, local park, or evergreen forest. On your winter walks, try the following:

- Stop and listen to the sounds of winter (e.g., crumbling snow under feet). Ask: How does our walk sound, smell, or look different from the last time we walked? What is the same?
- Search on the ground for cones. Look up high in the trees for cones still on them. Look at the branches and knobs on deciduous trees. With the leaves gone, these shapes are easier to see.
- Find places that are out of the wind (e.g., close to a building or next to a tree or hedge). Ask: If you were an animal outside in winter, where would you stay? Search on the ground for tracks and other animal signs.
- Search for animal homes in deciduous trees. Nests and holes should be more visible now. Look for evidence of ways animals survive in winter.
- Lie down under evergreens and look up through the branches. Talk about the visible patterns, and experience the way evergreens provide shelter from wind, rain, and snow.
- Look for the whorls of branches on conifers, such as pine, spruce, and fir. Each year, the tree adds a new whorl of branches. You can estimate the age of the tree by counting the whorls. Add two or three years to represent the first few years of growth before the tree started making whorls.

Enhance the Activity

Once back inside, prepare and enjoy some hot tea or cocoa and remind the children that these tasty treats also come from trees! (maybe explain how they come from trees) Plan to visit the trees again in the spring to look for new growth.

Trees as Habitats

Description

From their leafy branches to their tangled roots, trees provide a habitat for a host of plants and animals. In this activity, children will inventory the plants and animals that live in, on, and around trees and discover how plants and animals depend on trees in many ways.

Objective

Appreciate a tree as a home to wildlife and many other living things.

Indiana Science and Engineering Process Standards

- SEPS.3: Constructing and performing investigations
- SEPS.6: Constructing explanations and designing solutions
- SEPS.7: Engaging in argument from evidence

Type of Activity

- Small group or classroom
- K 5th

Materials Needed

No materials are needed for the activity, however the enhanced activity will require:

- Natural materials (leaves, twigs, rocks, moss, etc.)
- Sand in trays

Resources

American Forest Foundation. Adapted from Activity 22: Trees as Habitats from Project Learning Tree's PreK-8 Environmental Education Activity Guide.

Vocabulary

Discuss the following vocabulary before conducting the activity:

• habitat

snag

cavity

benefit

• harm

neutral

Prepare the Activity

Prior to conducting the activity with the students, consider the following:

• Conduct a read-aloud with young children using *Goodnight, Owl!* by Pat Hutchins. For a children's story about how a cactus provides habitat for desert wildlife, check out *Cactus Hotel* by Brenda Guiberson.

Conduct the Activity

Where do you live? A habitat is the place where a plant or animal can get all the things it needs to survive. The next time you pass by a tree, think of it as a habitat, or living space. While observing a tree, have students learn about the different ways plants and animals can find food, water, shelter, and living space by asking:

- What are some plants and animals that depend on trees?
- What do trees provide for these plants and animals?
- Can you see signs of life on the trunk, branches, roots, and leaves? (Have children look on the ground around the tree for fallen leaves, twigs, bark, seeds, fruits, or nuts.) Even snags, or standing dead trees, provide habitat for a number of different species. Tree frogs and beetles live under a snag's bark. Woodpeckers and other birds feed on the insects that live in snags. Chickadees nest in cavities created by woodpeckers, while squirrels and deer mice store food in them.
- How is a tree affected by the plants and animals that live on it? (They may benefit, harm, or be neutral to the tree.)

If possible, allow children to use hand lenses or binoculars to get a closer look. Ask them to use their sense of hearing to locate more plants and animals. Finally, compare a tree to your own home, or habitat. How are they alike or different?

Enhance the Activity

Have students design and build a model of a habitat for an animal. Provide (or ask students to find) natural items, such as rocks, twigs, vines, moss, and leaves which the students may use to build with. Sand in trays make excellent foundations for this activity if done inside.

The Closer You Look

Description

Children have an idea of what a tree looks like, but many are unfamiliar with the actual structure of a tree. In this activity, children will go outdoors to take a closer look at trees and their parts.

Objective

Learn more about the structure of trees and their differences.

Indiana Science and Engineering Process Standards

- SEPS.1: Posing questions and defining problems
- SEPS.3: Constructing and performing investigations
- SEPS.6: Constructing explanations and designing solutions
- SEPS.7: Engaging in argument from evidence

Type of Activity

- Small group or classroom
- 1st 5th grade

Materials Needed

The following materials are needed for this activity:

- hand lens
- binoculars
- materials to sketch or record with
- camera

Resources

©American Forest Foundation. Adapted from Activity 61: The Closer You Look, from Project Learning Tree's PreK-8 Environmental Education Activity Guide

Vocabulary

Discuss the following vocabulary before conducting the activity:

• trunk (of tree)

branches

twig

gnarled

• fruit

• cone

- needles
- **Conduct the Activity**

Before your next nature walk or outdoor adventure, have students close their eyes and picture a tree. Ask them to think about its shape, branch arrangement, and trunk and leaf texture. Have them draw a picture of a tree from memory. Next, head outside with a camera or sketchbook to have a closer look. On your walk, locate several different tree species for students to observe.

Ask:

- What is the shape of the trunk? Tall, straight, bent, or gnarled? Is there one trunk or does it split into multiple trunks?
- What color is the bark? How does it feel? How does it look? What shape are the branches and twigs?
- Are there any seeds, flowers, fruits, nuts, or cones on the tree?
- What color and shape are the leaves or needles? Where are they located on the tree?
- What is the overall shape of the tree crown? While outside, consider taking photographs or making sketches to record your observation data. Once your observations are complete, have students draw a second tree picture.

Compare and contrast the two drawings. What new details appeared in the second drawing? What characteristics were similar? Use this Sample Graphic Organizer chart to assist with your comparison.

Enhance the Activity

Photography and Poetry Some children may not be confident in their drawing abilities or may not take the time necessary to complete field sketches. In lieu of drawing, consider using a camera to collect data. Photography, especially once paired with a story or poem, can deliver a powerful message. Check out this haiku by Hunter Liu, then a 4th grade student at Sunny Hills Elementary:

The icy branches

On a chilly winter day

Stare right back at me

Camouflage Trail

Description

Why is it difficult for us to see many animals? Students will learn about adaptation and protective coloration.

Objective

Learn how adaptation and camouflage helps to protect many animal species.

Indiana Science and Engineering Process Standards

- SEPS.3: Constructing and performing investigations
- SEPS.6: Constructing explanations and designing solutions
- SEPS.7: Engaging in argument from evidence

Type of Activity

- Small group or classroom
- $K 5^{th grade}$

Materials Needed

The following materials are needed for this activity:

- Small stuffed animals or objects
- 75 feet of rope (optional if using a well-established trail).
- Compass (see Enhanced Activity below)

Resources

From Sharing Nature: Nature Awareness Activities for All Ages, © 2015 Joseph Bharat Cornell

Vocabulary

Discuss the following vocabulary before conducting the activity:

• camouflage

adaptation

• coloration

Prepare the Activity

Prior to conducting the activity with the students, consider the following:

- Review vocabulary with the children to ensure understanding.
- Ensure that the children remember to dress for an outdoor experience.
- Share the book: Hidden in Plain Sight: Animal Camouflage by Elsie Belbak

Conduct the Activity

Look for a trail going through an area where you can see the ground and where there isn't a lot of tall grass or thick shrubs. (A forest where there are both small and large trees, leaf litter, rotting logs, and some plants is ideal.) Choose a 65- to 100-foot section of the trail making sure that it is wide enough for two people to pass. Along the trail place 16 to 24 man-made objects. Some of them should stand out, like brightly colored balloons or fluorescent pink cockroaches. Others should blend with their surroundings and, therefore, be more difficult to pick out. Keep the number of objects you've planted secret.

The children walk over the section of trail one at a time, with intervals between them, counting (but not pick up) as many of the objects as they can. When they reach the end of the trail, they whisper in your ear how many they saw. Tell each child the total number of objects, or, if you prefer, the fraction or percent of the total they've found. Encourage the students to walk the trail again to look for any objects they've missed. If you want to make it easier for the students, place a marker (like a red bandanna) near the objects that are the hardest to find.

In setting up, it's helpful to use rope to mark the side of the trail where the objects are hidden. Then place the objects no further than four feet beyond the rope (make sure to tell the players this). You can, however, hide the objects at different heights, and in places where they can be seen only if you turn and look backwards. This helps the children break out of the habit of looking only straight ahead. If you have a large group, be sure to make the trail long enough so that everyone can be on the trail at once. It's also helpful to ask half the group to begin along the middle of the trail, and then come back and finish the first half. This way no one has to wait in line too long.

To allow everyone to see where the objects were hidden, go to the beginning of the trail, and start walking along the rope, and have the students (who are standing further back) point out the objects as you go by each one. As you pick up the objects, have a designated player collect them, and another player to count out the number of objects found as you go along.

Discuss the ways camouflage coloration helps animals. Then go on a search for small camouflaged animals (insects, spiders, etc.).

Enhance the Activity

To challenge older students, it's important to have some objects that are placed in plain view, but are still difficult to find. A 3 x 4 inch camping mirror, when its top edge is tilted toward you, the mirror reflects only the forest litter, making it blend in perfectly with its surroundings. (Lay a small branch over the top of the mirror to cover its edge and to hold it upright.) Objects like rusty chains, nails, rubber bands, and clothes pegs work well, too.

Another extension to this activity would be to have the children in pairs hide an animal in an appropriate location and record cardinal directions to describe that location. Have another pair, using the compass, follow the directions i.e. four steps to the north, turn west.

Sound Map

Description

Sitting quietly in nature, players map out a natural chorus of sounds.

Objective

Use their sense of hearing to identify and locate.

Indiana Science and Engineering Process Standards

- SEPS.3: Constructing and performing investigations
- SEPS.6: Constructing explanations and designing solutions

Type of Activity

- Small group or classroom divided into smaller groups
- $3^{rd} 6^{th grade}$

Materials Needed

The following materials are needed for this activity:

• Paper and pencils

Resources

From Sharing Nature: Nature Awareness Activities for All Ages, © 2015 Joseph Bharat Cornell

Vocabulary

Discuss the following vocabulary before conducting the activity:

• Sense of hearing

Conduct the Activity

Give each student a piece of paper with an X marked in the center. Tell them that the paper is a sound map and that the X represents where each player is sitting (once he/she have chosen a

spot). When a player hears a sound, they make a mark on the paper to represent the sound. The location of the mark should indicate the direction and distance of the sound from where they are seated. Tell the children not to draw a detailed picture for each sound, but to make just a simple mark. For example, a few wavy lines could represent a gust of wind, or a musical note could indicate a singing bird. Making simple marks keeps the focus on listening rather than on drawing.

Encourage the students to close their eyes while listening for sounds. To help them increase their hearing ability, ask them to make "fox" ears by cupping their hands behind the ears. This hand position will create a greater surface area to capture sounds. Then show them how to cut the hands in front of the ears (palms facing backwards) to hear sounds behind them more easily.

To hear a variety of natural sounds, choose an area that encompasses several habitats, such as meadow, stream, and forest. Tell the students that they have one minute to find their special "listening place." Setting a definite time limit prevents restless children from walking around too long and disturbing the rest of the group. For the same reason, tell the group to remain in their spots until you signal that the activity is over.

