Second Grade Science Curriculum

Unit: Insects	Time: September- October	Standards:
Essential Questions • How can you describe the life cycle stages of an insect? • What do insects need to live? • How do plants depend on animals for seed dispersal and pollination?	**Enduring Understandings** • I know all living things have a life cycle. • I know insects need air, food, water, and shelter; different insects meet these needs in different ways depending on their habitat. • I can describe how bees and other insects and animals help some plants by moving pollen from flower to flower.	2-LS2-2: Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants. 2-LS4-1: Make observations of plants and animals to compare the diversity of life in different habitats.

Benchmark Assessment(s)

- SWBAT create a habitat in the classroom for the monarch caterpillars to observe how their basic needs are met. The habitat would be built inside of a glass terrarium with fresh milkweed. This will serve as a food source and place for the monarch caterpillars to build their chrysalis when they are ready to go into the pupa stage. Students will make observations in their journal as they go through their life cycle and compare to a natural habitat. (2-LS2-2)

- SWBAT release adult Monarch butterflies in the school butterfly garden to observe how the butterflies spread pollen from flower to flower and why this is important to nature. (2-LS-4-1)

Other Assessments

- ✓ Formative (On-going): Teacher observation, group and individual participation, science notebook entries, and center activities.
- ✓ Summative (Culminating): Butterfly and Insect Test

Materials

- Student and Teacher Resource Books (Plants and Insects)
- Second Grade Interactive Student Notebook (Shared Drive)
- Monarch habitat net
- Other Foss investigation materials

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SUGGESTED ACTIVITIES

- Introduction to our science notebook: Students will brainstorm ideas and discuss what Scientists can, have, and are and fill in on graphic organizer. Example: Scientists can investigate, they have tools, and they are smart. Students will follow the same procedure for filling in a graphic organizer for what insects can, have, and are. They will use their brainstorming ideas to write a good sentence about insects.
- Insect Parts: Students will read a short paragraph about the parts of an insect (antennae, head, legs, thorax, abdomen). They will label the appropriate parts of an insect picture using the vocabulary terms they just learned and answer a few questions in complete sentences. Later they will label the parts of a monarch butterfly (head, antennae, wing, abdomen, leg, scales, thorax.)
- Life Cycle: Students will read a short paragraph about the life cycle stages of the monarch butterfly. They will arrange pictures of the stages in the correct order and write sentences to describe each stage.
- Students will observe monarch caterpillars and set up a monarch habitat. They will draw pictures and a write a sentence to show what they have learned. Students will continue observing the monarchs and discuss how they can tell their monarch is growing, how it has changed so far, and write a question they still have about monarchs.
- Students will read about migrating monarchs and trace the path the monarchs travel before winter (from north to south). They will learn that migrating means to travel to a warmer place to survive.
- Students will watch a short video about Painted Lady butterflies. They will draw the Painted Lady caterpillar and chrysalis and compare to a Monarch at those same stages. Students will write a sentence to describe how they are similar and how they are different.
- Monarch Life Cycle Plate: Model the life cycle of a monarch butterfly with paper plate and dyed pasta (egg, larva/caterpillar, pupa/chrysalis, adult/butterfly). Students will correctly label the four stages.
- Students will listen to a story about moths. They will learn the ways to tell a moth apart from a butterfly (moths come out a night time, they have thicker bodies, furry antennas, etc.) Students will complete a cut and paste activity to show they can differentiate between a butterfly and moth by gluing them in the day or night side.
- Observe the complete metamorphosis of a Monarch butterfly in our classroom habitat and compare to a Painted Lady butterfly (by looking at pictures and videos).

REINFORCEMENT

- Display: "Interesting Insects" pictures - Foss Teacher Page/Digital Only Resources /Image Gallery
- Read: Investigating Insects with a Scientist, by Patricia J. Murphy
- Provide printed notes, organizers, etc. for student notebooks/folders.
- Students can pair-up with a partner to share answers to focus questions.

