School District of Springfield Township
Montgomery County, PA

PLANNED COURSE OF STUDY

Course Title	Science
Grade Level	Kindergarten
Content Area / Dept.	Science
Length of Course	Year long
Author(s)	Ryan Berger

Course Description:
Kindergarten students will develop and practice the scientific method as they study weather, trees, and animals. Students will participate in hands-on lessons that allows them to practice and improve observation skills.

Course Rationale:
Students will be introduced to scientific concepts that will build upon what they already know which allows them to make connections to new concepts and skills. The Tree module focuses on changes in weather, and how those changes affect trees and animals. The Animals Two by Two module will allow students to identify physical and behavioral differences amongst animals.

Curriculum Map (Year Long Course)

Month	Typical # of Weeks	Topics Covered this Month
August / September	4 weeks	Living/nonliving, seasons(fall) Life cycle of apples
October	4 weeks	Trees(fall), Life cycle of pumpkins Social Studies (Community Scavenger Hunt)
November	3 weeks	Trees (physical changes), nocturnal/diurnal, hibernation/migration
December	3 weeks	Seasons(winter) Goldfish and Guppies
January	4 weeks	Trees(winter) Social Studies (Trip Around the World)
February	4 weeks	Red worms and Night crawlers Social Studies (Trip Around the World)
March	4 weeks	Trees(spring) Social Studies (Trip Around the World) Big and Little Worms
April	4 weeks	Seasons (spring) Social Studies (Trip Around the World)
May	4 weeks	Social Studies (Trip Around the World) Pill Bugs and Sow Bugs
June	2 weeks	Seasons(summer)

Unit Title	**Trees**
Unit Description	Provides students with solid experiences to help them develop an understanding of what plants and animals need to survive and the relationship between their needs and where they live. By monitoring the local weather, students experience the patterns and variations in weather. Students engage in science and engineering practices by asking questions, participating in collaborative investigations, observing, recording, and interpreting data to build explanations, and obtaining information.
Essential Questions & Enduring Understandings	What do we know about trees? What are the parts of a tree? What can we find out about our tree? How can we care for our tree? What shapes do leaves have? How are leaves different? The same? Trees are growing, living organisms. Trees are a resource. Trees have basic needs, including water, air, light, and nutrients from soil. Trees and leaves are identifiable by their shape. Trees have identifiable structures. Individual trees can be described by their properties, including size, shape, and texture. Many kinds of trees lose their leaves in the fall. Leaves from the same trees have the same shape. Leaves have many properties that can be compared. Leaf shapes can be compared to geometric shapes. Leaves can be identified by their shapes, tips, and colors. Evergreen trees can be identified by the properties of their leaves (needles). Trees change through the seasons. The buds on twigs grow into leaves or flowers. Different kinds of trees can be identified by the properties of the bark.

PA Core Standards
3.1.K.A1, 3 & 9 3.1.K.B6 3.1.K.C2, 3 & 4 3.2.K.A6 3.2.K.B6 & 7 3.3.K.A5

Key Unit Vocabulary	*bark, branch, circumference, cone, conifer, desert, leaves, living, observe, plant, seed, stem, trunk, twig, temperature, thermometer, bud, evergreen, needle, season, spring, summer, winter, autumn*

Learning Objectives – *The student will…*	Assessment Opportunities
Investigation 1: Fall Trees Identify trees as living plants. Identify the structures of a tree: branches, leaves, trunk, and roots. Identify that trees are different shapes and sizes. Observe class tree and identify physical characteristics of tree	Student journal
Investigation 2: Leaves Identify different leaves. Describe properties of leaves: size, shape, tip, edge, texture and color. Identify and describe what happens to leaves in the fall. Identify the various properties of leaves. Describe and compare leaves by their properties. Compare leaves to geometric shapes. Identify leaves by their shapes and edges. Compare properties of different leaves. Observe class tree and identify any physical changes that have occurred.	Student journal
Investigation 3: Trees Through the Seasons Identify and describe the changes trees go	Student journal

through during the seasons Observe and compare bark on a variety of trees. Compare the changes in parts of the trees through the seasons. Observe class tree and identify any physical changes that have occurred. Communicate observations and comparisons of schoolyard trees.	

