Grade One Science Curriculum

The Seymour School District believes that every student needs and deserves a rich and challenging education in science. Quality education in science is an integral part of the core curriculum for our students. Students should be enabled to achieve the learning goals and standards outlined in Connecticut's science framework.

Such an education will promote essential understandings of the natural world and nurture student's abilities to apply scientific knowledge to make informed and logical judgments about personal and societal issues. Such an education requires that the fundamental approach to science is a creative process for investigating, reasoning, critiquing and communicating about ideas, not as a static body of facts to be memorized.

We believe that learning science is important for all students in order to prepare them to be informed individuals and citizens and to participate in a wide range of scientific and technological careers. Understanding the interconnections between science and technology, and their shared impact on environmental and societal issues, is essential in order to preserve and improve life on Earth.

Learning experiences in science should lead all students to:

- Understand and apply basic concepts, principles and theories of biology, chemistry, physics, earth and space sciences and their interrelationships;
- Recognize and participate in scientific endeavors which are evidence based and use inquiry skills that lead to a greater understanding of the world;
- Identify and solve problems through scientific exploration, including the formulation of hypotheses, design of experiments, use of technology, analysis of data and drawing of conclusions;
- Select and use properly appropriate laboratory technology, equipment and material, including measuring and sensing devices;
- Understand and use existing and emerging technologies which have an effect on society and the quality of life, including personal academic and work environments;
- Analyze the possibilities and limits of science and technology in order to make and defend decisions about societal issues; and
- Understand that the way in which scientific knowledge is formulated is crucial to the validity of that knowledge.

Teachers plan units and lessons that contain current, accurate and meaningful content that is aligned with the district curriculum. Through professional development, teachers keep up-to-date with the latest scientific advances in their discipline. They set a context for scientific learning that is relevant to students in class. Engaging students in extended, where developmentally appropriate scientific investigations that motivate student effort and interest in scientific learning are planned. Students are provided with a safe environment in which to participate in scientific investigations an have the resources needed to support their learning;
Students are assessed regularly to build an understanding instruction is adjusted to accommodate students with diverse needs, abilities and interests. Students are encouraged to pursue the study of advanced science and science-related careers.

Parents play an essential role in ensuring a quality educational program in science by encouraging their children to participate in high-level science courses and activities, both in and out of school and to talk to their children about science they learn at school and showing interest in scientific content, processes and ideas, and by providing their children with access to science resources, such as museums, libraries and the Internet.

CMT
The science portion of the test is administered to students in Grades 5 and 8. The CMT science assessments measure what students have learned over several years about core science concepts and about how scientific inquiry is done. The assessments include questions related to concepts in life science, physical science and earth science and how those concepts apply to real world issues and technologies.

EMBEDDED TASKS
To assess students' understanding of inquiry and the nature of science, the CMT science assessment includes some questions framed within the CONTEXT of the curriculum-embedded performance tasks developed by the Connecticut State Department of Education. The embedded tasks engage students in focused explorations of science concepts using all the inquiry practices described in the science framework. Each embedded task is designed to be part of a larger learning unit described in the science framework, and teachers decide when and how to incorporate them into the curriculum. These inquiry investigations demonstrate how students use science inquiry practices to deepen understanding of a science concept.

CSDE 2008

Grade 1 Science

1.1 Forces and Motion

Concept 1 – Description of Object's Position

August/September 10 Days

SUBTOPIC	DAYS	LESSON/ASSESSMENT	CT STANDARD	SOURCE
Object's Position	1 Day	Arrange 3-dimensional objects and have students explain their location	1.1.1; 1.1.3; 1.1.4; 1.1.5; 1.1.6	
Student's Position	1 Day	Students move and then stop and announce their location in relationship to other students	1.1.1; 1.1.3; 1.1.4; 1.1.5; 1.1.6	
Object's Position	1 Day	Collect pictures showing objects in a variety of locations	1.1.1; 1.1.3; 1.1.4; 1.1.5; 1.1.6	
Object's Position in Sky	1 Day	Students draw daytime and nighttime sky	1.1.2	
Object's Position in Sky	1 Day	Compare/contrast the daytime and nighttime skies	1.1.2	