ENRICHMENT

- Have the students create a picture book about the lifecycle of an insect to share with the class or an adult. Some common insects they could choose include: grasshopper, butterfly, mosquito, dragonfly, house fly.
- The students can create a "bug diary" to record/draw all of the insects they see on a nature walk around the school or their neighborhood.
- Create a "Wanted" poster on an insect considered a pest by humans.
- Discuss and create a T-chart of the pros and cons of different kinds of insects in our environment.
- Invite an entomologist to come in and talk with students.
- Investigate the role of insects in food chains. What other species do they support? How do they assist in agriculture (bees)?

Suggested Websites

- https://www.fossweb.com/
- https://jr.brainpop.com/
- http://www.discoveryeducation.com/
- https://www.pebblego.com/

Suggested Materials

- A variety of informational texts about insects
- Life Cycle magnets (for white board)
- Monarch caterpillars
- Paper Plates
- Dyed pasta

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	• Vocabulary Journal • Technology- SMART Board, Document Camera
Cross-Curricular Connections ***21st Century Skills:*** *CRP5 – Consider the environmental, social and economic impacts of decisions. *Discuss with students the importance of protecting the natural habitats of Monarch butterflies so they continue to migrate each year.* ***Technology:*** *(8.1.2.E.1) Use digital tools and online resources to explore a problem or issue. *Use various online websites to provide students with supplemental information to support their learning (BrainPopJr and PebbleGo)* ***SEL:*** *Social Awareness – Demonstrate an awareness of the expectations for social interactions in a variety of settings *Discuss with students the expectations for working with partners in groups during an investigation.* ***Language Arts:*** *(W.2.8) Recall information from experiences or gather information from provided sources to answer a question. (2-LS2-1) *Use prior knowledge of insects to aid in answering questions in student interactive notebook.*	

Second Grade Science Curriculum

Unit 2: Solids and Liquids	Time: November – January	Standards:
Essential Questions • How do we describe and sort solid and liquid materials? • How can mixtures of solids be separated? • What happens when solids are mixed with liquids?	**Enduring Understandings** • I can describe solids and liquids by their properties. • I can sort solid and liquid materials based on their properties. Some materials are different states of matter but behave in similar ways (like sand pouring). • I can separate mixtures of solids using screens of various sizes. • I know that solids of different materials react differently when mixed with water.	2-PS2-1: Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties. 2-PS1-2: Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose. 2-PS1-3: Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object. 2-PS1-4: Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot. K-2-ETS1-1: Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool. 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. K-2-ETS1-3: Analyze data from tests or two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

Benchmark Assessment(s)

- ➢ SWBAT sort solid objects by their observable properties, describing the properties they used to sort them. Students will identify solid objects which are made from different materials, but have the same properties. (2-PS2-1)
- ➢ SWBAT work collaboratively to determine which solid materials would be best suited to draw a sketch and build a tower. (2-PS1-2) (2-PS1-3) (K-2-ETS1-1) (K-2-ETS1-2) (K-2-ETS1-3)
- ➢ SWBAT investigate what happens to various objects when they are exposed to heating and cooling (water, ice, margarine, chocolate chips). (2-PS1-4)

Other Assessments

- ✓ Formative (On-going): Teacher observation, group and individual participation, Solids and Liquids vocabulary quiz, science notebook entries, and center activities.
- ✓ Summative (Culminating): Solids and Liquids Test

Materials

- Student and Teacher Resource Books (Solids and Liquids)
- Second Grade Interactive Student Notebook (Shared Drive)
- Other Foss investigation materials

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Second Grade Science Curriculum

