Unit 3: Insects and Plants

Content Area: **Science**
Course(s): **Science**
Time Period: **Marking Period 4**
Length: **10 Weeks**
Status: **Published**

Unit Overview

This module provides students with life science core ideas dealing with structure and function of living things, growth and development of plants and animals, interactions of organisms with their environment and the diversity of organisms on land and in water. Throughout the module, students engage in science and engineering practices to collect and interpret data to answer science questions. They will develop models to communicate interactions and processes. They will define problems in order to develop solutions. Students will gain experiences that will contribute to understanding of crosscutting concepts of patterns, cause and effect; and structure and function.

Standards

Disciplinary Core Ideas (DCI's)

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 of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.
2-LS2-1	Plan and conduct an investigation to determine if plants need sunlight and water to grow.
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.

Crosscutting Concepts (CC's)

	Observed patterns in nature guide organization and classification and prompt questions about relationships and causes underlying them.
CCC.1.1	children recognize that patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence.
	Events have causes, sometimes simple, sometimes multifaceted. A major activity of science is investigating and explaining causal relationships and the mechanisms by which

	they are mediated. Such mechanisms can then be tested across given contexts and used to predict and explain events in new contexts.
CCC.2.1	students learn that events have causes that generate observable patterns. They design simple tests to gather evidence to support or refute their own ideas about causes.
	The way in which an object or living thing is shaped and its substructure determine many of its properties and functions.
CCC.6.1	students observe the shape and stability of structures of natural and designed objects are related to their function(s).
SCI.K-2.2.2	Simple tests can be designed to gather evidence to support or refute student ideas about causes.

Science and Engineering Practices (SEP's)

SEP.1	Asking Questions and Defining Problems
SEP.2	Developing and Using Models
SEP.3	Planning and Carrying Out Investigations
SEP.4	Analyzing and Interpreting Data
SEP.5	Using Mathematics and Computational Thinking
SEP.6	Constructing Explanations and Designing Solutions
SEP.7	Engaging in Argument from Evidence
SEP.8	Obtaining, Evaluating, and Communicating Information

Essential Questions

Investigation 1: Mealworms

- What do mealworms need to live?
- How do mealworms grow and change?
- What are the stages of a beetle's life cycle?

Investigation 2: Brassica Seeds

- How did we plant the brassica seeds?
- How does a young plant change as it grows?
- What will happen to the flowers on the brassica plants?
- Where is a good outdoor place for growing young plants?

Investigation 3: Milkweed Bugs

- What are the yellow objects and how do they change over time?
- What do milkweed bugs need in their habitat?
- How do milkweed bugs grow and change?
- Where do insects live?

Investigation 4: Silkworms

- What do silkworms need to live?

- How does a silkworm compare to a mealworm?
- What is the life cycle of the silkworm?
- What evidence is there that insects are eating plants in the schoolyard?

Investigation 5: Butterflies

- What do caterpillars do?
- How is a painted lady pupa different from a silkworm pupa?
- What is the life cycle of a painted lady butterfly?
- What plants in our schoolyard have pollen?

Application of Knowledge: Students will know that...

- animals disperse seeds
- insects have characteristics structures and behaviors
- insects move pollen from flower to flower
- insects need air, food, water and space
- insects pollinate plants
- life cycles are different for different animals
- plants need water, air, nutrients, light and space
- seeds develop into new plants that look like the parent plant
- the life cycle of a plant consists of stages that can be observable
- the life cycle of an insect consists of stages that can be observed

Application of Skills: Students will be able to...

- analyze and interpret data based on observations of insects and plants
- ask questions based on observations of insects and plants
- communicate with peers using precise vocabulary of insects and plants
- develop and use models and or the actual insect/plant to identify common/different features among the species
- engage in peer conversations that are based on evidence learned about insects and plants
- plan and carry out investigations on insects and plants
- use mathematics to help in the analyzing of data and look for patterns

Assessments

Investigation 1: Mealworms

- Formative Assessment: Science notebook entry, Performance assessment
- Benchmark Assessment: Survey, Investigation 1 I-Check

Investigation 2: Brassica Seeds

- Formative Assessment: Science notebook entry, Response sheet, Performance assessment
- Benchmark Assessment: Investigation 2 I-Check

Investigation 3: Milkweed Bugs

- Formative Assessment: Science notebook entries, Performance assessment
- Benchmark Assessment: Investigation 3 I-Check