Grade 1 Science

1.1 Forces and Motion

Concept 2 – Description of Object's Motion

October 15 Days

SUBTOPIC	DAYS	LESSON/ASSESSMENT	CT STANDARD	SOURCE
Shadows	1 Day	Chart students' knowledge of shadows. Observe shadows of people and objects.	1.1.2 & 1.1.3	www.bbc.co.uk/schools/scienceclips/ages/7_8/light_shadows.shtml
Shadows	1 Day/ ongoing	Choose a shadow site to observe day to day and season to season and collect data	1.1.2 & 1.1.3	www.bbc.co.uk/schools/scienceclips/ages/7_8/light_shadows.shtml
Cast a Shadow	1 Day	Students measure shadows and predict where the next shadow will fall	1.1.2 & 1.1.3	www.bbc.co.uk/schools/scienceclips/ages/7_8/light_shadows.shtml
Balance	4 Days	Activity 1- • Balance Card Board Shapes • Demonstrate Stable Position and Counterweighing • Make Mobiles	1.1.1; 1.1.4; 1.1.5; 1.1.6	FOSS Kit – Balance and Motion
Spinners	4 Days	Activity 2- • Make Tops • Make Zoomers • Make Twirlers	1.1.1; 1.1.4; 1.1.5; 1.1.6	FOSS Kit – Balance and Motion

Rollers	4 Days	Activity 3- • Investigate Rolling Objects Investigate Wheels of Different Sizes • Use Marble Runways • Make Large Runway	1.1.1; 1.1.4; 1.1.5; 1.1.6	FOSS Kit – Balance and Motion

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1.2 Structure and Function

Concept 1 – Animals Need Air, Water, and Food to Survive

November/December 30 Days

SUBTOPIC	DAYS	LESSON/ASSESSMENT	CT STANDARD	SOURCE
Survival of Animals		Animals Need Air, Water, and Food to Survive	1.2.1	RESOURCES NEEDED
Survival of Animals		How Animals Move	1.2.2	RESOURCES NEEDED
Survival of Animals		How Animals Breathe	1.2.3	RESOURCES NEEDED
Survival of Animals		How Animals Get Food	1.2.4	RESOURCES NEEDED
Survival of Animals		How Animals Get Water	1.2.5	RESOURCES NEEDED
Survival of Animals		Fictional Animals and Plants are Different Than Real Animal and Plants	1.2.6	RESOURCES NEEDED

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Grade 1 Science

1.2 Structure and Function

Concept 2 – Plants Need Air, Water, and Sunlight to Survive

SUBTOPIC	DAYS	LESSON/ASSESSMENT	CT STANDARD	SOURCE
Survival of Plants		This Standard is Covered in Grade 2 in the FOSS Kit New Plants	1.2.1-1.2.5	FOSS Kit – New Plants

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1.3 Structure and Function

January/February/March 45 Days

SUBTOPIC	DAYS	LESSON/ASSESSMENT	CT STANDARD	SOURCE
Investigation 1 - Mealworms	Ongoing	Part 1-Mealworms/Student Journals	1.3.1; 1.3.2; 1.3.3; 1.3.4; 1.3.6; 1.3.7	FOSS Kit - Insects
	Ongoing	Part 2-Larva, Pupa, Adult/Student Journals	1.3.1; 1.3.2; 1.3.3; 1.3.4; 1.3.6; 1.3.7	FOSS Kit - Insects
	Ongoing	Part 3-Life Cycle/Student Journals	1.3.1; 1.3.2; 1.3.3; 1.3.4; 1.3.6; 1.3.7	FOSS Kit - Insects
Investigation 2 - Waxworms	Ongoing	Part 1-Waxworms/Student Journals/Student Sheet Venn Diagram	1.3.1; 1.3.2; 1.3.3; 1.3.4; 1.3.6; 1.3.7	FOSS Kit - Insects
	Ongoing	Part 2-Larva, Pupa, Adult/Student Journals	1.3.1; 1.3.2; 1.3.3; 1.3.4; 1.3.6; 1.3.7	FOSS Kit - Insects
	Ongoing	Part 3-Life Cycle/Student Journals/Math Extension	1.3.1; 1.3.2; 1.3.3; 1.3.4; 1.3.6; 1.3.7	FOSS Kit - Insects
Investigation 3 – Milkweed Bugs	Ongoing	Part 1-Eggs/Student Journals	1.3.1; 1.3.2; 1.3.3; 1.3.4; 1.3.6; 1.3.7	FOSS Kit - Insects
	Ongoing	Part 2-Habitats/Student Journals/Student Sheet Milkweed Bug Habitat	1.3.1; 1.3.2; 1.3.3; 1.3.4; 1.3.6; 1.3.7	FOSS Kit - Insects
	Ongoing	Part 3-Growing Milkweed Bugs/Student Journals/Student Sheet Life Cycle of the Triangle Bug	1.3.1; 1.3.2; 1.3.3; 1.3.4; 1.3.6; 1.3.7	FOSS Kit - Insects
Investigation 4 – Silkworms	Ongoing	Part 1-Eggs/Student Journals	1.3.1; 1.3.2; 1.3.3; 1.3.4; 1.3.6; 1.3.7	FOSS Kit - Insects
	Ongoing	Part 2-Larvae/Student Journals	1.3.1; 1.3.2; 1.3.3; 1.3.4; 1.3.6; 1.3.7	FOSS Kit - Insects
	Ongoing	Part 3-Close Observations/Student Journals	1.3.1; 1.3.2; 1.3.3; 1.3.4; 1.3.6; 1.3.7	FOSS Kit - Insects
	Ongoing	Part 4-Silkworm Structure/Student Journals	1.3.1; 1.3.2; 1.3.3; 1.3.4; 1.3.6; 1.3.7	FOSS Kit - Insects