SUGGESTED ACTIVITIES

- Youtube– Bill Nye the Science Guy Video: Phases of Matter
- Matter sort activity (solids, liquids, gases) with matter cards
- Investigation 1: How can solid objects be described? Students will read in their student resource book about "Everything Matters" and answer a few questions. Then, they will observe different solid objects and describe them by their properties (the cylinder is round and flexible, the cloth is flexible and soft, etc.) Students will observe that some solid objects can be grouped together by their property (a metal screw and wooden stick can both be rigid). They will draw and describe four of the objects from their bag. Next, students will describe what materials these solid objects are made of (fabric, plastic, metal, wood) and fill in a graphic organizer. Students will look around the classroom to find other objects that are made from the same materials. Finally, students will select objects which are made from materials and have properties that would be useful for building towers. They will work with a partner to draw a sketch of their plan, label, and build their tower.
- Investigation 2: How are liquids different from each other? Students will observe many different liquids in plastic bottles (soda, dish detergent, fabric softener, oil) and record how they are different from each other. They will describe these liquids by their properties (transparent, translucent, bubbly, foamy, viscous). Next, students will describe how liquids change in containers when the container is tipped or turned. They will investigate what happens when the same amount of liquid is poured into different size containers.
- Investigation 3: Are these materials solid or liquid? Students will investigate how mixtures of solids can be separated using screens. They will read the section "Pouring" from their student resource book and answer several questions. Next, students will investigate how to compare solids and liquids based on their properties. Although some materials can be different states of matter, they might still have similar properties.
- Investigation 4: What happens when solids and/or liquids are mixed with water? Students will investigate and observe what happens when certain solids are placed in water. They will record their observations after a few days to see what changes have occurred. Students will do the same with liquids in water (oil). We will also observe what happens when toothpaste is placed in water and left over night. Is toothpaste a solid or liquid? Finally, students will investigate how properties of materials change when heated and cooled (ice melts, water evaporates, etc.)

REINFORCEMENT

- Vocabulary matching game
- Provide printed notes, organizers, etc. for student notebooks/folders.
- Read: Matter: See It, Touch It, Taste It, Smell It, by Darlene Stille.

ENRICHMENT

Build a Tower – Enrichment Activity
Prepare materials such as cups, paper, straws, cardboard, and any others to distribute to each pair or group of students. Review properties of solids. Then explain that students use solid materials to build towers, using the best objects and the best materials at each level of the tower to provide strength and stability. What materials are best to build a tall and stable tower?
Extension: After building towers, students take the structures apart and use the same materials to construct bridges. Students can compare the two structures and discuss observations.

Suggested Websites

- https://www.fossweb.com/
- https://jr.brainpop.com/
- http://www.discoveryeducation.com/
- http://www.youtube.com/
- https://www.pebblego.com/

Suggested Materials

- *Variety of informational texts about Solids and Liquids*
- *Vocabulary Journal*
- *Matter Sort Cards*
- *Solids and Liquids Center*

Cross-Curricular Connections

21st Century Skills: *CRP6 – Demonstrate Creativity and innovation *Students will demonstrate creativity when planning and building their tower out of solid materials.*
Technology – *(8.2.2.C.1) Brainstorm ideas on how to solve a problem or build a product *Students will brainstorm ideas with their partner groups before building their tower. (8.2.2.C.2) Create a drawing of a product or device that communicates its function to peers and discuss *Students will draw a plan for their tower prior to building.*
SEL *(Responsible Decision-Making) Develop, implement and model effective problem solving and critical thinking skills. *Students will choose the materials with properties best for supporting a tower, making revisions to their design as necessary.*
Math *(MP.5) Use appropriate tools strategically (k-2-ETS1-1), (k-2-ETS1-3) Students will choose the solid materials which have properties that would best support a tower (materials that are strong and wide).*

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Second Grade Science Curriculum

Unit: Pebbles, Sand, and Silt	Time: February-April	Standards:
Essential Questions • How can rocks be sorted? • How does land change and what are some things that cause it to change? • How do people use different Earth materials?	**Enduring Understandings** • I can sort rocks into groups by their visible properties. • I know that land can change rapidly (volcanoes, earthquakes) or slowly (erosion, weathering – when rocks rub together.) • I know that Earth materials can be used for various uses including building, tools, jewelry, food, etc.	2-ESS1-1: Use information from several sources to provide evidence that Earth events can occur quickly or slowly. 2-ESS2-1: Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land. 2-ESS2-2: Develop a model to represent the shapes and kinds of land and bodies water in an area. 2-ESS2-3: Obtain information to identify where water is found on Earth and that it can be solid or liquid.