Investigation 4: Silkworms

- Formative Assessment: Science notebook entry, Performance assessment
- Benchmark Assessment: Investigation 4 I-Check

Investigation 5: Butterflies

- Formative Assessment: Science notebook entry, Performance assessment
- Benchmark Assessment: Investigation 5 I-Check

Suggested Activities

Investigation 1: Mealworms

Part 1: Mealworms

- Focus Question: What do mealworms need to survive?
- Students are induced to mealworms and observe their behavior. Students attend to the insect's needs of food, water, air and space.
- Plan and carry our investigation
- Science notebook entry

Part 2: Larva, Pupa, Adult

- Focus Question: How do mealworms grow and change?
- Students actively observe the life cycle of the mealworm. They collect data as the insect progress through their stages.
- Plan and carry our investigation
- Read: Animals and Plants in their Habitats
- Performance Assessment

Part 3: Life Cycle

- Focus Question: What are the stages of a beetle's life cycle?
- Students maintain the mealworm habitat and collect evidence that supports the known life cycle.
- Plan and carry our investigation

- Science notebook entry
- Benchmark Assessment: Investigation 1 l-Check

Investigation 2: Brassica Seeds

Part 1: Planting Brassica

- Focus Question: How do we plant the brassica seeds?
- Students plant seeds of brassica plant.
- Plan and carry out investigation
- Growth of Brassica Calendar
- Science notebook entry

Part 2: Observing Brassica Growth

- Focus Question: How does a young plant change as it grows?
- Students observe, collect data, measure growth and changes of the brassica plant over time.
- Plan and carry out investigation
- Video: How Plants Grow
- Video: What is pollination?
- Performance assessment

Part 3: Plant Life Cycle

- Focus Question: What will happen to the flowers on the brassica plants?
- Students observe the brassica flowers become seedpods. They harvest the seeds. They actively investigate the life cycle of the brassica plant.
- Plan and carryout investigation
- Read: Flowers and Seeds
- Online Activity: Watch it Grow
- Science notebook entry

Part 4: Planting Outdoors

- Focus Question: Where is a good outdoor place for growing young plants?
- Students plant marigold seeds outside the classroom using information they have collected to ensure plant growth renewal.
- Plan and carryout investigation
- Read: How Seeds Travel
- Video: How Seed Get Here...and There
- Benchmark Assessment: Investigation 2 l-Check

Investigation 3: Milkweed Bugs

Part 1: Eggs

- Focus Question: What are the yellow objects and how do they change overtime?
- Students observe the milkweed bug eggs in a vial and discuss what they could be come over time.
- Plan and carry out investigation
- Science notebook entry

Part 2: Habitats

- Focus Question: What do milkweed bugs need in their habitats?
- Students prepare milkweed bug habitats with their prior knowledge of the the needs of insects.
- Plan and carry out investigation
- Read: So Many Kinds, So Many Places
- Science notebook entry

Part 3: Growing Milkweeds Bugs

- Focus Question: How do milkweed bugs grow and change?
- Students care and observe bugs over time noting their stages of their life cycle.
- Plan and carry out investigation
- Science notebook entry

Part 4: Insect Search

- Focus Question: Where do insects live?
- Students select an insect and create a habitat for that insect after researching it's needs and life cycle.
- Plan and carry out investigation
- Online Activity: Insect Hunt
- Benchmark Assessment: Investigation 3 i-Check

Investigation 4: Silkworms

Part 1: Eggs and Larvae

- Focus Question: What do silkworms need to live?
- Students observe silkworm eggs in vials. After the eggs hatch, students will set and maintain a habitat.
- Plan and carry out investigation
- Growth of silkworms calendar
- Science notebook entry

Part 2: Silkworm Structures

- Focus Question: How does a silkworm compare to a mealworm?
- Students will create an observable area where the larvae can be viewed for data collection.
- Plan and carry out investigation
- Read: Insect Shapes and Colors
- Science notebook entry

Part 3: Pupae and Adults

- Focus Question: What is the life cycle of a silkworm?
- Students will investigate silkworms through the remaining life cycle stages.
- Read Insect Life Cycles
- Science notebook entry

Part 4: Plant Eaters

- Focus Question: What evidence is there that insects are eating plants in the schoolyard?
- Students will investigate outdoors for evidence of insects on plants.