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	Ongoing	Part 5-Pupae and Adults/Student Journals	1.3.1; 1.3.2; 1.3.3; 1.3.4; 1.3.6; 1.3.7	FOSS Kit - Insects
Investigation 5 - Butterflies	Ongoing	Part 1-Caterpillars/Student Journals	1.3.1; 1.3.2; 1.3.3; 1.3.4; 1.3.6; 1.3.7	FOSS Kit - Insects
	Ongoing	Part 2-Chrysalises/Student Journals	1.3.1; 1.3.2; 1.3.3; 1.3.4; 1.3.6; 1.3.7	FOSS Kit - Insects
	Ongoing	Part 3-Butterflies/Student Journals/Student Sheet Life Cycle of the Square Moth	1.3.1; 1.3.2; 1.3.3; 1.3.4; 1.3.6; 1.3.7	FOSS Kit - Insects
Investigation 6 – Other Insects	Ongoing	Part 1-Crickets/Student Journals	1.3.1; 1.3.2; 1.3.3; 1.3.4; 1.3.6; 1.3.7	FOSS Kit - Insects
	Ongoing	Part 2-Ants/Student Journals	1.3.1; 1.3.2; 1.3.3; 1.3.4; 1.3.6; 1.3.7	FOSS Kit - Insects
	Ongoing	Part 3-Aquatic Insects/Student Journals	1.3.1; 1.3.2; 1.3.3; 1.3.4; 1.3.6; 1.3.7	FOSS Kit - Insects
		Frogs	1.3.5	RESOURCES NEEDED

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Grade 1 Science

1.4 Science and Technology in Society

April 8 Days

SUBTOPIC	DAYS	LESSON/ASSESSMENT	CT STANDARD	SOURCE
Measurement Tools	4 Days	Discuss and experiment with measurement tools. List everyday items that are measured in standard units.	1.4.1; 1.4.2; 1.4.3; 1.4.4; 1.4.5A; 1.4.5B; 1.4.4C; 1.4.5D	Voyages Mathematic, Various Trade Books, Measurement Tools
Nonstandard Measurement	1 Day	Measure objects using standard and nonstandard units of measurement. Discuss and explain which was easier.	1.4.1; 1.4.2; 1.4.3; 1.4.4; 1.4.5A; 1.4.5B; 1.4.4C; 1.4.5D	Voyages Mathematic, Various Trade Books, Measurement Tools
Graphing	1 Day	Graph measurement results from previous day and use to compare the measurements of various objects.	1.4.1; 1.4.2; 1.4.3; 1.4.4; 1.4.5A; 1.4.5B; 1.4.4C; 1.4.5D	Voyages Mathematic, Various Trade Books, Measurement Tools
Predicting Weight	1 Day	Predict and order weight of objects and test predictions.	1.4.1; 1.4.2; 1.4.3; 1.4.4; 1.4.5A; 1.4.5B; 1.4.4C; 1.4.5D	Voyages Mathematic, Various Trade Books, Measurement Tools
Predicting Length	1 Day	Predict and order length of objects and test predictions.	1.4.1; 1.4.2; 1.4.3; 1.4.4; 1.4.5A; 1.4.5B; 1.4.4C; 1.4.5D	Voyages Mathematic, Various Trade Books, Measurement Tools

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Grade: one	**Subject: Science**
CSDE Standard	**Forces and Motion**
Enduring Understanding	**An object's position can be described by locating it relative to another object or the background**
Essential Question	***What makes objects move the way they do?***
Content Standard:	**1.1 – The sun appears to move across the sky in the same way every day, but its path changes gradually over the seasons**
Performance Expectations (Student outcomes)	**GRADE-LEVEL CONCEPT 1: ◆ An object's position can be described by locating it relative to another object or the background** **GRADE-LEVEL EXPECTATIONS:** 1. **An object's position can be described by comparing it to the position of another stationary object. One object can be *in front of, behind, next to, inside of, above or below* another object.** 2. **The sun's position in the daytime sky can be described relative to stationary objects on Earth. For example, the sun can be "just above the treetops," "high or low in the sky," or "on the other side of the school."** 3. **The description of an object's position from one observer's point of view may be different from that reported from a different observer's viewpoint. For example, a box of crayons between two students is near Susan's left hand but near John's right hand.** 4. **When an observer changes position, different words may be needed to describe an object's position. For example, when I am sitting on the bench the sun is "behind" me; when I move to the slide, the sun is "in front of" me.** 5. **The same object when viewed from close up <u>appears</u> larger than it does when viewed from far away (although the actual size of the object does not change.) For example, a beach ball held in one's arms appears larger than it does when**