How long should you listen? From 4 to 10 minutes is good—depending on the group's age and interest level, and on how active the animals are. Once you've called the group back together ask them to divide into pairs and share his/her sound map with their partner.

Enhance the Activity

Once inside you might want to explore the following questions as a group:

- What sounds were the most familiar to you?
- What sound had you never heard before? Do you know what made the sound?
- What sound did you like best? Why?

Spring Activities

Overview

This component of the guide includes activities relating to spring. Review the directions prior to completing each activity with your audience. The **Outdoor Classroom Management** component of the guide also provides tips to successfully complete each activity.





Activity Title	Brief Description	Approximate Time to Complete	Suggested Grade Level
Pinecone Weather Station	Students make a homemade weather station using a pinecone to track changes in the weather	30 minutes	3rd -5th grade
Sounds Around	Students "tune in" to the sounds of their environment and explore the sounds of nature	30 minutes	K - 3rd grade
Tree Detectives	Students practice observation skills and apply them to identifying trees in their neighborhood	45 minutes	3rd - 6th grade
The Forest of S.T. Shrew	Through this read aloud, students view the forest from the perspective of a tiny shrew	50 minutes	1st - 6th grade
Birds and Worms	As "birds" students learn how important camouflage is for creatures to survive in the forest	50 minutes	K - 4th grade
How Big is Your Tree	Students learn how to determine the height of a tree by using simple tools and its shadow.	2 x 50 minutes	3rd - 6th grade
Soil Stories	Students learn about what makes soils different from one another.	2 x 60 minutes	K - 6th grade
How Plants Grow	Students design experiments to see what is necessary for plants to grow.	Multiple Session	3rd - 6th grade

How to Make a Pinecone Weather Station

Background

Pinecones open and close based upon the humidity. Humidity measures how much water is in the air. In low humidity, pinecones open and in high humidity, they close.

Objective

• Create a homemade weather station using a pinecone to track changes in the weather

Indiana Science and Engineering Process Standards:

- SEPS.1: Posing questions and defining problems
- SEPS.3: Constructing and performing investigations
- SEPS.6: Constructing explanations and designing solutions
- SEPS.7: Engaging in argument from evidence

Type of Activity

- Individual or small groups of 3-4 students
- 3-5th grade students

Materials Needed

The following materials are needed for each student or each small group of students:

- Pinecone with thick scales that will fit in the bottom of a soda bottle
- Clean 2-liter soda bottle
- Graph paper
- Needle or toothpick
- Glue or other adhesive

Vocabulary

Humidity

- Scale (on the pine cone)
- Weather Station

Resources

- To track daily humidity levels: [https://www.theweathernetwork.com/ca/hourly-weather-forecast/ontario/london]
- To learn more about why the pinecones open and close based on humidity: [http://thehappyscientist.com/science-experiment/pinecone-weather]

Conduct the Activity

- Cut one side out of a soda bottle.
- Apply adhesive to the bottom of the pinecone so it will stand up in the bottle.
- Stand some graph paper behind it.
- Carefully stick a needle into the end of one of the scales to track how much the pinecone opens or closes.
- Go to: [https://www.theweathernetwork.com/ca]. This website tracks daily humidity levels.
- Draw a line where the needle or paper is and record the humidity level for that day. Repeat for the next few days, and watch the needle and see how much it moves.
- Over time students will be able to predict

the humidity by the position of the needle. Since your house might be more or less humid than outdoors, students might want

to keep their weather station outside, or near a window.





Questions

After the students have completed the activity and recorded data, ask the following questions:

- What did you observe about the humidity from the pinecone marks?
- What days were more humid than others?
- How do you feel when it is humid outside?
- What does the humidity tell us about the weather?
- How does the humidity affect how plants and trees grow?

Sounds Around

Background

Our ears are constantly being bombarded with sound – so much so that we automatically tune out a lot of it.

Nature provides us with many unforgettable sounds. Breezes whistling through the leaves, birds singing early in the morning, and streams gurgling over rocks, just to name a few.

Objective

• Help children "tune in" to the sounds of their environment and explore the sounds of nature.

Indiana Science and Engineering Process Standards:

- SEPS.2: Developing and using models and tools
- SEPS.3: Constructing and performing investigations
- SEPS.4: Analyzing and interpreting data
- SEPS.6: Constructing explanations and designing solutions
- SEPS.7: Engage in argument from evidence
- SEPS.8: Obtaining, evaluating, and communicating information

Type of Activity

- Individual or small group of 3-8 students
- K-3rd grade

Materials Needed

The following materials are needed for each student or each small group of students

- Pencils and crayons
- Paper
- Paper cups (2 per student)
- Scissors

Vocabulary

Ear

• Mimic

• Investigations

Resources

• Project Learning Tree: [https://www.plt.org]

• Showers, Paul, and Aliki. The listening walk. Boston: Houghton Mifflin, 2006.

Conduct the Activity

- Sound helps animals in a number of ways. Explain to children that having ears on opposite sides of our heads enables us (and other animals) to judge the location a sound comes from.
- Find a safe, comfortable outdoor space where children can sit quietly.
- Have them close their eyes and listen to the sounds around them for several minutes.
- Provide pencils, crayons, and paper, and ask children to make a "sound map."
- They can put an X in the middle of a page to represent themselves.
- Use pictures or words to show the locations of the sounds around them. Encourage them to use lines to show directions and distances.
- When reviewing the sound map, ask children:
- Which sounds did you like most? Least?
- What else did you hear?
- What might have caused the sounds you heard?
- Ask children to name some animals that are active at night.
- Do they have any special adaptations for seeing and hearing in the dark? For example, foxes have large ears for picking up small sounds.
- Have children mimic fox ears by following the directions to Make-Your-Own Animal Ears.
- Ask the children:
- How does this change what you hear?
- Can you add any new sounds to your map after listening with these new ears?



Tree Detectives!

Background

Participants will practice observation skills and apply them to identifying trees in their neighborhood.

Learning how to identify trees by studying their different parts helps participants become familiar with local plant life. In addition, once participants learn good observation and identification techniques, it is easier for them to transfer these skills to the study of other organisms living in the area, such as songbirds or native flowering plants.

Objective

- Demonstrate basic observation and identification skills.
- Describe different characteristics of two (or more) different tree species.
- Associate particular characteristics with different tree species.

Indiana Science and Engineering Process Standards

- SEPS.1: Posing questions and defining problems
- SEPS.2: Developing and using models
- SEPS.3: Constructing and performing investigations
- SEPS 4: Analyzing and interpreting data
- SEPS.8: Obtaining, evaluating and communications data

Type of Activity

- Individual, small group, or large group
- 3-6th grade students

Materials Needed

The following materials are needed for each student or each small group of students:

- Child's field guides, including: The Audubon Society's Nature Guides, Golden Guides, The Peterson's Field Guide Series (Peterson First Guide to Trees for younger participants), Nature Study Guide's Tree Finder, etc.
- Large pictures of leaves and bark of trees
- Small notebooks and pencils
- Copies of The Whole Tree Clue Sheet, Leaf Clue Sheet, and Leaf and Bark Clues

Vocabulary

- Observation
- Characteristics
- Investigations

Resources

• National Wildlife Federation: [www.nwf.org]

Prepare for the Activity

For younger participants (Grades 1 - 2): Prior to the activity, select a number of different tree leaves and paste one of each on a sheet of paper. Make several sets of these guides, enough for one for each small group. On the tree hunt, have participants try to find a leaf that matches each of those in their guide. If the leaves can be found on the ground, have them take one that matches each sample. Ask participants to explain what is similar about the leaves they found and to describe some differences. How can they tell which? Have participants draw pictures of the leaves they found.

For older participants (Grades 7 and up): Instead of using the Leaf and The Whole Tree Clues Sheets below, have participants create their own field notebook. Have them answer the same questions, but do so by organizing their own notes. Older participants may also be asked to design a new method for identifying trees.

Conduct the Activity

- Find a wooded area that has at least five different types of trees, preferably native trees, to conduct the activity.
- Ask participants, "Do you know how to tell one kind of tree from another?" Have them name different characteristics that will help them and use visual aids such as posters or the accompanying handout (Leaf and Bark Clues). Explain the different parts of a tree and how needles, leaves and bark can all vary from one tree to the next.
- Tell participants that they are all going to become "tree detectives" and will study different trees in detail. Each child should have at least one partner to work with. Make sure they have a clipboard to share, copies of both the Leaf and the Whole Tree Clue sheets, and a pencil. The worksheets are a part of their field notebook in which they will carefully describe different tree characteristics.
- Begin by exploring leaves. Ask the participants to find at least three leaves on the ground, and on the leaf worksheets, describe the color(s), shape, texture, and size of each of the leaves. If participants can see how the leaves are arranged on a twig (alternating, opposing, etc.; see Leaf and Bark Clues on handout) have them note that

as well. They can also draw the leaves in a notebook. Once they have done this, ask all participants to throw their leaves into a pile and mix them up. Then, ask them to look at their notes and try to locate their own leaves. Often, participants will have studied their leaves well enough that they will be able to find the leaf without their notes; encourage them to cite evidence in their notes too.

- Once all participants have located their leaves, have them use field guides to find out what kind of tree the leaves came from. Encourage them to use several characteristics of their leaves to find the tree. Assist where necessary.
- After they have completed their leaf hunt, have participants find a single tree to study. Using the Whole Tree Clue worksheet, have them take notes on every detail of the tree they can find, including the appearance of the leaves, flowers, fruits (including nuts and acorns), or needles and cones. They should consider the color, texture, and patterns in the bark and the general size and shape of the tree. Also ask them to consider the area in which the tree is growing. Participants can also draw a picture of their trees in their field notebook.
- When they have finished taking notes on their tree, have them investigate what kind of tree they have found using field guides. Ask each pair or small group to make a short presentation to the whole group about their tree and any interesting information the field guides may have told them about this species. In particular, encourage small groups to discuss what wildlife might depend on the tree they have studied and what kinds of native plants might grow nearby. Ask participants if they can find other trees of the same kind at their study site.
- Ask participants, "Why do you think tree identification can be useful?" (Helps to evaluate the health of the forest, the kind of habitat available the amount of biodiversity present, the kinds of trees certain animals use, etc.) Ask them what interesting things they learned about the process.

Questions:

- How can you tell one kind of tree from another?
- What characteristics can you use?
- What does this information tell you about a forest?

Enhance the Activity

• The leaf hunt portion can also be done with nuts, seed pods, other fruits, or pinecones. Consider doing a nut/fruit/cone hunt in addition to the leaf hunt if the items are available.

Birds and Worms

Description

In this activity, children will discover the value of camouflage as they pretend to be birds in search of colored worms.

Objective

- Demonstrate basic observation and identification skills
- Discover how animals use camouflage.

Indiana Science and Engineering Process Standards

- SEPS. 2: Developing and using models
- SEPS. 6: Constructing explanations and designing solutions
- SEPS.8: Obtaining, evaluating, and communicating information

Type of Activity

- Individual or small groups of 5-10
- K 5th grade students

Materials Needed

• Small, biodegradable objects, such as colored pasta, shreds of colored paper, or yarn.