- Plan and carry out investigation
- Performance Assessment
- Benchmark Assessment: Investigation 4 i-Check

Investigation 5 : Butterflies

Part 1: Caterpillars

- Focus Question: What do caterpillars do?
- Students will be introduced to the painted lady caterpillar and observe it closely.
- Plan and carry out investigations
- Performance assessment

Part 2: Chrysalises

- Focus Question: How is a painted lady pupa different from a silkworm pupa?
- Students will observe the painted lady chrysalises and note differences in this stage. The students will understand the need to transfer to a net cage from it's former habitat.
- Define problem, then design solution
- Science notebook entry

Part 3: Adult Butterflies

- Focus Question: What is the life cycle of a painted lady butterfly?
- Students will observe the adult butterflies and maintain their habitat while searching for evidence of the life cycle.
- Read: Life Goes Around
- Science notebook entry

Part 4: Flower Powder

- Focus Question: What plants in our schoolyard have pollen?
- Students will research the insect's role in plant pollinating. They will design model pollinators to test the shape and materials that will collect pollen.
- Plan and carry out investigations
- Develop and use models
- Video: What is Pollination?
- Benchmark Assessment: Investigation 5 l-Check

Activities to Differentiate Instruction

Differentiation for special education:

- General modifications may include:
    - Modifications & accommodations as listed in the student's IEP
    - Assign a peer to help keep student on task
    - Modified or reduced assignments
    - Reduce length of assignment for different mode of delivery

- Increase one-to-one time
- Working contract between you and student at risk
- Prioritize tasks
- Think in concrete terms and provide hands-on-tasks
- Position student near helping peer or have quick access to teacher
- Anticipate where needs will be
- Break tests down in smaller increments

- Content specific modifications may include:
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    - Provide multiple means of representation. Give learners various ways to acquire information and knowledge. (ex. leveled books, i-Pads, magazines)
    - Provide multiple means of action and expression. Offer students alternatives for demonstrating what they know. (ex. drawings, dictation)
    - Provide multiple means of engagement. Help learners get interested, be challenged and stay motivated.

Differentiation for ELL's:

- General modifications may include:
    - Strategy groups
    - Teacher conferences
    - Graphic organizers
    - Modification plan
    - Collaboration with ELL Teacher
- Content specific vocabulary important for ELL students to understand include:
    - **Investigation 1: Mealworms**
        - abdomen, adult, air, antenna, bran, darkling beetle, dead, dropping, egg, exoskeleton, food, habitat, head, insect, larva leg, life cycle, living, mealworm, molt, molting, observe, organism, pupa, segment, space, stage, structure, thorax, water
    - **Investigation 2: Brassica Seeds**
        - brassica, bud, fertilizer, flower, fruit, germinate, leaf, light, nutrient, plant, pollen, pollination, root, seed, seedling, seedpod, soil, sprout, stem
    - **Investigation 3: Milkweed Bugs**
        - bug, female, hatch, male, mating, milkweed, bug, nymph, proboscis, shelter
    - **Investigation 4: Silkworms**
        - clasper, cocoon, engineering, evidence, eyespot, metamorphosis, mulberry leaf, proleg, silk, silkworm, spinneret, spiracle
    - **Investigation 5: Butterflies**
        - butterfly, caterpillar, chrysalis, nectar, offspring, painted lady, predict, waste

Differentiation to extend learning for gifted students may include:

- Integrate language arts instruction to enhance science learning
- Label diagrams, pictures and science notebook recordings.

- Utilize the Math extension problems and Science extensions provided in Foss Teacher Manual

Integrated/Cross-Disciplinary Instruction

When reading scientific texts, students need to be able to gain content knowledge from challenging texts that often make extensive use of elaborate diagrams and data to convey information and illustrate concepts. Students read purposefully and listen attentively to gain scientific expertise. The interdisciplinary approach to literacy is backed by extensive research establishing the need students to be proficient in reading complex informational text in a variety of content areas.