	viewed from across the playground. 6. **An object's position can be described using words ("near the door"), numbers (10 centimeters away from the door) or labeled diagrams.**

Strategies/Modes (examples)	Materials/Resources (examples)	Assessments (examples)
	KEY SCIENCE VOCABULARY: position, motion, shadow, push, pull, force	**CMT Expected Performances** **A 1.** Describe how the motion of objects can be changed by pushing and pulling**.** **A 2.** Describe the apparent movement of the sun across the sky and the changes in the length and direction of shadows during the day.
1.1.1; 1.1.3; 1.1.4; 1.1.5; 1.1.6 Place a variety of objects (such as 3D blocks), randomly on a tabletop, arranging them in back of, in front of, under, and side by side. Or use classroom space to position a small group of students in this manner (A INQ. 1 and 4). Assign a group of students a spot in which to stand. Use music to cue students to move toward, then into each other's spaces, causing overlapping. Stop music. Students hold positions and announce their locations. (in back of, in front of, over, under and side by side) (A INQ. 6) Collect magazine pictures that show objects positioned in a variety of locations **(A INQ. 5)**	Pushing and Pulling… http://www.bbc.co.uk/schools/scienceclips/ages/5_6/pushes_pulls.shtml Variety of objects (3-dimensional round and flat) Cardboard (ramp material) Flashlight or lamp (optional)	**Students should describe (orally or written) the location of objects using given terms.** **Students can label pictures to describe locations of objects.**

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1.1.2 Students will draw pictures of objects that they see in the sky during the day and another of objects they might see at night. Use a Venn diagram to compare the daytime and nighttime skies. Ask students to predict how the objects move. (A INQ. 4 and 6)	Cast a Shadow… http://www.bbc.co.uk/schools/scienceclips/ages/7_8/light_shadows.shtml	**After measuring shadows, students will predict (orally or written) where the next shadow will fall.**

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Grade: one	**Subject: Science**
CSDE Standard	**Forces and Motion**
Enduring Understanding	**An object's position can be described by locating it relative to another object or the background**
Essential Question	**What makes objects move the way they do?**
Content Standard:	**1.1 – The sun appears to move across the sky in the same way every day, but its path changes gradually over the seasons**
Performance Expectations (Student outcomes)	**GRADE-LEVEL CONCEPT 2: ◆ An object's motion can be described by tracing and measuring its position over time.** **GRADE-LEVEL EXPECTATIONS:** 1. **Things move in many ways, such as spinning, rolling, sliding, bouncing, flying or sailing.** 2. **An object is in motion when its position is changing. Because the sun's position changes relative to objects on Earth throughout the day, it appears to be moving across the sky.** 3. **Changes in the sun's position throughout the day can be measured by observing changes in shadows outdoors. Shadows occur when light is blocked by an object. An object's shadow appears opposite the light source. Shadow lengths depend on the position of the light source.** 4. **Motion is caused by a push or a pull. A push or pull is called a force.** 5. **An object can be set in motion by forces that come from direct contact, moving air, magnets or by gravity pulling it down toward the earth.** 6. **Pushes and pulls can start motion, stop motion, speed it up, slow it down or change its direction.**

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Strategies/Modes (examples)	Materials/Resources (examples)	Assessments (examples)
	KEY SCIENCE VOCABULARY: position, motion, shadow, push, pull, force	**CMT Expected Performances** **A 3.** Describe how the motion of objects can be changed by pushing and pulling. **A 4.** Describe the apparent movement of the sun across the sky and the changes in the length and direction of shadows during the day.
1.1.2; 1.1.3 Ask students to talk about what they have noticed about shadows. Capture this information on a chart. Take students to a sunny spot outside. Ask them to observe the shadows of their forms on the ground. Ask them to observe other objects and the shadows they produce. As an alternate to going outdoors, set up a shadow site in the classroom. Set up a variety of objects (such as balls, blocks, hoops, and lace) on a piece of paper in a sunny spot in the room or make a shadow stick. You can do this by inserting a metric stick into a bucket filled with rocks or by inserting a straw into a cup with clay. (The rocks or clay should hold the object in an upright position). Using the shadow site of your choice, allow students to visit the area throughout the day to trace the shadow and to measure the shadows with cubes. Make a class bar graph to record the individual results using cubes. (A INQ. 8 and 10)		Students will describe (orally or written) how shadows form.