Vocabulary

Discuss the following vocabulary before conducting the activity:

Color coordinated
 Camouflage
 Mimic

Resources

• Project Learning Tree: [https://www.plt.org]

Prepare for the Activity

• Many animals are "color coordinated" with their surroundings. Any coloration, body shape, or behavior that helps an animal hide is called camouflage. Review vocabulary with the children.

Conduct the Activity

- Collect equal amounts of small biodegradable objects in at least three colors that can be used to represent "worms" in an outdoor setting. Consider tri-color rotini or spiral pasta noodles, pieces of yarn, or shreds of paper.
- Spread or hide your colored objects ("worms") in a well-defined area.
- Tip: orange cones or boundary flags work well for this.
- Have children pretend to be birds and "fly" around the area to find the "worms".
- Make a chart to visually record the children's findings.
- Try this same activity on different types of surfaces: grass, asphalt, gravel, or forested area.
- If working with multiple children, construct a relay race to find the scattered "worms". The winner of the race is the first team to get every child on the team at least one "worm".
- Children will most likely find the least camouflaged objects first.

Questions

- What color was easiest to find? Hardest to find? Why?
- Was there a pattern to the order in which the different colored "worms" were found?
- Did you know that a box turtle's dappled shell mimics the spots of sunlight on the forest floor? Can you name some other animals that have special camouflage?"

How Plants Grow

Background

A plant is a living system. It needs sunlight, water, air, nutrients, and space to function and grow. Children's growth can be compared to the growth of a plant and other living things: need sunlight, water, air and nutrients!

Objective

• Design an experiment to test what factors are required for a plant to grow and thrive.

Indiana Science and Engineering Process Standards:

- SEPS.1: Posing questions and defining problems
- SEPS.2: Developing and using models and tools
- SEPS.3: Constructing and performing investigations
- SEPS.4: Analyzing and interpreting data
- SEPS.5: Using mathematics and computational thinking
- SEPS.6: Constructing explanations and designing solutions
- SEPS.7: Engage in argument from evidence
- SEPS.8: Obtaining, evaluating, and communicating information

Type of Activity

- Individual or small groups of 5-10
- $3^{rd} 5^{th}$ grade children

Materials Needed

The following materials are needed for each student or each small group of children:

- Pencil
- Paper

Vocabulary

Nutrients

Species

• Growth

• Requirements

Discuss the following vocabulary before conducting the activity: Resources

Project Learning Tree: [https://www.plt.org]

Conduct the Activity

- While outside, challenge children to find signs of new plant growth.
- While examining samples, ask what factors are necessary for plants to grow. See if the children can identify:
- Sunlight
- Water
- Soil
- Space
- Ask children how they might design an experiment to test the necessity of these requirements.
- Help them write and illustrate the steps to their experimental design.
- Ask children to look at the drawings below. Of the four options (A, B, C and D), which two should be used to test how sunlight affects plant growth? Use this example to explain the importance of experimental control.



- If possible, obtain two plants of the same size and species to give the experiment **YOU** designed a try.
- Allow one plant access to a single requirement, while denying the same requirement to the other.
- At set intervals, let children measure the seedlings. After a period of time, measure and compare the two plants. Ask whether they look different, and if so, why?
- Try the following:

- Take digital photos every few days, and use presentation software to create a visual timeline of plant growth.
- Compare children's growth to that of the experimental plants by measuring child height at the beginning and end of the experiment.
- Create a "flip-book" that shows plant growth in animation. Index cards work

Soil Stories

Description/Background

In this activity, students explore differences in soil types and composition.

Who doesn't like getting their hands a little dirty? The next time a child in your care decides to dig a hole in the ground, turn it into an educational opportunity. Describe to children that you will conduct an experiment to analyze the soil sample they have just collected.

Objective

- To analyze a soil sample
- To determine that soils are made up of different types and sizes of particles
- There are many different types of soils

Indiana Science and Engineering Process Standards:

- SEPS.2: Developing and using models and tools
- SEPS.3: Constructing and performing investigations
- SEPS.4: Analyzing and interpreting data
- SEPS.8: Obtaining, evaluating, and communicating information

Type of Activity

- Individual or small groups of 3-4
- K-6th grade students

Materials Needed

The following materials are needed for each student or each small group of students:

- Plastic jar with lid
- Water

Vocabulary

Discuss the following vocabulary before conducting the activity:

- Clay • Silt
- Particle size

Sand

Gravel

Resources

- Sustainable Forests. Healthy Communities.: [http://amforest.org/]
- Project Learning Tree: [https://www.plt.org/family-activity/soil-stories/]

Conduct the Activity

- Have children make a "soil shake" by placing one half cup of soil into a jar with a lid and adding two cups of water. Ask them to predict what will happen if they shake the closed jar and let it settle for a few hours. Then, try it.
- Over time, soil layers will become visible. Gravel will fall first; then sand, silt, and clay; organic matter (leaves, twigs, stems) will remain floating in the water. Have children draw a picture of the layers formed by their soil shake, or collect and test soil samples from other areas (forest, field, yard) for comparison.
- Challenge students to complete the "Soil Composition" diagram, reminding them that the largest particles fall to the bottom first.

Questions

After the students have completed the activity and recorded data, ask the following questions:

- What do trees and other plants get from soil? Why?
- Do different plants have different soil needs?
- Describe the soil. What color is it? How does it smell? How does it feel?

How Big is Your Tree?

Background

Trees come in a variety of shapes and sizes. Children will discover different ways to measure trees and will learn about scale and structure.

Objectives

- Learn that different types of trees have specific sizes and shapes.
- Learn how the importance of a standard unit of measurement and measuring techniques.

Indiana Science and Engineering Process Standards

- SEPS.2: Developing and using models and tools
- SEPS.3: Constructing and performing investigations
- SEPS.5: Using mathematics and computational thinking
- SEPS.8: Obtaining, evaluating, and communicating information

Type of Activity

- Small groups of 2-4
- 3rd 8th grade

Materials Needed

- 6 inch ruler
- 5 foot section of yarn/string
- Paper, pencil, clipboards (optional)
- 1

Vocabulary

Height

• Circumference

• Width

Canopy

- Diameter
- Crown spread

Resources

Project Learning Tree: [https://www.plt.org/family-activity/

Conduct the Activity

- Take group outside to observe trees and have children describe the different shapes and sizes that they see. Have the group estimate the height and circumference of one of the trees. **Tip:** Do this on a sunny day.
- Ask the group to suggest ways that they might be able to determine the actual height of the tree. How would they measure it? What would they need to do this? What unit of measurement would they use?
- Break the group into smaller groups. Distribute a 6 inch ruler and a 5 foot section of yarn/string to each group. Tell them that they will be measuring a tree using only the two items provided.
- Show students how to measure shadows and use a ratio comparison to determine the height of a tree. Provide the mathematical proportions illustrated below.
- Ask each group to select a tree to practice using their tools and mathematical skills.
- Bring the whole group together to discuss results.

Questions

- Why do we measure trees?
- Why is it important to use standard units of measurement?
- Who would want to know the size of a tree?



The Forest of S.T. Shrew

Description/Background

A habitat is a place where an animal or plant lives and gets all the things it needs to survive, including food, water, shelter, and space to grow, breed, and raise young. Within any habitat there are smaller microhabitats. For example, a decaying log is a microhabitat within a larger forest habitat. The decaying log provides all essential elements for the many small animals and microorganisms that make the log their home.

In this activity, children read a story in which they are introduced to a short tailed shrew called *S. T. Shrew*. They are introduced to several living organisms such as Millie, the millipede, to learn about these living organisms in the forest as S. T. takes them on an adventure.

Objective

• Learn about the many living organisms that that make the forest their homes and the different habitats found in the forest

Indiana Science and Engineering Process Standards

- SEPS.1: Posing questions and defining problems
- SEPS.6: Constructing explanations and designing solutions
- SEPS.7: Engaging in argument from evidence
- SEPS.8: Obtaining, evaluating, and communicating information

Type of Activity

- Individual or groups of 5-10
- 2nd 4th grade children

Materials Needed

The following materials are needed for each student

- Connect the Dots to Meet S.T. Shrew
- Pencil

Vocabulary

- TIP: Find pictures of the organisms and show them to the children as you discuss the vocabulary. They may not be familiar with the organisms.
- Habitat

Microhabitat

- Shrew
- Earthworms
- Lichens
- Pill Bug
- Nuthatch

- Centipedes
- Millipedes
- Termite
- Camouflage

- Microorganisms
- Beetles
- Moss •
- Borrow
- Roach •
- Salamander

Resources

- Project Learning Tree: [https://www.plt.org]
- In the Forest of S. T. Shrew Story: https://www.plt.org/stuff/contentmgr/files/1/48e6bfd29359d5015cb187492a51aac9/fi les/act 8 student pages.pdf
- TIP: Read this story with the children prior to completing the activity. This will give them the context needed to understand/complete the activity.

- Grubs

Conduct the Activity

- Ask the children:
- What is a forest?
- Have you ever visited a forest? If so, what did you see? If not, what might you expect to see?
- What do you enjoy most about forests?
- Review the vocabulary with the children.
- Read the story, *In the Forest of S. T. Shrew* (use the link above to access). As you read, ask children to complete actions each time you reference a particular animal. For example, each time S.T. Shrew's name is mentioned, have children wiggle their fingers by their faces to mimic a shrew's whiskers
- Distribute the *Connect the Dots to Meet S.T.* page to the children and have them connect the dots to uncover the image of the story's main character.
- When the story is finished, invite children to draw pictures of events that took place or of their favorite character.
- Show the pictures again of the organisms from the vocabulary.
- Finish the adventure by taking children on a walk through the woods. Look for microhabitats such as a fallen log, tree bark, or leaf litter.
- Ask children to see if they can find any of the organisms from the story.
- If they find them, discuss the habitat they found them in and what they are doing.
- Ask the children if there are other microhabitats near their school? Near their home? In their own backyard?


Summer Activities

Overview

This component includes activities relating to summer. Review the directions prior to completing the activity with your audience. The **Outdoor Classroom Management** component of the guide also provides tips to successfully complete each activity.



Activities:

Activity Title	Brief Description	Approximat e Time to Complete	Suggested Grade Level	
Poet-Tree	Observing a variety of trees, students use inspiration to write a poem.	45-60 minutes	2nd - 6th grade	
Getting in Touch with Trees	Through use of a tree "mystery box," Students use their senses to explore the various parts of a tree.	50 minutes	K-3rd grade	
The Fallen Log	Students discover life forms that are supported within a fallen log.	50 minutes	1st-6th grade	
Tree Life Cycle	Students learn that like other living things, trees have a cycle of life.	45 minutes	3rd-6th grade	
Have Seeds Will Travel	Students learn about seed dispersal and classification.	50 minutes	K-4th grade	
Adopt a Tree	Students examine the role their special tree plays in the community of trees.	45 minutes	3rd-6th grade	
Invasive Species	Students learn how to determine an invasive species and why it is so important that they are controlled.	45-60 minutes	4th–6th grade	
Looking at Leaves	Students take a closer look at leaves and learn how they can help us identify trees.	2 X 30-45 minute sessions	K–6th grade	

Poet-Tree

Description

Poetry offers children an opportunity to express their thoughts and ideas about the environment in creative and artistic ways. Take children outdoors to observe a variety of trees and then encourage them to write a poem.