Benchmark Assessment(s)

- ➢ SWBAT mimic various Earth events including the process of weathering by observing what happens when two rocks are rubbed together. (2-ESS1-1)
- ➢ SWBAT construct and label a 3-D model of a landform map which includes landforms (mountain, island, valley, plain, hill, peninsula) , different bodies of water (river, lake, ocean) and at least one natural barrier (tree, shrub, dune, grass) which is used to slow or prevent land erosion. (2-ESS2-1) (2-ESS2-2)
- ➢ SWBAT use a variety of print and media sources (informational texts, student resource book, PebbleGo) , and prior knowledge to discuss where water is found on Earth and that it can be solid or liquid depending on the climate in that area. (2-ESS2-3)

Other Assessments

- ✓ Formative (On-going): Teacher observation, group and individual participation, science notebook entries, and center activities.
- ✓ Summative (Culminating): Pebbles, Sand, and Silt Test

Materials

- Student and Teacher Resource Books (Pebbles, Sand, and Silt)
- Second Grade Interactive Student Notebook (Shared Drive)
- Other Foss investigation materials

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SUGGESTED ACTIVITIES

- Investigation 1: Students will explore what happens when three different rocks rub together (basalt, scoria, and tuff). They will draw a picture and write to show what happened. This is meant to mimic the natural weathering of rocks. Next, students will investigate what happens when rocks are placed in water. They will write their observations in a chart and draw a picture. After that, students will sort a bag of rocks by their properties and discuss the ways we can sort rocks into groups.
- Investigation 2: Students will separate rocks by size using screens. They will record what these different size rocks are called (pebble, large gravel, small gravel, and sand.) Students will read the "Story of Sand" in their student resource book. They will take a look at a sample of sand and investigate how sand can be further separated using water. Is there a material that's smaller than sand? They will then take their findings and complete another investigation to see if there is a material that is smaller than silt.
- Investigation 3: Students will learn how people use Earth materials (clay, sand, gravel, etc.) for different uses (brick walls, concrete steps, etc.) Next, students will experiment with sand paper to find which sand paper you would use for a smooth finish (find, medium, or course?)

REINFORCEMENT

- Provide printed notes, organizers, etc. for student notebooks/folders.
- Read: The Magic School Bus, Inside the Earth, by Joanna Cole.
- Students can pair-up with a partner to share answers to focus questions.

ENRICHMENT

- Making Bricks – Enrichment Activity
- Plan as described in the teacher preparation video 3.5.
- Students make adobe clay bricks with a mixture of clay soil, dry grass or weeds, and water. After the bricks dry, they can be used to build a class wall. Have students use Notebook sheet 14 Uses of Earth Materials for students to identify Earth materials used to build each item.

Suggested Websites

- https://www.fossweb.com/
- https://jr.brainpop.com/
- http://www.discoveryeducation.com/
- http://www.youtube.com/
- https://www.pebblego.com/

Suggested Materials

- *Variety of informational texts about Rocks and other Earth materials*
- *Vocabulary Journal*
- *Rocks and Minerals Center*

Cross-Curricular Connections

21st Century Skills: *(CRP8) Utilize critical thinking to make sense of problems and persevere in solving them *Students will use critical thinking and problems solving skills when sorting different size rocks using screens.*