Sequence of Teaching and Learning		
Number of lessons	**Lesson Topics**	**Lesson Activities**
	Fall Trees	**<u>Day 1</u>** Introduce the module (who has seen a tree, where was it, what did it look like, where else could you see trees, what would you like to find out about trees?) Have students draw a picture of a tree and leaf from that tree in their science journal. **<u>Day 2</u>** Take students outside to investigate trees on school grounds (how do you know this is a tree, what can you tell me about this tree, do you think this is an old tree or a young tree, how can you tell, how does the tree feel, can you find anything on the ground that might have come from the tree, what do the leaves look like?) Discuss parts of the tree on your walk (trunk, bark, branches, leaves, and roots) Discuss how people use trees. **<u>Day 3</u>** Allow students to build tree puzzles Discuss tree shapes (use silhouette cards) Introduce tree-part cards Allow students to match picture cards **<u>Day 4</u>** Adopt a school yard tree (tree will be observed throughout the school year) Make observations of adopted tree and draw in student journal.

	Leaves	**Day 1** Leaf walk (plan to visit several trees, tree with leaves, tree with needles, tree with scales) Have students observe the leaves on trees during leaf walk (where are the leaves, what color are they, where do they grow on the branch, are all the leaves the same shape and size) **Day 2** Visit other trees in the school yard and discuss the similarities and differences the students observe from tree to tree. Students collect leaves in a bag. **Day 3** Have students work in pairs to match and compare the leaves they have collected. Press leaves between books. **Day 4** Investigate and compare leaves by shapes (paddle, line, triangle, heart, spear, oval) Compare leaves (lobed and serrated)
	Trees through the seasons	Observe seasonal changes to adopted tree in the school yard. Identify the resources we obtain from trees (fruits, nuts) Observe adopted tree in the various season. Observe evergreen trees in winter.

Unit Title	**Animals 2x2**
Unit Description	Provides early-childhood students with close and personal interactions with some common land and water animals. Students engage in science and engineering practices by asking questions, participating in collaborative investigations, observing, recording, and interpreting data to build explanations, and obtaining information.
Essential Questions & Enduring Understandings	What are the parts of a goldfish, water snail, and red worm? What do organisms need to live? How do living organisms behave? How are guppies and goldfish different? How are they the same? How are red worms and night crawlers different? How are they the same? How are pill bugs and sow bugs different? How are they the same? What birds visit our schoolyard? How can shells be grouped? What are isopods? Living organisms have basic needs (food, water, air) Living organisms have structures that help them grow. Living organisms have similar but different structures and behaviors. They also have differences (size, color) Living organisms behavior is influenced by conditions in the environment. Worms change plant material into soil. There is great diversity among isopods.

PA Core Standards
3.1.K.A1, 3, 5 & 9 3.1.K.B1 4.1.K.A, D, E 4.4.K.C

Key Unit Vocabulary	*land snail, sea animal, shell, snail, tentacle, terrarium, vial, water snail, bristle, clitellum, earthworm, night crawler, red worm, segment, swollen, antenna, carapace, isopod, jagged, moisture, nonliving, living, pill bug, protect, freshwater, gill, goldfish, guppy, male, female, prefer*

Learning Objectives – *The student will…*	Assessment Opportunities
Investigation 1: Goldfish and Guppies Observe the structures and behaviors of goldfish. Compare the structures of and behaviors of goldfish to those of other fish, guppies. Students compare photos of fish and read about fish.	Teacher observations Student journal
Investigation 2: Water and Land Snails Observe the structures and behaviors of two kinds of water snails. Discuss the similarities and differences of seashells. Create shell pairs, make designs, and create patterns.	Teacher observations Student journals
Investigation 3: Big and Little Worms Locate red worms on school grounds, and identify their structures. Observe red worm behaviors. Construct worm jars and provide for the needs of composting worms. Observe how worms change plant material into soil. Compare night crawlers and red worms.	Teacher observations Student journal
Investigation 4: Pill Bugs and Sow Bugs Observe structures of two kinds of isopods. Identify pill bugs and sow bugs. Create terrarium in which all land animals live together. Compare photos and read about isopods. Compare living and nonliving things.	Teacher observations Student journals

Sequence of Teaching and Learning		
Number of Lessons / Blocks	Lesson Topic	Lesson Activities
	Goldfish and Guppies	**Prior to investigations** Prepare water for aquariums (24 hours) Prepare aquarium