Objective

- Students will use observation skills to be able to describe a tree.
- Using their senses, children will be able to generate words describing a tree.
- Children will create poems that describe their chosen tree.

Indiana Science and Engineering Process Standards

- SEPS.3: Constructing and Performing Investigations.
- SEPS.8: Obtaining, evaluating, and communicating information.

Type of Activity

• Individual or small group of 5-10

Audience

• 2nd – 6th grade students

Materials Needed

The following materials are needed for each child or each small group of children:

- Clipboards (optional)
- Paper/journals and pencils
- Worksheet (optional, may want to use for 4th-6th grades)

Vocabulary

Discuss the following vocabulary before conducting the activity:

- Poetry (diamante, haiku, etc.)
- Descriptive terms to describe a tree

Resources

• Project Learning Tree: https://www.plt.org/family-activity/

Prepare the Activity

Prior to conducting the activity, consider the following:

Review vocabulary with the children to ensure understanding.

Conduct the Activity

- Invite children to choose a tree near their home, school, or local park for observation.
- Ask children to spend time observing their tree from various perspectives; sitting against it, lying underneath it, walking around it, etc.
- Using nature journals or notebooks, have children record words, ideas, and impressions that enter their minds.
- Remind children to use their senses (touch, smell, sight, and sound... but not taste) to generate more words to describe their tree.
- Finally, challenge children to convert their thoughts into one of the poetic forms provided. Later, you might ask them to explain which form they chose and why.

Enhance the Activity

• Have students use a variety of poetic forms given below.

Haiku Poetry is a Japanese form that consists of three lines: the first line has five syllables, the second line has seven, and the third line has five again. The third line often contains a surprising or tension element.

Title: Snails By Leslie Heisler, Grade 3

Makes a slimy path

Sticking on the long thick grass

Hides from predators



Invasive Species

Description

• A species is regarded as invasive if it has been introduced to a location where it did not previously occur in nature, becomes capable of sustaining life, reproduces naturally, becomes a pest in its new location, and threatening other local materials.

Objective

• Introduction of the term "invasive species" to children and discussion of its meaning

IN Science and Engineering Process Standards

- SEPS.1 : Posing questions and defining problems
- SEPS 6 : Constructing explanations and designing solutions

Type of Activity

• Individual or small group

Audience

• 3-5th grade students

Audience Size

• 3-8 students

Materials Needed

The following materials are needed for each student or each small group of students

- Pencil
- Crayon
- Paper

Vocabulary

Discuss the following vocabulary before conducting the activity:

Invasive

Species

Impact

Predators

• Habitat

• Threaten

Resources

- https://www.plt.org/family-activity/have-seeds-will-travel/
- American Forest Foundation https://www.forestfoundation.org/

Prepare the Activity

Prior to conducting the activity, consider the following:

Review vocabulary with the children to ensure understanding.

Conduct the Activity

Start by asking the following questions to the children:

- How would this area look different if a family of elephants lived here?
- What impact would the elephants have on the plants and animals nearby?
- Where do elephants live in the wild?
- Why don't elephants live here?

Of course, elephants have not invaded woodlands of the United States, but invasive species are impacting local forest ecosystems. For example, Tree of Heaven (or Ailanthus) is an invasive plant originally from central China, now found in 30 U.S. states. It is often mistaken for the native Black Walnut and left to grow and reproduce. Tree of Heaven grows rapidly, is difficult to remove, and displaces native plants. Both species have compound leaves, but can you identify the differences between the leaflets?



Fill in the vowels to identify common characteristics of invasive species.

- 1. Have a short I_f_cycl_ and produce many __ffspr__ng
- 2. Gr_w very quickly
- 3. Are not affected by natural pr__d_t__rs in their new h__b__t__ts
- 4. Spr___d quickly and easily to new __c__syst__ms
- 5. Often t_l_r_t_ a wide range of different __nv_r_nm__nts

Questions

After the students have completed the activity and recorded data, ask the following questions:

- Why do invasive species of plants grow where they do?
- Do you think it is important to stop the growth of plants that are invasive?
- How do you think to remove invasive species of plants?

Answers:

1. Lifecycle, offspring; 2. Grow; 3. Predators, habitats; 4. Spread, ecosystems; 5. Tolerate, environments

The Fallen Log

Description

It's amazing how many things live in and on rotting logs. In this activity, kids become familiar with some of those organisms by observing fallen logs.

Objective:

• Gain an understanding of how *decomposition* takes place and a better appreciation for *microhabitats* and *communities*.

IN Science and Engineering Process Standards

- SEPS.1: Posing questions
- SEPS.2: Developing and using models and tools
- SEPS.6 Constructing explanations (for science) and designing solutions (for engineering)
- SEPS.7 Engaging in argument from evidence
- SEPS.8 Obtaining, evaluating, and communicating information

Type of activity:

• Individual or small group

Audience:

• K-8 students

Group size:

• 3-8 students

Materials needed:

The following materials are needed for each student or each small group of students.

- Digital Camera (optional)
- Sketch Book
- Pencil

- Word Search Puzzle
- Children's Story What's Under the Log?

Vocabulary

Discuss the following vocabulary before conducting the activity:

• Bacteria

• Termite

• Decomposition

• Habitat

Resources:

https://www.plt.org - Project Learning Tree

What's Under the Log? by Anne Hunter - This children's story book illustrates many creatures a child could find under a fallen log.

Prepare for the Activity

(Add more to this section. Or, use "Prepare for the Activity" in place of "Materials Needed.")

Conduct the Activity

- Take your grandchild, neighbor's child, or others for a walk in the woods.
- Look for a fallen log or rotting tree stump.
- Be careful not to disturb the habitat as you observe.
- Conduct a thought exercise by asking:
 - What happens to a tree after it dies?
 - How did the tree die and how long has it been dead?
 - Are there signs of animals, including insects, in, on, or around the log?
 - How about plants?
 - How are they interconnected?
 - Where do these living things get the nutrients they need to survive?
- You can use a digital camera or sketchbook to record pictures of anything you see.
- Use field guides or the internet to identify and research them later.

• Brainstorm ways in which the forest ecosystem benefits from the fallen log you examined.

D	E	С	0	М	Ρ	0	S	I	Т	I	0	Ν	В
S	т	Ν	E	I	R	т	U	Ν	Ν	Μ	Z	E	т
х	G	E	A	I	R	E	т	С	A	В	E	E	А
F	U	Ν	G	I	D	В	E	Р	Q	т	R	К	т
S	Ρ	I	D	E	R	S	J	Н	L	Μ	W	Y	I
м	I	L	L	I	Ρ	E	D	E	I	I	0	В	В
E	L	С	Y	С	E	R	U	т	S	I	0	М	А
Y	F	Μ	S	К	т	С	E	S	Ν	I	D	S	н

Do this word search puzzle to discover some important components in this microhabitat.

Adopt a Tree

Description

In this activity, children "adopt" a tree, deepening their awareness of individual trees over time and encouraging a greater understanding and appreciation of their local environment.

Objective:

The children will choose a tree to observe over time and record their observations in a Tree Journal.

IN Science and Engineering Process Standards:

- SEPS.3 Constructing and performing investigations
- SEPS.4 Analyzing and interpreting data
- SEPS.6 Constructing explanations (for science) and designing solutions (for engineering)
- SEPS.7 Engaging in argument from evidence
- SEPS.8 Obtaining, evaluating, and communicating information

Type of Activity:

Individual or small group

Audience:

2-6 grade students or K-1 students with the help of older buddies.

Audience Size:

6-8 students per adult

Materials needed:

- Tree Journal
- Pencils,
- Crayons,
- Clipboards

Vocabulary

Discuss the following vocabulary before conducting the activity:

Observation

• Senses

Attributes

Prepare for the Activity:

- Make copies of Tree Journal
- Prepare crayons without wrapper for tree bark and leaf rubbings

Conduct the Activity:

The next time you are on a walk in a familiar area, invite the children to choose a particular tree to observe. Suggest they become better acquainted with it by using their senses of sight, touch, hearing, and smell to describe the tree. Encourage critical thinking by asking:

- Is this tree alive? How do you know?
- How is this tree similar to and/or different from other trees around it?
- How does this tree help the environment around it?

Complete the Tree Journal as the seasons apply. Revisit the tree on a regular basis to complete more pages in a variety of weather conditions. Have the children guess the reasons for the changes they see and then predict changes for the future.

Enhance the Activity:

Have the children draw a map to the tree, including other species of trees and plants nearby.

Have Seeds Will Travel

Description

Seed disperses in nature. Unlike animals, plants cannot move on their own. As a result, plants have evolved a variety of adaptations for seeds to spread out and away from their parents. Why would it be important for offspring to move away from the parent? Think about children and their parents racing to get the last slice of pizza or cookie from the package: close proximity means that parents and offspring need to compete for food, sunlight, and other resources.

Objective

• Most plants reproduce using systems that include flowers and seeds. In this outdoor investigation, children observe, collect and classify plant seeds.

IN Science and Engineering Process Standards

- SEPS.2: Developing and using models and tools
- SEPS.3: Constructing and performing investigations
- SEPS.6: Constructing explanations and designing solutions
- SEPS 7: Engaging in argument from evidence

Type of Activity

• Individual or small group

Audience

• 3-5th grade students

Audience Size

• 3-8 students

Materials Needed

The following materials are needed for each student or each small group of students

- Old blanket
- Fuzzy cloth
- Wool socks
- Masking tape to make bracelets
- Other materials: feather, toothpicks, cardboard, cotton balls, string, rubber bands, pipe

cleaners, etc.

Vocabulary

Discuss the following vocabulary before conducting the activity:

Disperse
Classification
System

Resources

- https://www.plt.org/family-activity/have-seeds-will-travel/
- <u>http://www.kidsdiscover.com/parentresources/seed-dispersal/</u>

Conduct the Activity

Gather a collection of seeds from a wooded area. Try using one or more of the following methods:

- Drag an old blanket or fuzzy cloth behind you to see what you can pick up.
- Place a large, old, wool sock over hands or shoes to see what you can pick up.
- Wear bracelets make of masking tape (sticky side out), to hold the seeds you find.

Have children examine their seed collections and invent a system for sorting or classifying them. Explain that plants have developed many different methods of seed dispersal, to ensure the success of their species. Some seeds need the help of other external variables to disperse.

These three examples represent only a few of the many ways that seeds can be dispersed. Conduct your own research to explore more –OR- consider challenging children to design their own seeds, complete with specialized dispersal mechanisms. To make a functioning model, try using a dried lima bean with different art materials (feather, toothpicks, cardboard, cotton balls, string, rubber bands, etc.) to design a new type of seed. What dispersal method will it use?

Enhance the Activity

After the students have completed the activity and recorded data, ask the following questions:

- How do a seed's shape and size affect its dispersal?
- Why is it important for seeds to be dispersed in different ways?
- What are three mechanisms of seed dispersal?

