

Kindergarten Science Curriculum

Unit 1: Trees (Foss Trees & Weather Unit: Investigations 1 & 2)		Time: September -November	Standards:
Essential Questions <ul style="list-style-type: none"> Why are trees important? 		Enduring Understandings <ul style="list-style-type: none"> Trees are living plants that have basic needs: light, air, nutrients, water and space. Trees give us shade. Trees are a natural resource that are used in everyday life. 	<p>K.PS3-1. Make observations to determine the effect of sunlight on Earth's surface.</p> <p>K-PS3-2. Use tools and materials to design and build a structure that will reduce the warming effects of sunlight on an area.</p> <p>K-2-ETS1-2. Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.</p>
Benchmark Assessment(s) <ul style="list-style-type: none"> ➤ SWBAT design and build a structure (i.e. umbrella, canopies, and tents) that will minimize the warming effect of the sun. By using a tree as a model to observe, students work in small groups to discuss, draw, and build a structure using a variety of materials (i.e. assortment of fabrics, rubber bands, popsicle sticks, paper, etc.) K.PS2-1; K-PS3-2; K-2-ETS1-2 		Other Assessments <ul style="list-style-type: none"> ✓ Teacher observations ✓ Group and individual participation 	Materials <ul style="list-style-type: none"> Foss Science Teacher manual Assortment of materials to build a structure <ul style="list-style-type: none"> - Fabrics - Paper - Rubber bands - Popsicle sticks - Paper clips - Tape - Glue - Cardboard
SUGGESTED ACTIVITIES			
<ul style="list-style-type: none"> Foss Investigation 1- Part 1-Observing Schoolyard Trees: Students go on a walk around the schoolyard, developing general concepts about trees and discussing how trees are useful to people and wild animals. Foss Investigation 1- Part 2 Tree Parts: Students use picture and word cards to identify the main parts of trees. Students' understanding of tree parts is enhanced as they put together their own pictures of tree parts. Foss Investigation 1- Part 3 Tree Puzzles: Students use puzzles to learn and compare different shapes of trees. 		REINFORCEMENT <ul style="list-style-type: none"> Preview vocabulary at the beginning of the lesson. https://jr.brainpop.com/science/habitats/forests/ Make free-form trees by cutting out parts of a tree from construction paper, then gluing them together. Read books about trees: See suggested materials Read: <u>Red Leaf, Yellow Leaf</u> by Lois Ehlert Read: <u>What is Today's Weather</u>, by Jennifer Boothroyd. Provide students with printed notes, organizers, etc. 	

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- Foss Investigation 1- Part 4 Tree-Silhouette Cards: Students play a matching game, using matched sets of Tree-Silhouette Cards.
- Foss Investigation 1- Part 5 Adopt Schoolyard Trees: The class adopts several schoolyard trees to observe throughout the school year. Students start a classroom scrapbook to document their observations.
- Foss Investigation 1- Part 6 A Tree Comes to Class: A living tree enters the classroom. Students learn that a tree is alive and discuss what it needs to grow and stay healthy. The whole class goes outdoors to plant the tree that they have been observing in the classroom.
- Johnny Appleseed- Read aloud a book, watch a brainpopjr video, and create a Johnny Appleseed craft or “pot” hat.
- Foss Investigation 2- Part 1- Leaf Walk- Students read about and discuss how we use our senses to learn. They take a schoolyard walk to observe leaves on trees, noting similarities and differences and gather leaves to press.
- Foss Investigation 2-Part3- Comparing Leaves- Students go outdoors for a leaf hunt. Using a paper reference leaf, they look for leaves that differ in size and shape.
- Foss Investigation 2-Part 5- Leaf Books- Students make leaf books to add to their science notebooks. The teacher reads Our Very Own Tree, which summarizes many of the ways students have studied trees.
- View leaves that have changed colors, compare them to green leaves, and discuss the term chlorophyll.
- Make an apple blossom tree craft using tissue paper and pastels.
- Compare tastes, color, and shapes of apples.
- Investigate apple parts (seeds, core, flesh, skin stem) by cutting open an apple.
- Cook applesauce in the crockpot from apples.