Examples:

- Read So Many Kinds, So Many Places in the FOSS Science Stories book and explain how insects survive in different habitats.
- After reading Insects Shapes and Colors in the FOSS Science Stories book, use other texts and resources to identify and describe several different insects and how they use color to protect them in their environment
- Distinguish between information provided by pictures or other illustrations and information provided by visuals in a text – use the glossary as well as the stories.
- Use the illustrations and details in the science text and other text sources to describe key ideas. (e.g. Read What Makes an Insect an Insect? in the FOSS Science Stories. Reflect on the text by making a data chart. Using information from the text and other resources record the characteristics of different animals and explain why they are insects or not.)
- With prompting and support, read functional texts including history/social studies, science, and technical texts, appropriately complex for grade 2 (e.g. explain with evidence and reasoning differences in insect life cycles)

Writing is a key means for students to express what they know about a subject. Science notebooks are critical and essential components of science learning whereby students record observations, data, visual representations, and thinking about their learning. They are excellent tools for formative assessment purposes. Writing can be formal or informal, using records and ideas from their notebooks.

Examples:

- Write an informative/explanatory booklet titled “How Insects Survive.”
- Explain through writing and scientific illustrations how insects grow and develop.
- Participate in shared research and writing projects (e.g. gather and record information about how insects are beneficial to humans).
- Using pictures and captions compare and contrast the life cycles of different insects.
- Construct a model of an insect from recycled materials. Identify structures and their functions and write a description of how the insect survives in certain habitats. Include possible adaptations for predator/prey relationships. Include details of the life cycle in the description and model.

LA.RI.2.2	Identify the main topic of a multiparagraph text as well as the focus of specific paragraphs within the text.
LA.RI.2.3	Describe the connection between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text.
LA.RI.2.4	Determine the meaning of words and phrases in a text relevant to a grade 2 topic or subject area.
LA.RI.2.5	Know and use various text features (e.g., captions, bold print, subheadings, glossaries, indexes, electronic menus, icons) to locate key facts or information in a text efficiently.
LA.RI.2.6	Identify the main purpose of a text, including what the author wants to answer, explain, or describe.
LA.RI.2.7	Explain how specific illustrations and images (e.g., a diagram showing how a machine works) contribute to and clarify a text.
LA.RI.2.8	Describe and identify the logical connections of how reasons support specific points the author makes in a text.
LA.RI.2.9	Compare and contrast the most important points presented by two texts on the same topic.
LA.W.2.2	Write informative/explanatory texts in which they introduce a topic, use evidence-based facts and definitions to develop points, and provide a conclusion.
LA.W.2.5	With guidance and support from adults and peers, focus on a topic and strengthen writing as needed through self-reflection, revising and editing.
LA.W.2.6	With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers.
LA.W.2.7	Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations).
LA.W.2.8	Recall information from experiences or gather information from provided sources to answer a question.
LA.SL.2.1	Participate in collaborative conversations with diverse partners about grade 2 topics and texts with peers and adults in small and larger groups.
LA.SL.2.2	Recount or describe key ideas or details from a text read aloud or information presented orally or through other media.
LA.SL.2.3	Ask and answer questions about what a speaker says in order to clarify comprehension, gather additional information, or deepen understanding of a topic or issue.

Resources

www.FOSSweb.om - Teacher-user account

Investigation 1:

- **Science Resources Book**
- "Animals and Plants in their Habitats"

Investigation 2:

- **Science Resources Book**

- “Flowers and Seeds"
- "How Seeds Travel"
- **Videos**
- *How Plants Grow*
- *What is Pollination*
- *How Seeds Get Here...and There*
- **Online Activity**
- “Watch it Grow”

Investigation 3:

- **Science Resources Book**
- “So Many Kinds, So Many Places”
- **Online Activity**
- “Insect Hunt"

Investigation 4:

- **Science Resources Book**
- “Insect Shapes and Colors”
- “Insect Life Cycles”

Investigation 5:

- **Science Resources Book**
- “Life Goes Around”
- **Videos**
- *What is Pollination?*

Student Plant Center Activities

Parts of a Flower
My First Garden
Growing Plants - Plant Parts
Plant Life Cycles
BBC BiteSize - Science
Plant & Animal Variations
Plant & Animal Habitats

21st Century Skills

CRP.K-12.CRP1	Act as a responsible and contributing citizen and employee.
CRP.K-12.CRP2	Apply appropriate academic and technical skills.
CRP.K-12.CRP4	Communicate clearly and effectively and with reason.
CRP.K-12.CRP5	Consider the environmental, social and economic impacts of decisions.
CRP.K-12.CRP6	Demonstrate creativity and innovation.
CRP.K-12.CRP7	Employ valid and reliable research strategies.
CRP.K-12.CRP8	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP.K-12.CRP11	Use technology to enhance productivity.
CRP.K-12.CRP12	Work productively in teams while using cultural global competence.