• Can some seeds travel farther than others?



Answers: ACORN, SAMARA, CRANBERRY

Looking at Leaves (A)

Description

Part 1. Trees have leaves and when we look at them, some are broadleaves and some have needles. This lesson helps develop the vocabulary needed to talk about different kinds of trees.

Part 2. We sometimes like to save a "snapshot" of how a leaf looks. Deciduous trees shed their leaves at certain seasons and it is helpful to save the image of the leaf if you are studying the tree through many seasons.

Objectives

- Children explore deciduous trees and conifers and learn how they are alike and different. Children learn how they can gather clues to help them identify a tree.
- Children learn 5 ways that they can preserve a leaf.

Indiana Science and Engineering Process Standards (SEPS)

- SEPS.1: Posing questions (for science) and defining problems (for engineering)
- SEPS.2: Developing and using models and tools
- SEPS.3: Constructing and performing investigations
- SEPS.8: Obtaining, evaluating, and communicating information

Type of Activity

• Small or large group

Audience

• K – 5th grade children

Audience Size

• Any number of children

Materials Needed

The following materials are needed for each child or each small group of children:

- Pencils and art paper or construction paper
- Leaves collected from trees the children are observing.
- Tempera paint and 8 soft brushes,
- Rolling pin, paper towels

- Crayons with the paper removed
- Big books and paper towels
- Leaves collected from trees the children are observing.

Vocabulary

Discuss the following vocabulary before conducting the activity:

DeciduousNeedles

• Conifer

Broadleaf

Prepare for the Activity

• Evergreen

Compound leaf

Prior to conducting the activity with the children, consider the following:

- Review vocabulary with the children to ensure understanding.
- Read the book: <u>We are Going on a Leaf Hunt</u>, by Steve Metzger or <u>Look What I Did with a</u> <u>Leaf</u>, by Morteza E. Sohi
- Provide plenty of space for the students to work.

Conduct the Activity

Part 1. "Leaf Clues"

- Ask the children: "When someone says the word "tree," what do you picture in your mind? Draw a picture you have in your mind on a sheet of paper." If you are already outside near trees, you may ask them to draw a tree that they see.
- Lots of people picture the kind of tree we call a broadleaf tree. **Broadleaf** is two words put together meaning a leaf that is wide. Deciduous is another word for this kind of tree.
- Discuss the following with the children:



If you drew a tree that looks sort of like this, you drew a broadleaf tree. A broadleaf tree:

- Has leaves that look flat if you turn them on their edges, or broad (wide) if you look at them from the top;
- Needs lots of water for the three seasons it has leaves on it;
- Loses its leaves before cold weather;

• Has no leaves in the cold season and survives almost without water, since its roots can't use frozen ice and snow.

Can you name a broadleaf tree?

What would be the opposite of a broadleaf? There are trees with very narrow leaves, as skinny as needles. Can you guess what they are? Draw your guess on your paper and look to see if you can spot this tree in the area too. If you drew a tree that looks like a Christmas tree, you drew a **conifer**.



A conifer:

- Grows its seed inside cones (do you see the word cone inside the word conifer);
- Keeps its leaves in wintertime;
- Loses and replaces its leaves a lot more gradually then a broadleaf;
- Grows well in cold climates, because its leaves are so small and thick that they can catch the winter sun but won't lose important moisture.

Remind the children:

- If you want to use a leaf for a project any other time, you should take only a few leaves. After all, your tree needs those leaves to make food!
- One final note: Many people can identify a tree just by looking at its leaves. Maybe you already know what kind of tree you have, but if you don't and want to find out, libraries have lots of books that can help you. Often brining just one leaf or leaf print to the library is enough of a clue for you and a librarian to find you tree in a book.

Part 2. "Keep a Leaf"

1. You can trace it!

Hold the leaf gently with one hand. Trace around the edge, using a pencil, with the other hand.

2. You can print it!

Using a soft brush and tempera paint, cover the underside of your leaf with paint. Place it carefully, paint side down, on some paper on a table. Cover it with a paper towel, and press it down with a rolling pin. Let it dry and be sure to clean up.

3. You press it!

Take the biggest book you can find or a stack of books. Sandwich your leaf in paper towels,

press it between the pages, and wait two weeks. Then you can glue your leaf in a journal to save it.

4. You can rub it!

Put your leaf underneath some art paper on a flat surface. Using a crayon with the paper peeled off, rub over the leaf.

5. You can stencil it!

Using a soft brush and tempera paint, lay the leaf flat on the paper. Brush from the leaf and past the leaf edge onto the paper. Hold the leaf gently in place as you repeat this until you have gone all the way around the leaf. Carefully lift the leaf off the paper and the outline will remain on the paper. Be sure to clean up.

Enhance the Activity

- Ask the children to compare the different leaves.
- How do the leaves help them to identify the trees? Can they name their tree?

Looking at Leaves (B)

Description

Children will use their critical thinking skills when doing this activity. Knowing how to match leaves with plants enhances the students' environmental awareness.

Objective

Taking a closer look at leaves, children can discover how leaves are used to identify trees. They'll find out what to look for and gain an understanding of leaf characteristics.

Type of Activity

Individual or small group

Audience

• $K - 5^{th}$ grade

Audience Size

• Small group(s)

Materials Needed

The following materials are needed for each student or each small group of children

- Field guide
- Paper
- Crayons
- Books, or similar item, to use for a smooth, hard surface if nothing is available in area you're visiting

Vocabulary

Discuss the following vocabulary before conducting the activity:





Resources

• <u>https://www.plt.org</u> – Project Learning Tree

Prepare for the Activity

(Add more to this section. Or, use "Prepare for the Activity" in place of "Materials Needed.")

Conduct Activity

- Have children collect leaves of various shapes, sizes and colors from the forest floor.
- While examining samples, conduct a comparison investigation by asking:
- What similarities and differences can you see?
- Feel the leaves. What do they feel like? Do they have hairs? Do they have teeth?
- Can you locate the tree that each leaf came from?
- Using the field guide identify nearby trees. Compare the leaf structure described in the field guide to the real-life specimens found on the ground. Are there other trees you see with this same type of leaf?
- Explain that leaves can be used to identify trees. The edges or margins of leaves can provide clues to the tree's identify. The arrangement of leaves on the twigs is another characteristic to identify a tree. Even needle leaves grow in patterns. For example, leaves on pines may grow in clusters of two, three or more.
- Further explore the characteristics of leaves by making prints of the leaves the kids collect. To make a leaf crayon rubbing, place a leaf on a smooth, hard surface with the vein side up. Cover it with a piece of paper and rub a crayon back and forth over the leaf. What do you see? The leaf's margin and veins will appear on the paper as you rub.

Tree Life Cycle

Description

In this activity, students will discover that trees have a lifecycle that is similar to that of other living things. This includes birth, growth, injury and disease, aging, and death. This can be either an indoor or outdoor activity.

Objective

Children will be able to identify the life cycle of a tree

IN Science and Engineering Process Standards

(Add SEPS to this section.)

Type of Activity

Individual or small group

Audience

• $3^{rd} - 6^{th}$ grade students

Audience Size

• Small or large groups

Materials Needed

The following materials are needed for each student:

• Optional printing of tree lifecycle image sheet

Vocabulary

Discuss the following vocabulary before conducting the activity.

Mature tree

- Snag (dead tree)
- Sapling

Seed

Rotting log



Resources

• <u>https://www.plt.org</u> – Project Learning Tree

Prepare for the Activity

(Add to this section. Or, use "Prepare for the Activity" in place of "Materials Needed.")

Conduct Activity

- Conduct a thought exercise, asking them:
- Are trees alive? How do you know?
- How are trees born? Do they die?
- How does a tree's life compare to the life of a person?
- After this discussion, have the children match the vocabulary words with the tree lifecycle illustration. You could also have them work individually by completing the lifecycle activity sheet.



- If you're outside, in the presence of trees, ask the children to identify various stages of a tree's life. Can you find a young tree? An adult tree? An elderly tree? A dead tree?
- Try the following:

Have children act out the lifecycle of a tree. They can curl up as a seed, kneel to sprout stick up arms as branches wiggle fingers for leaves, stand up to grow tall, spread feet to show roots, and fall over to die.

Nature Games

Overview

This component of the guide includes games that can be played by children of all ages. Games are a great way to introduce and connect young people to nature. Before engaging your group in these activities, it is suggested that you review the tips presented in the **Outdoor Classroom Management** component of the guide.

Games

The following is a list of games included in the following pages:

Game/Activity Title	Brief Description	Suggested Age
Listen to the Heartbeat of a Tree!	Using a stethoscope, children hear the sound of sap flowing through a tree.	Any
Owls and Crows	Owl chase Crows and Crows chase Owls as teams compete in determining the truth or falsity of nature statements.	5 and up
Pyramid of Life	Predator or prey? Plants and animals interact in this active game demonstrating the food chain.	7 and up
Sound Map	Sitting quietly in nature, players map out a natural chorus of sounds.	5 and up
Camouflage Trail	Players are introduced to the concept of protective coloration and adaptation while heightening their observation skills.	5 and up
Meet a Tree	There is a tree waiting to meet you! Players get to know their tree through only the sense of touch.	4 and up
Recipe for a Forest	Create your dream forest when deeded an imaginary plot of land.	5 and up
Silent Sharing Walk	Explorers walk nature in silence, pointing out their wonderful natural discoveries.	6 and up

Listen to the Heartbeat of a Tree!

Description

Using a stethoscope, children hear the sound of sap flowing through a tree.

Age: 5 and up

Number of people needed: Any number

Materials: Stethoscope(s)

How to do the activity:

Listen carefully and you can hear the "heartbeat of a tree." In a wooded area, find a thin-barked tree more than 6 inches in diameter and place your stethoscope against its trunk. Quietly move the stethoscope around the trunk until you can hear the bubbling, gurgling sound of the sap flowing upward toward the branches.

Questions to explore:

- Why does sap move through the trunk of the tree?
- Where is it headed?
- What layer of the tree is it moving through?

Owls and Crows

Description

Owl chase Crows and Crows chase Owls as teams compete in determining the truth or falsity of nature statements.

Age: 5 and up Number of people: 6 or more Materials: Rope, 2 bandanas How to play:

Divide the group into two equal teams, the Owls and the Crows. Lay a rope across a clear area, and have the teams line up facing each other, each team about two feet back from the rope. About eleven feet behind each team, place a bandana on the ground to indicate home base.

When the leader makes a statement about nature, if the statement is true, the owls chase the crows; if it's false, the crows chase the owls. If a player is tagged before he crosses the home base line, he joins the opposite team.

There is a certain amount of happy pandemonium in this game— players forget which way to run or are so confused by the statement that sometimes half the players run one way, and half the other.

To minimize chaos and make things as clear as possible, use blue and red bandanas to mark the two home bases—blue, behind the crows; red, behind the owls. Tell the players that the blue bandana represents "true blue." When a statement is true, the owls chase the crows (all players run toward the blue bandana). When the statement is false, the crows chase the owls (all players run toward the red bandana). You can also point out natural features to remind players which way to run; for example, forest for true and meadow for false.