- Students can pair-up with partner to draw understanding of focus questions.

ENRICHMENT

- Student can choose a tree and make a bark rubbing, then write the tree name.
- Students create labels for trees, then with the help of a teacher, label trees in the school yard or outside the classroom window.
- Roots in Water (Hydroponics) - Enrichment Activity
Review what plants needs to survive and grow. Explain to students that they will grow the same seedling in both soil and water to compare the different ways to grow plants. Have students germinate seeds in a zip lock bag. Once the seeds have germinated, transfer the seedlings and plant in a cup with soil and another in a cup with water. Have students make observations. As the plants grow then you can investigate the roots of the plants. Compare the growth of the seedlings to the roots of trees outside.
Extension: A student may notice that the seedling planted in water will need support. Then provide support for the seedling in water with pebbles.

Suggested Websites

- www.fossweb.com
- <https://jr.brainpop.com/socialstudies/biographies/johnnyappleseed/>
- <https://jr.brainpop.com/science/habitats/forests/>
- Scholastic Digital Issue of Johnny Appleseed:
http://sni.scholastic.com/SN2/09_03_15_SN2
- www.Pebblego.com
- www.discoveryeducation.com

Suggested Materials

- Smartboard/ipad
- Student Foss Resource Book
- Weekly Readers
- Photographs of real trees
- Laminated and labeled leaves
- Books:
Johnny Appleseed
Red Leaf, Yellow Leaf by Lois Elhert
Leaves by David Stein
Amelia Bedelia Apple Pie by Herman Parish
An Apple Orchard Riddle by Margaret McNamara
Leaf Jumpers by Carole Gerber
Changing Colors by Gare Thompson
A Busy Year by Leo Lionni
A Tree is Nice by Janice May Udry

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Cross-Curricular Connections

Skills 9.4.2.Cl.1: Demonstrate openness to new ideas and perspectives (e.g., 1.1.2.CR1a, 2.1.2.EH.1, 6.1.2.CivicsCM.2).

SEL- Relationship skills: Utilize positive communication and social skills to interact effectively with others.

Language Arts –L.K.6. Use words and phrases acquired through conversations, reading and being read to, and responding to texts.

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Unit: Materials and Motion Foss Materials and Motion Investigations 4		Time: December-Feb	Standards:
Essential Questions <ul style="list-style-type: none">• What causes objects to move?• What happens when objects collide?• How can we change the speed or direction of an object?		Enduring Understandings <ul style="list-style-type: none">• Pushing or pulling moves an object and changes its direction.• Gravity pulls things down.• When objects touch or collide, they push on one another, which can change motion.	<p>K-2-ETS1-1. Ask questions, make observations, and gather information about a situation people want to change (e.g., climate change) to define a simple problem that can be solved through the development of a new or improved object or tool.</p> <p>K-2-ETS1-3. Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.</p> <p>K-PS2-1. Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.</p> <p>K-PS2-2. Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull.</p>
Benchmark Assessment(s) <ul style="list-style-type: none">➤ SWBAT 1.use a balloon-rocket system to find out how far the air in the balloon will propel the system along the flight line and change the strength of the push (number of pumps of air in the balloon), to change the speed of the balloon rocket and distance. 2.Student will use an object to cause a collision on the flight line. Students work with a partner and afterwards, the partnership discusses the results with the whole class. Teacher will observe students and note their discussion with the whole class. (Foss Investigation 4- Part 4- Balloon Rockets)		Other Assessments <ul style="list-style-type: none">✓ Teacher observations✓ Group and individual participation	Materials <ul style="list-style-type: none">• Foss Science Teacher Manual• Balloons• Ziploc bags• Straws• Index cards• Tape• Balloon pump• Strings• Masking tape• Chairs