Technology: *(8.2.2.A.1) Define products produced as a result of technology or of nature *Student will identify the various products which can be made using Earth materials.*

SEL: *(Relationship Skills) Utilize positive communication and social skills to interact effectively with others *Students will use these skills when interacting with their small group during investigations.*

Language Arts: *(W.2.8) Recall information from experiences or gather information from provided sources to answer a question *Students will use prior knowledge about Earth materials when answering questions in their interactive student notebook.*

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Second Grade Science Curriculum

Unit: Plants	Time: May and June	Standards:
Essential Questions • How can you describe the life cycle of a plant? • What are the parts of a plant? • What are the basic needs of a plant?	**Enduring Understandings** • I know that all living things have a life cycle which continues in a circle. • I can describe the parts of a plant including the roots, stem, leaves, flower, and seeds. • I know that a plant needs air, water, nutrients, sunlight, and space to grow.	2-LS2-1: Plan and conduct an investigation to determine if plants need sunlight and water to grow.

Benchmark Assessment(s)

- SWBAT conduct an investigation where they grow plants from seed in two locations of the classroom. Students will determine that plants which are watered daily and placed under a grow light or near a window will grow. Plants which are left in the closet where they do not receive any sunlight or water will not grow. (2-LS2-1)

Other Assessments

- ✓ Other Assessments
- ✓ Formative (On-going): Teacher observation, group and individual participation, science notebook entries, and center activities.
- ✓ Summative (Culminating): Pebbles, Sand, and Silt Test

Materials

- Student and Teacher Resource Books (Pebbles, Sand, and Silt)
- Second Grade Interactive Student Notebook (Shared Drive)
- Other Foss investigation materials

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SUGGESTED ACTIVITIES

- Students will brainstorm ideas for what plants can do, have, and need. Then they will write a sentence about plants.
- Students will create an interactive diagram where they will color, cut, and glue to label the parts of a plant, the needs of a plant, and the stages in the life cycle of a plant.
- Students will plant seeds (marigold or zucchini) in small plastic cups and place them under a light in the classroom. Students will watch and record daily observations as the plant grows through the life cycle.
- Students will read in their student reference book "flowers and seeds" and answer questions using complete sentences.
- The plants will be transferred to the school garden when they are ready. Students will identify that this is a good outdoor place for young growing plants (because there is soil, sun, air, and water.)
- Students will complete an activity where they get to "create – a – plant". They will pretend to be a botanist who has discovered a new type of plant. They will come up with a name for the plant, list its basic needs, tell how those meets are met, where it lives, and draw a picture of the plant in its natural habitat.

REINFORCEMENT

- Provide printed notes, organizers, etc. for student notebooks/folders.
- Vocabulary matching game.
- Show video: How Plants Grow – Foss Teacher Page/Digital Only Resources/Streaming Videos

ENRICHMENT

- Hydroponics - Enrichment Activity
- Review what plants needs to survive and grow. Define hydroponics to students. And explain 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. 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

- https://www.fossweb.com/
- https://jr.brainpop.com/
- http://www.discoveryeducation.com/
- http://www.youtube.com/
- https://www.pebblego.com/

Suggested Materials

- *Variety of informational texts about Plants*
- *Vocabulary Journal*
- *Rocks and Minerals Center*

Cross-Curricular Connections

21st Century Skills *(CRP5) Consider the environmental, social and economic impacts of decisions *Students will discuss how they can make a positive impact on the environment by growing and eating local fruits and vegetables (school garden)*

Technology *(8.1.2.A.2) Create a document using a word processing application *Students and teacher will work collaboratively to record daily observations of our plants in an online word document*

SEL: *(Social Awareness) Recognize and identify the thoughts, feelings, and perspectives of others *Students will be mindful of others when working in collaborative groups during various investigations*

Language Arts: *(W.2.7) Participate in shared research and writing projects (2-LS2-1) *Students will work together in small groups and share their projects with the class*

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