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Use your shadow site from season to season to observe the differences in the location of the sun. 1.1.1; 1.1.4; 1.1.5; 1.1.6 FOSS: Balance and Motion Module Activity 1: Balance Students discover numerous ways to balance two-dimensional shapes made out of tag board. They use a piece of pliable wire and counterweights (clothespins) to make a pencil balance on its point. They make mobiles from paper clips, rubber bands, straws, and index cards to apply their understanding of balance, stability, and counter-weighting. ❖ Many different objects and shapes can be made to balance. ❖ A stable position is one that an object or system returns to after being put into motion. ❖ The point of balance of an object or system can be changed by counter-weighting. ❖ A mobile is a system of balanced beams and masses. Activity 2: Spinners Students make tops from plastic disks and straws, and spin them, exploring the variables that influence the spinning of a top. They use these same disks with strings to make zoomers to observe a different kind of spinning motion. They make twirlers (flying spinners), first using straws and paper wings, and then using folded paper and paper clips. ❖ Objects and systems that go around exhibit rotational motion. ❖ There are different kinds of rotational motion.	<u>FOSS Science Kit: Balance and Motion</u> **Key Science Vocabulary**: arch, balance, balance point, counterbalance, counterweight, crayfish, mobile, object, position, stable, system, triangle, unstable, weight Vocabulary: disk, motion, rotate, spin, swirl, top, twirl, twist, whirl	❖ Make cardboard shapes and demonstrate how to balance them in stable positions. ❖ Use representations of balanced systems to demonstrate understanding of stable position and counterweighing. ❖ Set up a mobile center for students to make mobiles of their own design. Demonstrate ability to make and vary the performance of tops using Tinker Toys ™ and other top-building materials.

❖ The amount and position of mass affects how an object or system rotates. ❖ There are different ways to initiate rotational motion in objects and systems. Activity 3: Rollers Students investigate rolling objects-wheels, cups, and spheres. They make cardboard ramps and investigate wheels of different sizes on axles, and they roll paper cups of two sizes. Students use flexible marble runways to make marbles do tricks. The grand finale involves the whole class cooperating to make one large runway through which a marble can roll nonstop. ❖ Disks (wheels) and spheres roll down hill. ❖ Axles support wheels. ❖ Wheel-and-axle systems with wheels of different sizes roll toward the smaller wheel. ❖ The amount and location of mass affects how objects and systems roll.	**Key Science Vocabulary:** Axle, disk, loop, motion, ramp, roll, runway, slope, sphere, spiral, wheel	

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Grade: one	**Subject: Science**
CSDE Standard	**Structure and Function**
Enduring Understanding	**Animals need air, water and food to survive.**
Essential Questions	**How are organisms structured to ensure efficiency and survival?**
Content Standards:	**1.2 – Living things have different structures and behaviors that allow them to meet their basic needs.**
Performance Expectations (Student outcomes)	**GRADE-LEVEL CONCEPT 1: Animals need air, water and food to survive.** **GRADE-LEVEL EXPECTATIONS:** **1. All living things (organisms) need air, water and food to stay alive and grow; they meet these needs in different ways.** **2. Most animals move from place to place to find food and water. Some animals have two legs, four legs, six legs or more for moving. Other animals move using fins, wings or by slithering.** **3. Animals get air in different ways. For example, humans breathe with lungs, while fish breathe with gills.** **4. Animals get food in different ways. Some animals eat parts of plants and others catch and eat other animals.** **5. Animals get water in different ways. Some animals have special body parts, such as noses, tongues or beaks that help them get water.** **6. Fictional animals and plants can have structures and behaviors that are different than real animals and plants.**

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Strategies/Modes (examples)	Materials/Resources (examples)	Assessments (examples)
	KEY SCIENCE VOCABULARY: organism, plant, animal, energy, breathe, lungs, gills, absorb	CMT Expected Performances A 12. Describe the different ways that animals, including humans, obtain water and food. A. 13 Describe the different structures plants have for obtaining water and sunlight. A 14. Describe the structures that animals, including humans, use to move around.
1.2.1;1.2.2;1.2.3;1.2.4;1.2.5;1.2.6	**NOTE: Not covered in FOSS. Teachers cover material on their own and connect it to Reading/Writing.**	