		Obtain goldfish/guppies and elodea **Day 1** Introduce the fish into the aquariums Observe fish behavior **Day 2** Feed fish Observe goldfish behavior **Day 3** Add elodea plant Observe fish behavior **Day 4** Prepare paper aquariums Add tunnel to aquarium Children observe fish behavior and model this behavior with their paper aquariums **Day 5** Introduce students to guppies Students observe and compare guppies to goldfish **Day 6** Read "Fish Same and Different" Discuss reading and share information from photos **Day 7** Read "Fish Life in Many Places" Discuss reading and share information from photos **Day 8** Observe animals in schoolyard Compare schoolyard birds Read "Birds Outdoors" *Continue to care for goldfish.
	Water and Land Snails	**Prior to investigations** Prepare water for aquarium (24 hours) Set up aquarium (add water and gravel) Obtain water snails Set up vials with conditioned water, elodea, and water snails Set up vials with elodea and Ramshorn snails **Day 1** Introduce water snails and Ramshorn snails in vials Compare two types of water snails **Day 2** Show chapters 1 & 2 of Seashore Surprises

		Chapter 1-Characteristics of a Seashore Chapter 2- Learning about Seashells Observe shells **Day 3** Locate land snails in school yard **Day 4** Construct cardboard fence Observe snails' interactions with cardboard fence Observe snail structures **Day 5** Read "Water and Land Snails" Discuss reading and share information from photos
	Big and Little Worms	**Prior to investigations** Obtain red worms and night crawlers Set up red worm terrarium Prepare night crawlers **Day 1** Introduce red worms, and how to handle worms Allow small groups to dig through terrarium for worms and place in a plastic cup Rinse off worms, and allow students to observe worms on table or in hand. (identify head and tail, color of worm, top and bottom side of worms, identify segments of worms) Answer focus question: What are the parts of a red worm? **Prior to investigation** Prepare for red worm behavior investigation (collect small objects as barriers that are waterproof and colorfast; i.e. pencil, paper clips, blocks) (collect materials for worm compost jar, i.e. newspaper, apple, carrot, small pieces of lettuce) Make construction sleeves for each jar **Day 2** Observe how worms move Introduce objects to worms to see how they interact with objects in their path **Day 3** Introduce worms to compost jars Observe worms in jar **Day 4** Check worm jars

		<u>Day 5</u> Introduce night crawlers Allow students to dig for worms **<u>Day 6</u>** Read "Worms in Soil" Discuss reading (where do worms live, where are the segments on a worm, what do worms eat, how do worms make soil?) Share information from photos **<u>Day 7</u>** Compare red worms and night crawlers (do all worms look the same, do they have the same number of segments, do they move the same way, are their bodies shaped the same way, are they all the same kind of worms, can you feel any bristles on the large worms?)
	Pill Bugs and Sow Bugs	**<u>Prior to investigation</u>** Obtain isopods (25 sow bug and 25 pill bugs) Add moistened paper towels to ½ liter containers and add isopods with a piece of potato or carrot in each container. **<u>Day 1</u>** Review three previous investigations (students compare behaviors and structures of previous animal studies) **<u>Day 2</u>** Introduce isopods Observe structures of isopods (who has seen this kind of animal, where have you seen it, what did you call it, which end is the tail, which is the head, how do you know, how many legs does it have, does it look the same on top as on the bottom, how many sections do you think the carapace has, where are the antennae?) **<u>Day 3</u>** Introduce hand lens and vial Answer focus question: what area isopods? Set up isopod cups (place moist towel in bottom of cup and place 2-3 pill and sow bugs in each cup) Gather sorting sheet and plastic cups for sorting. Have students sort bugs into empty plastic cups **<u>Day 4</u>** Read "Isopods" Discuss reading (where do isopods live, what do they eat,

		where are their antennae, what else did you learn about isopods?) Share information about photos **Day 5** Search for pill bugs and sow bugs on the school yard **Prior to investigation** Prep race tracks **Day 6** Begin races/discuss races (how they move, did they move in a straight line, how fast was your isopod, do pill bugs or sow bugs move fast?) Focus question: how do isopods move? **Day 7** Read "Animals All around Us" Discuss the reading (which animals have legs, which have scales, how are fish and lizards alike, how do some animals keep warm, what kind of skin do salamanders and worms have, is a bird an animal?)