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SUGGESTED ACTIVITIES

- Foss Investigation 4- Part 1-Pushes and Pulls-Students observe and describe how a push or pull causes something to move. They roll balls at different speeds (slow and fast) and determine the strength of the push required to achieve a certain speed. They are introduced to gravity as a pulling force.
- Foss Investigation 4- Part 2 – Colliding Objects- Students use balls and ramps to achieve different speeds. They explore what happens when a moving ball hits an object. Students change the speed of the ball by changing the slope of the ramp to knock over blocks. They apply their knowledge of ball motion to make a ball land in a particular spot.
- Foss Investigation 4- Part 3- Rolling Outdoors- Students find slopes in the schoolyard that can be used to set balls in motion. Each group uses a plastic bottle as a target to predict the path of a ball on a slope.
- Push and Pull activity- Students sort pictures into two categories by cutting and pasting
- Use balls on slides and other playground equipment to explore motion
- Play a bowling game and discuss strategies to get all the pins down and the motion of the ball
- Moving Ping Pong balls- Students blow it with mouth, straw, collide with a different ball, place it on a ramp.
- Create a balloon powered Lego car

REINFORCEMENT

- Preview vocabulary at the beginning of the lesson. (TM p 268)
- Read books about motion: See suggested materials
- Read: *All Kinds of Motion*, by Jennifer Waters.
- Provide students with printed notes, organizers, etc.
- Students can pair-up with partner to draw understanding of focus questions.

ENRICHMENT

- Students take their balloon rocket system (Benchmark assessment) to a preschool class or 1st grade class and teach/explain the experiment and answer student questions.
- Students draw runway path for a roller coaster, and write or dictate descriptions of their runways. They should describe where the ball will start, what happens in the middle and how it finishes the course.
- Sail Boats – Enrichment Activity
Prepare a set of material that will work for sail boat. Suggested materials: sponges, aluminum foil, small plastic containers, straws. Students review the properties of materials that sink and float. Have students brainstorm materials that will be best to build a small boat. Present the students with the material that the already prepared. As a class build one boat to model to students the use of the material. When students suggest to use a particular material ask them why they think the material will be suitable to build a boat. Test the boat and ask student to share their observations. What can be improved? Extension: Once the initial class investigation is complete. Have students create or assemble their own boat to test how well it floats in water.

Suggested Websites

- www.fossweb.com
- www.Pebblego.com
- www.discoveryeducation.com
- <https://jr.brainpop.com/science/forces/gravity/>
- <https://jr.brainpop.com/science/forces/pushesandpulls/>

Suggested Materials

- Smartboard/ipad
- Student Foss Resource Book
- Big Book Foss Materials and Motion
- Weekly Readers
- Ball
- Balls of different sizes

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- Scholastic Physics Lesson: <https://www.scholastic.com/teachers/lesson-plans/17-18/the-magic-school-bus-rides-again-physics-lesson-plan/>
- <https://www.scholastic.com/teachers/collections/17-18/magic-school-bus-rides-again-teaching-resources/>
- Toys that roll (trains, cars)
- Whiffle ball
- Wood samples
- Foam runways
- Bath towel or small blanket
- Empty plastic bottles
- Containers (basins provided by Foss)
- Books:
 - Move It! Motion Forces and You* by Adrienne Mason
 - I Can Push* –Mondo
 - What Makes Things Move* by Althea
 - Newton and Me* by Lynne Mayer
 - Roller Coaster* by Marla Frazee
 - The Magic School Bus Plays School*

Cross-Curricular Connections

21st Century Skills

9.4.2.CI.1: Demonstrate openness to new ideas and perspectives (e.g., 1.1.2.CR1a, 2.1.2.EH.1, 6.1.2.CivicsCM.2).

9.4.2.CI.2: Demonstrate originality and inventiveness in work (e.g., 1.3A.2CR1a).

CRP1. Act as a responsible and contributing citizen and employee.