Make sure your clues are unambiguous and age appropriate. For example, if you say, "The sun rises in the east," students may not be sure if you mean that the sun is first seen in the eastern sky (true), or that the sun rises at all—false, because it's the rotation of the earth that makes it only appear to rise. The best statements are simple and clear: for example, "birds have teeth," or "insects have six legs and a three-part body."

Before beginning, it's helpful to make a few practice statements. Have the players point in the direction they would run instead of actually running. Once everyone can easily point out the direction for true and false statements, then begin!

<u>Pyramid of Life</u>

Description

Predator or prey? Plants and animals interact in this active game demonstrating the food chain. *Pyramid of Life* demonstrates food chains and other ecological concepts through this lively game.

Ages: 7 and up Number of people: 6 or more Materials: Pencils& paper, plant and animal cards

How to Play:

To prepare, write on cards the names of plants, plant-eaters, predators, and one top, or apex, predator; number each card with its trophic level (plants, I; plant-eaters, II; primary predators, III; and top predator, IV).

Because plants and animals form an interconnected community, choose subjects from a local habitat or ecosystem, such as freshwater, grassland, or ocean. For example, for a class of twenty-seven participants, select fifteen plants, seven herbivores, four predators, and one apex predator. (In the accompanying sidebar are twenty-seven fun plant and animal names to use until you can create your own set.)

Give each player a card. Then ask players with a I on their card to come forward, form a line facing the rest of the group, and introduce themselves. You can then ask, Are you all plants? Yes, they reply. Ask the plants to kneel in a line facing you.

Then ask those with II on their cards to come forward and introduce themselves. Are you all plant-eaters? Yes. Please line up (standing) right behind the plants. III: predators? Yes. Please line up behind the plant-eaters.

Now there is only one person left. Ask if anyone has a IV. When that player comes forward and introduces himself, tell him he is the top of the food chain, and have him stand behind the third row.

Explain that each stage of the food chain is called a trophic level. As life ascends the food chain from one trophic level to the next, each level retains only ten percent of the biomass of the previous level. That is, a thousand pounds of plant biomass supports a hundred pounds of herbivore, which in turn supports ten pounds of carnivore, which supports one pound of apex predator.

Ask the kneeling plants, "If we built a human pyramid to represent the food chain, could you support all the animals behind you?" NOOOO!!! "Well, we're not going to build a pyramid

today, so you can relax!"

Explain that you will, however, use the trophic levels to demonstrate how pesticides concentrate as they move up the food chain. The toxins in pesticides remain in the tissue of whatever life is exposed. When that life form is eaten by one higher up the food chain, the pesticide also is absorbed. The higher in the food chain, the greater the concentration of pesticide.

Tell the first row, "The plants don't look very good. I see that insects have been eating you. To help protect you, I'm going to spray you with pesticide. Don't worry, it won't hurt! The bandana represents one poison part of pesticide." Then place a bandana on the head of each plant.

Now ask the second row to gather the bandanas from the plants and put them on their own heads as if they had just eaten the plants. Then have the primary predators (third row) take the bandanas from the herbivores and place the bandanas on their heads. Finally, the apex predator gathers all the bandanas and piles them on his head.

Questions to explore:

- When pesticides are sprayed on plants, how do animals get harmed?
- Where do humans eat on the food chain?
- In what ways are they effected by pesticides?

Sound Map

Description

Sitting quietly in nature, players map out a natural chorus of sounds.

Ages: 5 and up

Number of people: 1 person or more

Materials: Paper, pencil(s)

How to play:

To play, give each person a piece of paper with an X marked in the center. Tell the participants that the paper is a sound map and that the X represents where each player is sitting (once he's chosen his spot). When a player hears a sound, he makes a mark on the paper to represent the sound. The location of the mark should indicate the direction and distance of the sound from

the player's seat. Tell players not to draw a detailed picture for each sound, but to make just a simple mark. For example, a few wavy lines could represent a gust of wind, or a musical note could indicate a singing bird. Making simple marks keeps the focus on listening rather than on drawing.

Encourage the players to close their eyes while listening for sounds. To help them increase their hearing ability, ask them to make "fox" ears by cupping their hands behind the ears. This hand position will create a greater surface area to capture sounds. Then show them how to cup the hands in front of the ears (palms facing backwards) to hear sounds behind them more easily.

To hear a variety of natural sounds, choose an area that encompasses several habitats, such as meadow, stream, and forest. Tell the players they have one minute to find their special "listening place." Setting a definite time limit prevents restless players from walking around too long and disturbing the rest of the group. For the same reason, tell players to remain in their spots until you signal that the activity is over.

How long should you play? From 4 to 10 minutes is good—depending on the group's age and interest level, and on how active the animals are. Once you've called the group back together ask them to divide into pairs, each to share his sound map with a partner.

Questions to Explore:

- What sounds were the most familiar to you?
- What sound had you never heard before? Do you know what made the sound?
- What sound did you like best? Why?

Camouflage Trail

Description

Players are introduced to the concept of protective coloration and adaptation while heightening their observation skills. Players look for objects that are planted along a trail. Some are easy to spot, however some blend in, are camouflaged, by the natural surroundings.

Ages: 5 and up

Number of people: 1 to 30

Materials: Objects (small stuffed animals work well, however any item familiar to the players are good), 75 ft. length of rope (helpful for determining the beginning and end of planted items).

How to play:

Look for a trail going through an area where you can see the ground and where there isn't a lot of tall grass or thick shrubs. (A forest where there are both small and large trees, leaf litter, rotting logs, and some plants is ideal.) Choose a 65- to 100-foot section of the trail making sure that it is wide enough for two people to pass. Along the trail you'll place 16 to 24 man-made objects. Some of them should stand out, like brightly colored balloons or fluorescent pink cockroaches. Others should blend with their surroundings, and therefore be more difficult to pick out. Keep the number of objects you've planted secret.

The children walk over the section of trail one at a time, with intervals between them, trying to spot (but not pick up) as many of the objects as they can. When they reach the end of the trail, they whisper in your ear how many they saw. Tell each child the total number of objects, or, if you prefer, the fraction or per cent of the total that they've found. Encourage the children to walk the trail again, looking for any objects they've missed. If you want to make it easier for the players, place a marker (like a red bandanna) near the objects that are the hardest to find.

In setting up, I've found it's helpful to use rope to mark the side of the trail where the objects are hidden. Then place the objects no further than four feet beyond the rope (make sure to tell the players this). You can, however, hide the objects at different heights, and in places where they can be seen only if you turn and look backwards. This helps the children break out of the habit of looking only straight ahead. If you have a large group, be sure to make the trail long enough so that everyone can be on the trail at once. It's also helpful to ask half the group to begin along the middle of the trail, and then come back and finish the first half. This way no one has to wait in line too long.

To challenge older children, and keep them interested, it's important to have some objects that are placed in plain view, but are still difficult to find. One of my favorites is a 3 X 4 inch camping mirror. When its top edge is tilted toward you, the mirror reflects only the forest litter, making it blend in perfectly with its surroundings. (Lay a small branch over the top of the mirror to cover its edge and to hold it upright.) Often I've had as many as fifteen people kneeling and standing right in front of the mirror, gazing intently, but not seeing it, until I've touched the mirror. Objects like rusty chains, nails, rubber bands, and clothes pegs work well, too.

To allow everyone to see where the objects were hidden, go to the beginning of the trail, and start walking along the rope, and have the players (who are standing further back) point out the objects as you go by each one. As you pick up the objects, have a designated player collect them, and another player to count out the number of objects found as you go along.

End the game with a discussion of the ways camouflage coloration helps animals. Then go on a search for small camouflaged animals (insects, spiders, etc.).

Questions to explore:

• Why were some items more difficult to find?

- What ways do camouflage coloration help animals?
- What animals do you think hide in nature the best?

Meet a Tree

Description

There is a tree waiting to meet you! Players get to know their tree through only the sense of touch.

Ages: 4 and up

Number of people: 2 or more

Materials: Blindfolds

How to play:

To play, divide the group into pairs and have one of each pair wear a blindfold. The seeing player—if old enough—leads the blindfolded player to a special tree, one that has intriguing characteristics. Upon meeting the tree, the blindfolded player feels the texture of the tree's bark, sees how big the tree is by putting his arms around it, and explores the tree's branches and leaves. The guide can silently guide the player's hands to interesting places on and around the tree.

One Sharing Nature leader in Japan often tells children, "In this forest there is a tree that has been waiting to meet you since before you were born." The children, touched by these words, are honored and eager to meet their tree.

After getting to know their trees, the blindfolded players are brought back to the starting point, where their blindfolds are removed. They then try to find their tree. Most adults and children (except for the very young) who have walked blindfolded thirty yards or more to a tree, can find it later with open eyes. Leaders should, however, adapt the distance to the age, mobility, and the ability of the players to orient themselves in nature.

Faces of both children and adult players immediately glow with elation when they recognize their tree—it is as though two dear friends have reunited.

Children younger than twelve should probably be paired with an adult. Young children may also want to guide their adult friends: if so, the adult can look as needed for safety purposes.

Questions to explore:

• What are the features of your tree that helped you identify it when you took off the blindfold?

Silent Sharing Walk

Description

Explorers walk nature in silence, pointing out their wonderful natural discoveries.

Ages: 8 and up Number of people: 2 or more Materials: None How to play:

The ideal number for a Silent Sharing Walk is two or three walkers. If the group is larger, divide into sharing teams of two or three people.

Tell the participants to walk in silence. When one walker sees something captivating, instead of speaking aloud about it, he should gently tap the shoulder of one or more teammates, then point to the object and silently share the enjoyment.

Choose an attractive trail or open area that's easy to wander through. Since sharing teams move slowly, the distance they travel won't be great. If there are several sharing teams, agree on a time and place to gather afterwards.

Silent Sharing Walkers experience a beautiful rapport among themselves and with nature. Keeping silent and sharing nonverbally, the walkers become fully present with nature and with one another. It is moving to observe the serene, childlike love of the walkers as they gather around newly discovered flora, bird nests, and other natural wonders.

Questions to explore:

- What did you discover?
- How would this experience be different if you were allowed to talk?

Recipe for a Forest

Description

Create your dream forest when deeded an imaginary plot of land and express your appreciation for the diversity of a forest.

Ages: 6 and up Number of people: Any Materials: Paper, pencils, crayons or markers How to play:

Sound Map

Description

Create your dream forest when deeded an imaginary plot of land.

Ages: 5 and up

Number of people: Any

Materials: Paper, crayons, markers, pencils

How to play:

This activity encourages appreciation of the diversity of a forest. Give each child an imaginary ownership deed to one square mile or kilometer of land. Tell them that on this virgin plot, they are free to create their own dream forest, complete with as many trees, animals, mountains and rivers as they desire. encourage them to let their imaginations run wild. To encourage creativity, you can give some suggestions: e.g., "To make your forest beautiful and radiant, you might want to add waterfalls and windstorms, or perpetual rainbows…." 2. Have them list the components of their forest and then draw a picture of it

Questions to explore:

- Ask each participant to describe their dream forest. What was included?
- Will their dream forest be able to maintain itself year after year?
- What members of the food cycle (plant-eaters, plants, and decomposers (e.g., ants, mushrooms, bacteria) are included in the dream forest?