Seymour Public Schools Curriculum

Grade: one	**Subject: Science**
CSDE Standard	**Structure and Function**
Enduring Understanding	**Animals need air, water and food to survive.**
Essential Questions	**How are organisms structured to ensure efficiency and survival?**
Content Standards:	**1.2 – Living things have different structures and behaviors that allow them to meet their basic needs.**
Performance Expectations (Student outcomes)	**GRADE-LEVEL CONCEPT 2: ◆ Plants need air, water and sunlight to survive.** **GRADE-LEVEL EXPECTATIONS:** 1. **Plants absorb sunlight and air through their leaves and water through their roots.** 2. **Plants use sunlight to make food from the air and water they absorb.** 3. **Plants have various leaf shapes and sizes that help them absorb sunlight and air.** 4. **Plant roots grow toward a source of water.** 5. **Plant stems grow toward sunlight.**

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Strategies/Modes (examples)	Materials/Resources (examples)	Assessments (examples)
	KEY SCIENCE VOCABULARY: organism, plant, animal, energy, breathe, lungs, gills, absorb	**CMT Expected Performances** **A 12. Describe the different ways that animals, including humans, obtain water and food.** **A. 13 Describe the different structures plants have for obtaining water and sunlight.** **A 14. Describe the structures that animals, including humans, use to move around.**
NOTE: Covered in Grade 2 with the NEW PLANTS UNIT.	**FOSS Science- New Plants Module**	

Seymour Public Schools Curriculum

Grade: one	**Subject: Science**
CSDE Standard	**Structure and Function**
Enduring Understanding	**Animals need air, water and food to survive.**
Essential Question	**How are organisms structured to ensure efficiency and survival?**
Content Standard:	**1.3 – Organisms change in form and behavior as part of their life cycles.**
Performance Expectations (Student outcomes)	**GRADE-LEVEL EXPECTATIONS:** 1. **Plants and animals have life cycles that include a predictable sequence of stages: they begin life, develop into adults, reproduce and eventually die. Plants and animals produce offspring of their own kind. Offspring closely resemble their parents, but individuals vary in appearance and behavior.** 2. **Animals are either born alive (for example, humans, dogs and cows) or hatched from eggs (for example, chickens, sea turtles or crocodiles).** 3. **Animals change throughout their lives. Many animals begin life as smaller, less capable forms of the adult. As they develop, they grow larger and become more independent (for example, humans or robins).** 4. **Some animals change dramatically in structure and function during their life cycle in a process called metamorphosis.** 5. **Frogs are amphibians that undergo metamorphosis during their life cycle. As they grow, frogs develop different structures that help them meet their basic needs in water and then on land:** a. **Tadpoles hatch from eggs, live in water, breathe using gills, and swim using a tail. As they metamorphose into frogs, tadpoles lose their gills and their tails.**

	b. Adult frogs live on land <u>and</u> in water. They breathe air using lungs and develop webbed feet and hinged legs for swimming in water and hopping on land. After a female frog mates, she lays her eggs, and the cycle begins again. 6. **Butterflies are insects that undergo metamorphosis during their life cycle. As they go through egg, larva, pupa and adult stages, butterflies develop different structures that help them meet their basic needs in very different ways:** **c. Caterpillars hatch from eggs, live on plants, get food by chewing leaves and move about using legs. As they metamorphose into butterflies inside a chrysalis, they develop wings, antennae and different mouth parts.** **d. Butterflies live on land <u>and</u> in the air. They get food by sucking nectar from flowers and move around primarily using wings to fly. After a female butterfly mates, she searches for the proper host plant to lay her eggs, and the cycle begins again.** 7. **Comparing the life cycle stages of different organisms shows how they are alike in some ways and unique in other ways.**

Strategies/Modes (examples)	**Materials/Resources (examples)**	**Assessments (examples)**
	KEY SCIENCE VOCABULARY: life cycle, egg, metamorphosis, structures (body parts), amphibian, tadpole, gills, lungs, insect, caterpillar **Need additional resources for 1.3.5** **(1.3.5 covered in STC KIT 3)**	**CMT Expected Performances** **A 15. Describe the changes in organisms, such as frogs and butterflies, as they undergo metamorphosis.** **A 16. Describe the life cycles of organisms that grow but do not metamorphose.**
1.3.1; 1.3.2; 1.3.3; 1.3.4; 1.3.6; 1.3.7 FOSS Science: Insects	**FOSS Science Kit: Insects**	