CRP4. Communicate clearly and effectively and with reason.

SEL- Relationship skills: Utilize positive communication and social skills to interact effectively with others. (Students work together when building the experiments.)

Language Arts –L.K.6. Use words and phrases acquired through conversations, reading and being read to, and responding to texts.

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Unit: Weather (Foss Trees & Weather Unit: Investigation 3)		Time: March- April	Standards:
Essential Questions <ul style="list-style-type: none"> • What is the weather today? • How can we measure the air temperature? • What does a wind sock tell us about the wind? 	Enduring Understandings <ul style="list-style-type: none"> • Weather is the condition of the air outdoors. • Weather changes. • A thermometer measures how hot or cold the air is. • Wind is moving air. 	K-ESS2-1. Use and share observations of local weather conditions to describe patterns over time.	
Benchmark Assessment(s) <ul style="list-style-type: none"> ➤ SWBAT create a weather calendar and analyze data. (Use Foss Teacher Master No.23 and Foss weather calendar to record each day's weather. Then, tally each type of weather for the month to analyze the weather conditions, describe patterns, & ask and answer questions about weather forecasting.) K-ESS2-1 		Other Assessments <ul style="list-style-type: none"> ✓ Teacher observations ✓ Group and individual participation 	Materials <ul style="list-style-type: none"> • Foss Science Teacher Manual • Foss Teacher Master No.23 or other weather calendar for students • Access to window or outdoor classroom
SUGGESTED ACTIVITIES			
<ul style="list-style-type: none"> • Foss Investigation 3- Part 1- Weather Calendar – Students share what they know about weather and how it relates to air. A class weather monitor begins recording daily weather observations on a class calendar. Weather pictures (symbols) are used to indicate five basic types of weather. • Foss Investigation 3- Part 2- Recording Temperature- Students use a thermometer and take turns measuring and recording the relative temperature (freezing, cold, cool, warm, hot). • Foss Investigation 3- Part 3 – Wind Direction- Students construct a wind sock and observe how it responds when air moves through it. They find out that they can determine wind direction by using a wind sock. 		REINFORCEMENT <ul style="list-style-type: none"> • Preview vocabulary at the beginning of the lesson. • Read books about weather: See suggested materials 	

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- Create a seasons booklet by drawing pictures or cutting and gluing magazine pictures of things found in each season
- Use a stuffed animal or a bulletin board set to dress a person or animal appropriately for the daily weather
- Teach rhyme “Red sky at night- sailor’s delight!” and discuss meaning
- Place thermometers in different areas and analyze data (playground sunny spot, playground shady spot, inside window, outside window, etc.)
- Create a tornado by using 2 plastic water bottles taped together (3/4 full). Spin the bottles to show the motion of the tornado.
- Rub a balloon on hair to make static. Students use sense of sight to view static. Discuss how it relates to lightning.
- Write a weather poem about different types of weather
- Create symmetrical cloud pictures by putting white paint on blue construction paper and folding in half
- Build a structure to block the sun using school supplies
- Visit a weather website daily and discuss
(www.weather.com; www.weatherbug.com; www.accuweather.com)

ENRICHMENT

- Make a daily temperature graph using chart/graph paper.
- Make a weather vane using straws and paper cups.

Suggested Websites

- www.fossweb.com
- www.Pebblego.com
- www.discoveryeducation.com
- <http://www.prekinders.com/weather-theme/>
- <http://www.scholastic.com/kids/weather/sim/game.htm>
- www.discoveryeducation.com
- <https://jr.brainpop.com/science/weather/>
- <https://jr.brainpop.com/science/forces/>
- <http://www.littlegiraffes.com/weather.html>
- <http://www.learningreviews.com/Weather-Websites-for-Kids.html>
- <http://www.funology.com/category/science-experiments/weather-science-experiments/>
- http://billnye.com/billnye_resource/twistin-tornado/