Glossary

Adaptations – any alteration in the structure or function of an organism or any of its parts that results from natural selection and by which the organism becomes better fitted to survive and multiply in its environment.

Alternate leaf – an arrangement of leaves (or buds) on a stem (or twig) in which the leaves emerge from the stem one at a time. This often makes the leaves appear to alternate on the stem.

Arborist - a specialist in the care of woody plants, especially trees.

Bark – The outermost layers of stems and roots of woody plants

Blossoms – a flower or a mass of flowers on a tree or bush.

Branches – a part of a tree that grows out from the trunk or from a bough.

Broadleaf – used to define a type of tree: having broad and flat, often deciduous leaves as opposed to needles.

Bud – a compact knoblike growth on a plant that develops into a leaf, flower, or shoot.

Cambium – in plants, a layer of actively dividing cells between xylem (wood) and phloem (bast) tissues that is responsible for the secondary growth of stems and roots (secondary growth occurs after the first season and results in increase in thickness).

Camouflage – an adaptation that allows animals to blend in with certain aspects of their environment. Camouflage increases an organism's chances of survival when hiding from predators.

Canopy – the uppermost trees or branches of the trees in a forest, forming a more or less continuous layer of foliage.

Carbon Dioxide – a colorless, odorless gas produced by burning carbon and organic compounds and by respiration. It is naturally present in air (about .03 percent) and is absorbed by plants in photosynthesis.

Cavity – an empty space within an object.

Cells – the structural and functional unit of a plant or animal.

Characteristics – a feature or quality belonging to a thing that serves to identify it from other things.

Chlorophyll – a green pigment, present in all green plants and in cyanobacteria, responsible for the absorption of light to provide energy for photosynthesis.

Circumference – the enclosing boundary of a circle.

Clay – sediment with particles smaller than silt.

Coloration – the natural color or variegated marking of a plant.

Compatibility – a state in which two things are able to exist or occur together without problems or conflict.

Compound leaf – a leaf of a plant consisting of several or many distinct parts (leaflets) joined to a single stem.

Cone – the fruit of a pine tree.

Conifer – a bush or tree (such as a pine) that produces cones and that usually has leaves that are green all year.

Crown – refers to the totality of an individual plant's above ground parts.

Crown spread – the mass of foliage and branches growing outward from the trunk of a tree.

Cure - eliminate symptoms of a disease or condition

Deciduous – shedding the leaves annually, as certain trees and shrubs... falling off or shed at a particular season, stage of growth, etc..., as leaves.

Decomposition - the state or process of rotting; decay.

Diameter – a straight line passing through the body of a circle.

Disperse – distribute or spread over a wide area.

Ecology – the branch of biology dealing with the relations and intersections between organisms and their environment, including other organisms.

Ecosystem – a biological community of interacting organisms and their physical environment.

Environmental - the conditions that surround someone or something.

Environmental awareness – advocacy for or work toward protecting the natural environment from destruction or pollution.

Environmental Science – Environmental Science is defined as a branch of biology focused on the study of the relationships of the natural world and the relationships between organisms and their environments.

Evergreen – an evergreen is a plant that has leaves throughout the year, always green.

Fruit – the seed-bearing structure of a plant.

Fungus – any group of unicellular, multicellular, or syncytial spore-producing organisms feeding on organic matter, including molds, yeast, mushrooms, and toadstools.
Geometric shapes – such as triangles, squares, rectangles,

Germination – is the process by which a plant grows from a seed. The beginning of growth, as a seed, spore, or bud.

Gnarled – rough and twisted with age.

Growth rings - a concentric layer of wood developed during an annual period of growth of a tree

Habitat – the natural home or environment of an animal, plant, or organism.

Heartwood – the older, non-living central wood of a tree or shrub, usually darker and harder than the younger sapwood.

Height – a measurement from base to top or head to foot.

Hibernation – the condition or period of a plant spending the winter in a dormant state.

Humid – a high level of water vapor in the atmosphere.

Humidity – is the amount of water vapor in the air. Water vapor is the gaseous state of water and is invisible.

Illness – a disease or period of sickness affecting the health of a plant,...

Invasive species – An invasive species is a plant, fungus, or animal species that is not native to a specific location (an introduced species), and which has a tendency to spread to a degree believed to cause damage to the environment, human economy or human health.

Leaf/leaves/foliage – the main organ of a tree or plant that is responsible for photosynthesis and transpiration.

Lifecycle- The course of stages through which an organism passes from fertilized zygote until maturity, reproduction, and death.

Lobed leaf – a leaf having deeply indented margins.

Micro Habitat- a habitat that is small of limited extent and which differs in character from some surrounding more extensive habitat.

Mimics - resembles or imitates.

Needles – leaf of a pine tree.

Neutral - having no strongly marked or positive characteristic or features

Nutrient – a substance that provides nourishment essential for growth and the maintenance of life.

Opposite leaf – an arrangement of leaves (or buds) on a stem (or twig) in which the leaves emerge from the stem in opposing pairs.

Organic matter – leaves, twigs, stems...

Organism – an individual animal, plant, or single-celled life form.

Outer bark – the outer layer that covers the trunk of a tree.

Oxygen – a reactive element that is found in water, in most rocks and minerals, in numerous compounds, and as a colorless tasteless odorless diatomic gas constituting 21 percent of the atmosphere.

Parallelogram – a four-sided rectangular figure with opposite sides parallel.

Phloem– a tissue in vascular plants that conducts food from the leaves and other photosynthetic tissues to other plant parts.

Photosynthesis - the process by which green plants and some other organisms use sunlight to synthesize foods from carbon dioxide and water. Photosynthesis in plants generally involves the green pigment chlorophyll and generates oxygen as a byproduct.

Pigment – the natural coloring matter of animal or plant tissue.

Pollinators – a pollinator is the agent that moves pollen from the male anthers of a flower to the female stigma of a flower to accomplish fertilization.

Pollution - the presence in or introduction into the environment of a substance or thing that has harmful or poisonous effects.

Run – a path made by an animal frequently traveling in one place.

Roosting/nesting – a place where birds regularly settle or gather to rest at night, or where bats rest in the day

Roots – the part of a plant that attaches it tithe ground or to a support, typically underground, conveying water and nourishment to the rest of the plant visa numerous branches and fibers.

Rotting log – decomposing or decaying trunk of a tree

Sand - a loose granular substance, typically pale or brownish, resulting from the erosion of rocks.

Sapling – a young tree, especially one raised from seed and not from a cutting.

Sapwood – the living, outermost portion of a woody stem or branch.

Seed - a unit of plant reproduction.

Seedling – a young plant, especially one raised from seed and not a cutting.

Seed stratification – is the process of treating stored or collected seed prior to sowing to simulate natural winter conditions that a seed must endure before germination.

Senses - humans have 5: touch, sight, smell, hearing, and taste

Serrated leaf – having or forming a row of small, sharp, projections resembling the teeth of a saw. Having a saw-toothed edge or margin notched with tooth like projections.

Silt - fine sand, clay, or other material carried by running water and deposited as a sediment, especially in a channel or harbor.

Simple leaf – a leaf whose blade is not divided to the midrib even though lobed – compared to a compound leaf.

Snag - a dead tree.

Soil – the upper layer of earth in which plants grow that typically consists of a mixture of organic materials, clay, and rock particles.

Soil composition – the type and quantity of substance found in soil.

Species – biology: a group of animals or plants that are similar and can produce young animals or plants: a group of related animals or plants that is smaller than a genus.

Sprout – (of a plant) put for shoots.

Stem – the main body or stalk of a plant or shrub.

Symptoms – a physical feature that is regarded as indicating a condition or disease.

Requirement – a thing that is needed or wanted.

Tangram – a Chinese geometric puzzle consisting or a square cut into seven pieces that can be arranged to make various other shapes.

Temperature – the degree of heat present in a substance or object

Transpiration – plants giving off water vapor through their leaves.

Transplanting – to remove (a plant) from the ground or from a pot and move it to another place.

Trunk – the wide central part of a tree from which branches grow

Twig – a slender woody shoot growing from a branch or stem of a tree

Unique - the only one of its kind

Weaken – make or become weaker in strength

Whorled leaf – leaves that radiate from a single point and surround or wrap around a stem.

Width - measurement of something from side to side

Xylem – the vascular tissue in plants that conducts water and dissolved nutrients upwards from the root and also helps to form the woody element in the stem.

Bookcase

Spring:

<u>Guide To The Planet</u> (Incredible facts about our planet Earth) by Mathew Murrie and Steve Murrie

<u>The Secret Life of Trees</u> by Chiara Chevallier (Beginning to read level. Beautiful pictures and facts about trees.)

<u>Welcome Spring</u> by Megan E. Bryant (Spring is on its way and there are lots of things the Treetures need to do to get ready. Come along as the Treeture Teacher, Twigs, takes a new class of Sproutlings on a tour of Nutley Grove to watch the Treetures get a young apple tree ready for its first blossom! The lessons learned in this book that blends fiction and nonfiction will last long after kids have finished reading it!)

<u>Franklin Plants A Tree</u> by Sharon Jennings (Franklin has lost the tree sapling he was given for Earth Day, so he retraces his steps. Thanks to a bit of luck, he finds the sapling and proudly plants it in his backyard, hoping it will grow big enough for a tree house.)

The Goodness of Rain: Developing an Ecological Identity in Young Children by Ann Pelo (Join author Ann Pelo on her year-long journey as she nurtures the ecological identity of a toddler and discovers for herself what it means to live in relationship with the natural world.)

Summer:

<u>Loons in the Mist</u> by Carl R. Sams and Jean Stoick (A photographic journey of five summers spent with a family of loons. You're sure to become captivated with the magical spirit of the northern lakes.

<u>On Meadowview Street</u> by Henry Cole (Upon moving to a new house, young Caroline and her parents encourage wildflowers to grow and birds and animals to stay in their yard, which soon has the whole suburban street living up to its name.) <u>Plant Secrets</u> by Emily Goodman (Plants come in all shapes and sizes, but they go through the same stages as they grow. Using four common plants, young readers learn about a plant's life cycles.)

Our Tree Named Steve by Alen Zweibel and David Catrow (In a letter to his children, a father recounts memories of the role Steve, the tree in their front yard, has played in their lives.)

Fall:

<u>How Do Apples Grow</u>? by Betsy Maestro (Describes the life cycle of an apple from its initial appearance as a spring bud to that point in time when it becomes a fully ripe fruit. Have you ever eaten part of a flower?)

<u>Leaf Man</u> by Lois Ehlert (A man made of leaves blows away, traveling wherever the wind may take him, in a fresh, autumn tale with illustrations made from actual fall leaves and die-cut pages on every spread that reveal gorgeous landscape vistas.)

<u>Red Leaf Yellow Leaf</u> by Lois Ehlert (A child describes the growth of a maple tree from seed to sapling.)

<u>Sara Squirrel and the Lost Acorns</u> by Julie Sykes and Catherine Walters (When Sara Squirrel goes in search of acorns, all her friends want her to bring back something for them, too.)

<u>The Apple Pie Tree</u> by Zoe Hall (Soon the fruit is big, red, and ready to be picked. It's time to make an apple pie! Here is a celebration of apples and how things grow -- sure to delight young readers all year long.)