Investigation 1: Mealworms Each student receives two larval mealworms in a vial to care for and observe. Over 10 weeks students observe the larvae grow, molt, pupate, and turn into beetles (adults), which mate, lay eggs, and die. ❖ Insects need air, food, water and space. ❖ Insects have characteristic structures and behaviors. ❖ The life cycle of the beetle is egg, larva, pupa, and adult, which produce eggs. Students will: ❖ Observe mealworms change from larva, to pupae, to adults. ❖ Describe larval segments, legs, and other structures of mealworms. ❖ Learn the three parts of an insect-head, thorax, and abdomen. ❖ Communicate observations of the structure and behavior of insects in words and drawings. ❖ Provide for the needs of living insects-air, food, water, and space.	**Art extension: Make 3-D beetles.**	**Anecdotal notes** **Student journal-Students draw and write their observations in student journals.** **Student journal-Check for increasing observational skills and understanding of the mealworm life cycle.**
Investigation 2: Wax worms Students observe wax worms progress through their life cycle. They compare the complete metamorphosis of the wax moth to that of the mealworm beetle. ❖ Insects have similar structures and behaviors. ❖ Larvae produce silk. Students will: ❖ Observe the wax worm life cycle-larva to pupa to adult to egg, and back to larva.		**Anecdotal notes** **Student sheet-Students compare wax worms and mealworms on a Venn diagram.** ***Math Extension: Wax worms***

❖ Count and describe larval segments, legs, and other structures and behaviors of wax worms. ❖ Learn that some insects make silk. ❖ Communicate observations of insects in words and drawings. ❖ Provide for the needs of living insects-air, food, water, and space. Investigation 3: Milkweed Bugs Groups of students receive vials of milkweed bug eggs. Each group prepares a habitat for the bugs, providing air, space, food, and water. They observe structure, pattern, and behavior as the insects advance through simple metamorphosis. ❖ Insects hatch from eggs. ❖ Insects have three body parts: head, thorax, and abdomen. ❖ Insects have different structures for eating different kinds of food. ❖ Some insects go through simple metamorphosis (egg, nymph, adult). Students will: ❖ Observe insects hatching from eggs. ❖ Observe the sequence of changes that milkweed bugs go through as they mature into adults. ❖ Observe the three body parts of an insect-head, thorax, and abdomen. ❖ Compare structures on milkweed bugs to other insects. ❖ Observe that different insects have different food needs. ❖ Communicate observations of the structure, pattern, and behavior of insects in words and drawings. ❖ Attend to the basic needs of living insects-air, food, water, and space.		**Anecdotal notes** **Student Sheet-Students draw and label milkweed bug habitats to show what insects need to survive.** ***Milkweed Bug Habitat*** **Student Sheet** **Students sequence the stages of an imaginary insect as it progresses through simple metamorphosis.** ***Life Cycle of the Triangle Bug***

Investigation 4: Silkworms Students observe the life history of one of the most commercially successful insects. They start with eggs and observe the growth and changes to larvae, pupae, and adults who produce eggs. Students study the structure of a moth larva. ❖ Insect larvae have structures in common. ❖ Insect adults have structures in common. ❖ Male and female insects mate, and the female lays eggs. ❖ Moths pupate in silk cocoons. Students will: ❖ Observe insects hatching from eggs. ❖ Observe structures of an insect larva and of an insect adult. ❖ Compare silkworm larvae and adults to those of other insects. ❖ Observe silk production of the larvae for making cocoons. ❖ Observe insect mating and egg laying. ❖ Communicate observations of the structure and behavior of insects in words and drawings. ❖ Observe complete metamorphosis. ❖ Experience an insect's life cycle. Investigation 5: Butterflies The class observes the painted ladies grow, pupate, and emerge as adults. Students experience the stages of complete metamorphosis and compare the behaviors of moths and butterflies. ❖ Insect larvae and adults have structures in common. ❖ The lifecycle of the butterfly is egg, larva, pupa, and adult, which		**Anecdotal notes** **Student Journal - Check for increasing skills of observing, describing, and comparing, and the use of new vocabulary.** **Teacher observation – Check for models that show silkworm structures.** **Student Journal – Students write about the life cycle of the silkworm.** **Teacher Observation – Students predict how larvae will develop.**

produces eggs. Students will: ❖ Observe the structure and behavior of painted lady butterflies. ❖ Observe complete metamorphosis in the butterfly and compare it to other insects.. ❖ Observe the three parts of an insect-head, thorax, and abdomen. ❖ Compare larval segments, legs, and other structures of painted lady butterflies to other insects. ❖ Provide for the needs of insects – air, water, food, and space. Investigation 6: Other Insects The class sets up habitats and observes the structures and behaviors of house crickets, ants, and aquatic insects. ❖ Insects can live underground, above ground, and in water. Students will: ❖ Observe crickets in a classroom habitat. ❖ Observe ants in an ant farm. ❖ Observe aquatic insects living in water. ❖ Compare the structures and lifestyles of new insects to those of familiar insects. ❖ Separate insects from non-insects. ❖ Study local insects and compare them to ones studied in class. ❖ Provide for the needs of insects – air, water, food, and space.		**Anecdotal notes** **Students Sheet – Students sequence the life cycle stages of an imaginary moth.** ***Life Cycle of the Square Moth*** **Anecdotal notes**