Suggested Materials

- Smartboard/ipad
- Student Foss Resource Book
- Weekly Readers
- Books:
Up in the Sky Foss
Weather Foss
Cloudy with a Chance of Meatballs
It Looked Like Spilled Milk by Charles Greenshaw
Weather Words and What they Mean by Gail Gibbons
Feel the Wind by Arthur Dorros
Weather Forecasting by Gail Gibbons
Cat and Mouse in the Rain by Tomasz Bogacki
How’s the Weather in Fall? by Rebecca Felix
What is Today’s Weather? by Jennifer Boothroyd
Miss Mingo Weathers the Storm by Jamie Harper
What’s the Weather? by Children’s Press
The Wind Blew by Pat Hutchins
Super Storms by Seymour Simon
What Will the Weather Be Like Today? by Paul Rogers
Thunder Cake by Patricia Polacco

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The Cloud Book by Tomie dePaola

Cross-Curricular Connections

21st Century Skills-

9.4.2.Cl.1: Demonstrate openness to new ideas and perspectives (e.g., 1.1.2.CR1a, 2.1.2.EH.1, 6.1.2.CivicsCM.2).

9.4.2.Cl.2: Demonstrate originality and inventiveness in work (e.g., 1.3A.2CR1a).

CRP1. Act as a responsible and contributing citizen and employee.

CRP4. Communicate clearly and effectively and with reason.

SEL- SEL- Relationship skills: Utilize positive communication and social skills to interact effectively with others. (Students discuss weather with classmates.)

Math K.MD.B.3 Classify objects into given categories; count the number of objects in each category and sort the categories by count.

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Unit: Animals Two by Two		Time: May-June	Standards:
Essential Questions <ul style="list-style-type: none"> What do animals need to survive? 		Enduring Understandings <ul style="list-style-type: none"> Animals have basic needs- water, air, food, and space with shelter. Animals have similar but different structures and behaviors. 	<p>K-LS1-1. Use observations to describe patterns of what plants and animals (including humans) need to survive.</p> <p>K-ESS2-2. Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.</p> <p>K-ESS3-1. Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live.</p> <p>K-ESS3-3. Communicate solutions that will reduce the impact of climate change and humans on the land, water, air, and/or other living things in the local environment.</p>
Benchmark Assessment(s) <ul style="list-style-type: none"> ➤ SWBAT draw a picture of any animal (possibly the class goldfish- Foss Investigation1) and add many details to include its basic needs and label; i.e. show water, food, shelter. Students then share their picture with peers. K-LS-1; K-ESS2-2; K-ESS3-1 		Other Assessments <ul style="list-style-type: none"> ✓ Teacher observations ✓ Group and individual participation 	Materials <ul style="list-style-type: none"> Foss Science Teacher Manual Paper
SUGGESTED ACTIVITIES			
<ul style="list-style-type: none"> Foss Investigation 1- Part 1- The Structure of Goldfish- Students observe goldfish living in a simple aquarium. They look for and name different parts of the fish, such as fins, tail, mouth, and gills. They look to see if all the fish are alike, or if there are differences such as color and size. They draw a picture and dictate a sentence to record what they see. 		REINFORCEMENT <ul style="list-style-type: none"> Watch video on worms: Wild Kratts Squirmy Wormy (Also available on Amazon Prime) https://www.dailymotion.com/video/x35xmpb Invite a worm farmer to class Vocabulary Matching Game Provide students with printed notes, organizers, etc. 	