<u>We're Going on a Leaf Hunt</u> by Steve Metzger (Three friends go on a hike searching for fall leaves.)

<u>Why Do Leaves Change Colors?</u> By Betsy Maestrohy (Why do leaves turn from green to gold? It's fall! The leaves are changing color. This book explains the magical process of how leaves change their color in autumn.)

Winter:

<u>A Stranger In The Woods</u> by Carl R. Sams and Jean Stoick (Forest animals, awakened by the birds' warning that there is a stranger in the woods, set out to discover if there is danger and find, instead, a wonderful surprise.)

<u>First Snow In The Woods</u> by Carl R. Sams and Jean Stoick (With the arrival of winter, the forest animals prepare for the first snowfall of the season.)

<u>The Mitten by Jan Brett</u> (After Nicki accidentally drops his white mitten in the snow, it becomes an object of curiosity for a mole, a rabbit, a badger, a tiny brown mouse, a big brown bear, and others, as they all crawl into it.)

<u>Tea With Lady Saphire</u> by Carl R. Sams and Jean Stoick (The antics and activites of our wild feathered friends are brought to life with great descriptions and photographs that will amaze kids and adults, too!

Any Season:

<u>A Tree For All Seasons</u> by Robin Bernard (This picture book records the growth progress of a maple tree over a period of time to illustrate what trees do and how the seasons change.)

<u>Common Ground The Water, Earth, and Air We Share</u> by Molly Bang (Imagines a village in which there are too many people consuming shared resources and discusses the challenge of handling our world's environment safely.)

<u>Why Would Anyone Cut A Tree down?</u> by Roberta Burzynski (This delightful book shows children the life cycle of trees, showing that trees are a renewable resource as their seeds can be planted to make new trees grow.)

<u>Guide To The Planet</u> by Mathew Murrie and Steve Murrie (A beautiful collection of full-color photos and informative content captures the incredible diversity and natural wonders of this magnificent planet and its amazing inhabitants.)

<u>A Log's Life</u> byWendy Pfeffer, Robin Brickman (Presents a tale about a fallen oak tree in the forest, teaching young readers about its life cycle and the various purposes that it serves in the ecosystem during every step of its life cycle.) <u>The Secret Life of Trees</u> by Chiara Chevallier (Details the parts and inner lives of trees and all the organisms that live within them.)

<u>Dear Children Of The Earth</u> by Schim Schimmel (Mother Earth writes a letter telling people about herself and asking them to take care of her for themselves and for all living creatures.)

<u>Look What I Did with a Leaf!</u> by Morteza E. Sohi (Morteza E. Sohi gives careful directions on how to choose leaves for shape and color, how to arrange them in an animal form, and how to preserve the finished work of art.)

<u>Tell Me Tree: All About Trees for Kids</u> by Gail Gibbons (Featuring a special section on how children can make a tree identification book of their own, this title is a bright and colorful introduction to trees, leaves, and their inner workings in nature. Full color.)

<u>The Happiness Tree: Celebrating the Gifts of Trees We Treasure</u> by Andrea Gosline (With a detailed index of state trees, THE HAPPINESS TREE is a welcome reminder that everything good begins right here.)

<u>The Lorax</u> by Dr. Seuss (It chronicles the plight of the environment and the Lorax, who speaks for the trees against the Once-ler.)

<u>The Tree Book for Kids and Their Grown-ups</u> by Gina Ingoglia (Describes the different types of trees of North America and how to identify them by their leaves, buds, and bark, and explains why trees are important to the environment.

<u>The Tree Lady: The True Story of How One Tree Loving Woman Changed a City</u> <u>Forever</u> by H. Joseph Hopkins (Part fascinating biography, part inspirational story, this moving picture book about following your dreams, using your talents, and staying strong in the face of adversity is sure to resonate with readers young and old.)

<u>The Giving Tree</u> by Shel Silverstein (A young boy grows to manhood and old age experiencing the love and generosity of a tree which gives to him without thought of return.)



SEPS.1 Posing questions (for science) and defining problems (for engineering) SEPS.2 Developing and using models	Pine Cone Weather Station – Spring Tree Detectives – Spring The Forest of S.T. Shrew – Spring How Plants Grow – Spring Invasive Species – Spring Trees in Trouble – Summer Who Can Live Here? – Summer The Fallen Log – Summer The Closer You Look-Winter Tree Detective – Spring
and tools	Sounds Around – Spring How Big is Your Tree? – Summer How Plants Grow – Spring Birds and Worms – Spring Soil Stories – Spring Trees in Trouble – Summer Have Seeds Will Travel – Summer The Fallen Log – Summer Tree Lifecycle – Summer Trees in Trouble – Summer Getting in Touch with Trees – Summer Who Can Live Here? – Summer The Shape of Things – Fall Signs of Fall – Fall Every Tree for Itself – Fall To Be a Tree – Winter Tree Factory - Winter
SEPS.3 Constructing and performing investigations	Pine Cone Weather Station – Spring Tree Detectives – Spring How Big is Your Tree? – Summer Sounds Around – Spring How a Plant Grows – Spring Soil Stories – Spring Trees in Trouble – Summer Adopt a Tree – Summer Have Seeds Will Travel – Summer Getting in Touch with Trees – Summer Who Can Live Here? – Summer Signs of Fall – Fall Looking at Trees – Fall Trees as Habitats – Winter Tree Cookies – Winter The Closer You Look-Winter Evergreens in Winter – Winter



SEPS.4 Analyzing and interpreting	Sounas Arouna – Spring
data	How Plants Grow – Spring
	Tree Detectives – Spring
	Soil Stories – Spring
	<mark>Adopt a Tree – Summer</mark>
	<mark>Tree Life Cycle – Summer</mark>
	Trees in Trouble – Summer
	Who Can Live Here? - Summer
SEPS.5 Using mathematics and	How Plants Grow – Spring
computational thinking	How Big is Your Tree? – Summer
	Who Can Live Here? – Summer
	Every Tree for Itself – Fall
	The Shape of Things - Fall
SEDS & Constructing ovaluations (for	Pine Cone Weather Station – Spring
	The Forest of S.T. Shrew – Spring
science) and designing solutions (for	Sounds Around – Spring
engineering)	How Plants Grow – Spring
	Birds and Worms – Spring
	Invasive Species- Spring
	Trees in Trouble – Summer
	Adopt a Tree – Summer
	Getting in Touch with Trees – Summer
	<mark>Have Seeds Will Travel – Summer</mark>
	<mark>The Fallen Log – Summer</mark>
	<mark>Trees in Trouble –</mark> Summer
	Signs of Fall – Fall
	Every Tree for Itself – Fall
	Tree Cookies – Winter
	Trees as Habitats – Winter
	The Closer You Look-Winter
SEPS.7 Engaging in argument from	Pine Cone Weather Station – Spring
evidence	The Forest of S.T. Shrew – Spring
	Sounds Around – Spring
	How Plants Grow – Spring
	Adopt a Tree – Summer
	<mark>Have Seeds Will Travel – Summer</mark>
	<mark>The Fallen Log – Summer</mark>
	<mark>Trees in Trouble – Summer</mark>
	Getting in Touch with Trees – Summer
	Who Can Live Here? – Summer
	Trees as Habitats – Winter
	The Closer You Look-Winter
SEPS 8 Obtaining evaluating and	Tree Detectives – Spring
semmunication information	The Forest of S.T. Shrew – Spring
communicating information	Sounds Around – Spring
	How Rig is Your Tree? - Summer
	How Dig is four free: - Summer
	now Plants Grow – Spring



Birds and Worms – Spring
Soil Stories – Spring
<mark>Trees in Trouble – Summer</mark>
Adopt a Tree – Summer
<mark>Who Can Live Here? – Summer</mark>
<mark>The Fallen Log – Summer</mark>
<mark>Tree Life Cycle – Summer</mark>
Trees in Trouble – Summer
Getting in Touch with Trees – Summer
Tree Factory - Winter

Key: SPRING SUMMER FALL WINTER

Please note:

The activities contained in the Woodland Trails Guide may assist teachers in meeting required IN Academic Standards while facilitating and supporting outdoor learning adventures. Each activity is assigned to a SEPS category with the understanding that it is the instructor's decision as to whether or not they meet the assigned standard.



Trees in Trouble





Poet Tree





The Fallen Log

D	E	С	0	М	Ρ	0	S	I	Т	I	0	Ν	В
S	Т	N	E	I	R	Т	U	N	N	М	Z	E	Т
х	G	E	A	Ι	R	E	т	С	A	В	E	E	A
F	U	N	G	Ι	D	В	E	Р	Q	т	R	К	Т
S	Р	I	D	E	R	S	J	Н	L	Μ	W	Y	Ι
М	I	L	L	Ι	Р	Ε	D	Ε	Ι	I	0	В	В
E	L	С	Y	С	Ε	R	U	т	S	I	0	Μ	A
Y	F	Μ	S	К	Т	С	E	S	Ν	I	D	S	Н

FIND THESE WORDS: habitat, moisture, air, decomposition, beetle, spiders, wood, ant, millipede, fungi, termite, bacteria



Tree Life Cycle





Have Seed Will Travel





Have Seed Will Travel

Invasive Species Fill in the vowels to identify common characteristics of invasive species.

- 1. Have a short I__f__cycl__ and produce many __ffspr__ng
- 2. Gr__w very quickly
- 3. Are not affected by natural pr__d_t__rs in their new h__b__t__ts
- 4. Spr___d quickly and easily to new __c__syst__ms
- 5. Often t_l_r_t_ a wide range of different __nv_r_nm__nts





Looking at Leaves (B)





The Shape of Things





How Plants Grow





Poet Tree





The Fallen Log

D	E	С	0	М	Ρ	0	S	I	Т	I	0	Ν	В
S	Т	N	E	I	R	Т	U	N	N	М	Z	E	Т
х	G	E	A	Ι	R	E	т	С	A	В	E	E	A
F	U	N	G	Ι	D	В	E	Р	Q	т	R	К	Т
S	Р	I	D	E	R	S	J	Н	L	Μ	W	Y	Ι
М	I	L	L	Ι	Р	Ε	D	Ε	Ι	I	0	В	В
E	L	С	Y	С	Ε	R	U	т	S	I	0	Μ	A
Y	F	Μ	S	К	Т	С	E	S	Ν	I	D	S	Н

FIND THESE WORDS: habitat, moisture, air, decomposition, beetle, spiders, wood, ant, millipede, fungi, termite, bacteria



Tree Life Cycle





Have Seed Will Travel

Invasive Species Fill in the vowels to identify common characteristics of invasive species.

- 1. Have a short I__f__cycl__ and produce many __ffspr__ng
- 2. Gr__w very quickly
- 3. Are not affected by natural pr__d_t__rs in their new h__b__t__ts
- 4. Spr___d quickly and easily to new __c__syst__ms
- 5. Often t_l_r_t_ a wide range of different __nv_r_nm__nts





Looking at Leaves (B)





The Shape of Things





Trees in Trouble





The Forest of S. T. Shrew





How Big is Your Tree?





Soil Stories





How Plants Grow