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Grade: one	**Subject: Science**
CSDE Standard	***Science and Technology***
Enduring Understanding	**Various tools can be used to measure, describe and compare different objects and organisms.**
Essential Question	**How do science and technology affect the quality of our lives?**
Content Standard:	**1.4 – The properties of materials and organisms can be described more accurately through the use of standard measuring units**
Performance Expectations (Student outcomes)	**GRADE-LEVEL CONCEPT: ◆ Various tools can be used to measure, describe and compare different objects and organisms.** **GRADE-LEVEL EXPECTATIONS:** **1. Observations can be expressed in words, pictures or numbers. Measurements add accuracy to observations.** **2. Objects and organisms can be described using nonstandard measurement units, such as hand-lengths, pencil-lengths, handfuls, etc.** **3. Standard measurement units are more accurate than nonstandard units because they have consistent values agreed on by everyone. For example, "My caterpillar is one finger long" is much less accurate than "My caterpillar is 4 centimeters long."** **4. Scientists and nonscientists all over the world use the metric system of measurement. In the United States, the customary measurement system is used in daily life. Equivalent values between the two systems can be estimated (for example, 1 inch is a little more than 2 centimeters).** **5. Specific tools are used to measure different quantities:**

	a. Metric rulers are used to measure length, height or distance in centimeters and meters; customary rulers measure length, height or distance in inches, feet or yards. **b. Balances and scales are used to compare and measure the heaviness of objects. Grams and kilograms are units that express mass; ounces and pounds are units that express weight.** **c. Graduated cylinders, beakers and measuring cups are tools used to measure the volume of liquids. Volume can be expressed in milliliters (mL), liters (L), cups or ounces.** **d. Thermometers are tools used to measure temperature; thermometers can indicate temperature in degrees Celsius or degrees Fahrenheit, or both.**

Strategies/Modes (examples)	Materials/Resources (examples)	Assessments (examples)
	KEY SCIENCE VOCABULARY: centimeter, meter, gram, kilogram, milliliter, liter, graduated cylinder, thermometer, Celsius, Fahrenheit	**CMT Expected Performances** **A 17. Estimate, measure and compare the sizes and weights of different objects and organisms using standard and nonstandard measuring tools.**
1.4.1; 1.4.2; 1.4.3; 1.4.4; 1.4.5 a; 1.4.5 b; 1.4.5 d ***Voyages Mathematics***	***Voyages Mathematics***	
	<u>How Big is a Foot</u> by Rolf Myller **<u>Ten Beads Tall</u> by Pam Adams** **<u>Super Sand Castle Saturday</u> by Stuart J. Murphy** **Variety of measurement tools (rulers, scales, etc.)** **Variety of nonstandard measuring objects** **Variety of objects for measuring**	
Discuss what types of tools (rulers, balances, scales) can be used to measure distance and weight. Give students the		

opportunity to experiment with each tool. Ask students to tell when they have used measurement in their real life. Then generate a list of everyday items that are measured in standard units (for example: a pound of butter, a gallon of milk) (A INQ 2, 4, 7, 8)		
❖ **Discuss various units of standard measurement for measuring both distance and weight. Generate a list of objects/items that students can use to help them remember the size of each unit. To generate this list students can be given a variety of objects to weigh or measure that are equivalent to a standard unit of measurement. (For example: to remember how much an ounce is, students can remember that it is as heavy as 9 pennies). Create a class picture chart to display for student reference. (A INQ. 2 and 8).**		**Give students a variety of objects and a standard/nonstandard unit of measurement. Have the students estimate the length, height, or width of an object. Then measure the object using their specific unit. (A INQ 3, 7, 8)**
❖ **Measure using nonstandard tools. The students measure using the same objects using standard measurement tools. Discuss which way was easier to measure and why. (A INQ 7 and 8).**		**Students can graph the results of measurement experiments and use the graphs to compare the measurements of various objects. (A INQ 10)**
❖ **Give students a variety of objects and have them predict the weight/length. Then have the students order the objects from greatest to least. Students should**		**Once students have completed previous experiment on ordering objects based on their length or weight, ask students to add onto their order by identifying objects in the room that are greater than, less than, or**

then test their predictions and change their order as needed. (A INQ 3, 7, 8, 9).		**equal to the weight or length of the objects in their groups. Students can then tell how they determined which object to choose.**

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APPENDIX

Science CMT Handbook ..\Science\science_cmt_handbook.pdf