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- Foss Investigation 1- Part 2- Caring for Goldfish- Students learn how to care for goldfish, giving them food and fresh water, and adding plants to the aquarium. With each addition, students describe the fish behavior they observe.
- Foss Investigation 1- Part 3- Goldfish Behavior-Students add a tunnel to the aquarium to observe how the fish respond. They make their own paper aquariums to model the fish behavior they have observed.
- Foss Investigation 3- Part 1- The Structure of Redworms- Students dig through a terrarium to discover that there are redworms living in the soil. They look for some of the structure they have seen on other animals they have studied so far. They rinse the worms in water to remove the soil and get a better view.
- Foss Investigation 3-Part 2- Redworm Behavior- Students focus on the movement and behavior of redworms. They notice how the worm's body contracts and stretches to move forward. They observe the worm to see if it can move in other directions. They try blocking the worm's path to see what it does. Students consider what redworms need to live and set up a worm-jar habitat. Students observe how redworms change leftover food and other plant materials into soil.
- Foss Investigation 3- Part 3- Comparing Redworms to Night Crawlers- Students discover a new kind of worm in their terrarium-night crawlers. The new worms are much longer and fatter than the redworms. Students observe the two kinds of worms and compare the structures and behaviors of the two animals.
- Foss Investigation 4- Part 4- Animals Living Together- Students build a terrarium to observe how several animals live together. They put isopods, snails, and earthworms into a terrarium, then add objects from the natural environment to create an appropriate habitat for the animals.

Suggested Websites

- www.fossweb.com
- www.Pebblego.com
- www.discoveryeducation.com
- www.enature.com
- www.extremescience.com
- <https://jr.brainpop.com/science/animals/>
- <https://jr.brainpop.com/science/habitats/>
- www.littlegiraffes.com
- <http://www.sheppardsoftware.com/preschool/animals.htm>
- <http://www.animalfactguide.com/links/>
- <http://kids.nationalgeographic.com/>
- <https://www.nwf.org/Home/Educational-Resources>
- www.discoveryeducation.com

ENRICHMENT

- Compare the lengths of night crawlers- See Foss TM p158
- Look at worm paths- Have students dip their worms in water and let the wet worms crawl across dry construction paper. Have them compare the worm trails to snail trails. Foss TM p158
- Set up a vermicompost system (Foss TM p159)
- Enrichment – A to Z Animal Poster
Use a trifold project presentation board. Pre-measure and mark the spots (not with the actual letter) where the letters will be glued. Space the letters leaving enough space to be able to place a picture of an animal right beneath its corresponding letter. This will help students place the letters in the right spot. Present to the students the project trifold poster. Recite the alphabet with the class. Guiding the class have students (one at a time) place the letter of the alphabet A through Z on the marked spots. Now guide students to work on the title they will give the board. Explain that they will be completing the board by adding a picture of one animal for each letter. Have a couple of pictures ready to help students. One picture could be of an animal that your students are familiar with like a cat or cow. And have another picture from an animal that your students may not be familiar with like the xerus. Students are to brainstorm animals for each letter of the alphabet. Once they have a list ready as a class, then the teacher will be able to print a corresponding picture for each animal.
Extension: Once the poster is complete, have the students review and make up a song to include the name of all the animals.

Suggested Materials

- Smartboard/ipad
- Student Foss Resource Book
- Weekly Readers
- Books:
Animals Two by Two (Foss)
Animals All Around Us (Foss)
Worms in Soil (Foss)
Water and Land Snails (Foss)
A House for Hermit by Eric Carle
Isopods (Foss)
Animal Habitats by Judy Press
Dan's Pet
Living or Nonliving by C.E. Bear
Wonderful Worms by Linda Glaser

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Insects for Young Children by Connie Zakowski

Cross-Curricular Connections

21st Century Skills-

9.4.2.Cl.1: Demonstrate openness to new ideas and perspectives (e.g., 1.1.2.CR1a, 2.1.2.EH.1, 6.1.2.CivicsCM.2).

9.4.2.Cl.2: Demonstrate originality and inventiveness in work (e.g., 1.3A.2CR1a).

CRP1. *Act as a responsible and contributing citizen and employee.*

CRP4. *Communicate clearly and effectively and with reason.*

SEL- *Relationship skills: Utilize positive communication and social skills to interact effectively with others.*

Language Arts –L.K.6. *Use words and phrases acquired through conversations, reading and being read to, and responding to texts.*