Science Unit 3- Plan
Structures of Life
Grade 4

Grade 3
Structures of Life

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UNIT OVERVIEW

UNIT OVERVIEW
Structures of Life Unit 1

Summary

In this unit, students will work with living organisms to explore different functions including: growth, survival, and reproduction. Students compare and categorize properties of seeds, germinate seeds, and grow plants hydroponically to observe plant life cycles. Students care for a selection of organisms, and in doing so; they learn to identify properties of plant and animals and to sort and group organisms on the basis of observable properties.

Enduring Understanding:	***Essential Questions: Overarching***
• Seeds have specific structures and functions. • A seed is a (dormant) living organism. • Seeds undergo changes in the presence of water. • Plants need water, light, and nutrients to grow. • Individual organisms behave and use their structures to respond to internal and external stimuli to improve their chances of survival. • Similar structures found on different organisms (e.g., eyes, ears, mouths) have similar functions and enable those organisms to survive and reproduce in different environments. • There are similarities and differences with regards to the life cycles of different organisms. • Plants can be grown using hydroponics. • Organisms need water, food, air, and space to survive. • An organism's structure is shaped by its function. • Structures that function for similar purposes in living things may have different appearances. • Organisms can be grouped based on similarities and differences in their structures • Plants need the Sun's energy to grow and survive. • Animals need food to provide materials and energy for life, which they derive directly or indirectly from plants. • An organism displays behaviors in response to internal cues, such as hunger, and external cues, such as light, temperature, or interaction with living things. • There are similarities and differences in how organisms respond to internal and external cues. These behaviors may include strategies for acquiring food, building shelters, or evading predators. All living organisms interact with the living and nonliving parts of their surroundings to meet their needs for survival.	• How does structure relate to function in living systems? • How do responses to internal and external cues aid in an organism's survival? • How do organisms change as they go through their life cycles? • How are organisms of the same kind alike and different from each other? • How does an organism depend on its basic needs for its survival and growth? • How do changes in the environment affect living organisms? • How do living organisms' structures help them survive in their environment?

• Adaptations in organisms enable them to live and reproduce in certain environments. Those organisms that are best suited for a particular environment, have adaptations that allow them to compete for available resources and cope with the physical conditions of their immediate surroundings. • Plants need energy from the Sun, water and nutrients for growth and survival.	
Knowledge:	***Skills:***
Student will Know…. • The seed of a plant is found in the part called the fruit. • That seeds have three structures including the seed coat, cotyledon, and embryo. • Seeds are living but in a dormant stage. • Seeds undergo germination when water is present. • That plants and organisms need water, light, and nutrients to grow. • Hydroponics is the process of growing plants in water. • The life cycle of bean plants and crayfish. • Crayfish have distinguishable structures and functions. • The behavior of an organism means what an animal does or how it acts. • The habitat of an organism is where the organism lives. • That all living organisms need air, food, water, and space to survive. • Bess Beetles are insects. • The structures of an organism have functions that help it to survive in its habitat.	***Students will be able to…*** • Compare and contrast structures that have similar functions in various organisms (e.g., eyes, ears, mouths). Explain that the function of the structure is similar although the structures may have different physical appearances (e.g., compare eyes of an owl with the eyes of a crayfish). • Observe and identify structures of plants and describe the function of each structure. Explain that most plants produce many seeds, most of which do not germinate and grow into new plants. • Sort and group plants and animals according to similarities in structures or functions of structures. Explain why the plants and animals have been grouped in this manner. • Recognize that plants need light energy from the sun to make food, while animals need to eat plants and/or other animals as their food. • Select a living organism and develop descriptions of how the organism responds to a variety of stimuli (i.e., light/dark, warm temperature/cold temperature) based on multiple observations and data collection (e.g., crayfish and Bess Beatles). • Explain how individual organisms behave and use their structures to respond to internal and external cues such as hunger, drought, or temperature to improve their chances of survival.. • Observe, record, and describe changes in the health or behavior of an organism as a result of changes in its environment.
Evidence of Understanding:	
Pre- Assessment Notebook and Journal Entries Performance Assessments Reading Prompt	***Assessments Data –Propagated to Genesis Investigation 1*** Pre Assessment Notebook Assessment- Summative I-Check 1 I-Check 2

Student Observation/Anecdotal Notes Homework Checkpoint Assessments I-Check Assessments **Unit Assessments**	I-Check 3 I-Check 4 Unit Post Assessment

Preconception /Misconceptions

Students think…
- A seed is not a plant.
- A tree is not a plant.
- Bell peppers, cucumbers, and string beans (contain seeds) are vegetables.
- Plants are not living things.
- A life cycle ranges from when something is born to when it dies.
- Animals only have four legs, are large, live on land, have fur, and make recognizable sounds.
- Isopods are bugs.
- Snails are not animals.
- Humans are not animals.
- Crayfish do have feelings such as being afraid, mad, or waiting for a friend.

List other that you discover in your class:

_____
_____
_____
_____

Materials Sheet

Be aware that the classroom teacher or school site must supply a few items. Here is a summary of supplies not included in the kit.

KIT INVENTORY LIST

		EQUIPMENT
DRAWER 1—PERMANENT EQUIPMENT		
20	Container lids, plastic, 1/4-liter ✪	
20	Containers, plastic, 1/4-liter	
1	Container, plastic, 1/2-liter	
2	Sets of crayfish houses, plastic, 4/set	
10	Cup lids, plastic, for 250-ml cup	
25	Cups, plastic, 250-ml	
1	Meter tape	
1	Box of paper clips, large, 100/box	
1	Set of 5 metric spoons	
1	Water mister	
1	Teacher Guide	
1	Teacher Preparation Video	
•	*FOSS Science Stories Structures of Life*	
DRAWER 2—PERMANENT EQUIPMENT		
2	Basin covers, plastic, for 6-liter	
4	Basins, clear plastic, 6-liter	
2	Basins, 8-liter	
1	Brush	
2	Bags of gravel, mixed, 1 kg ✪	
4	Hydroponic plant holders	
8	Knives, plastic ✪	
10	Spoons, plastic ✪	
1	Sprouter	
4	Bags of washers, large, 20/bag	
DRAWER 2—CONSUMABLE ITEMS (for 2 classes)		
1	Bag of cat food, dry	
1	Set of dots, adhesive, 800, blue	
1	Roll of duct tape, 10'/roll	
50	Filter papers, round	
1	Pad of sticky notes, 100/pad	
1	Bag of nutrient powder for hydroponics	
4	Packages of seeds, bush bean, 80/pkg	
1	Package of seeds, lima bean, 1/4 lb./pkg	
2	Packages of seeds, pea, 100/pkg	
2	Packages of seeds, popcorn, 150/pkg	
2	Packages of seeds, sunflower, 100/pkg	
50	Straws, jumbo	
1	Set of yarn, 30 cm, 4 colors/set	

MATERIALS SUPPLIED BY THE TEACHER

Be aware that you must supply a few items. These are indicated in the materials list for each part of the investigation with an asterisk (*). Here is a summary list of those items.

Investigation 1: Origin of Seeds

- Fruit, including bean pods
- 16 Paper or plastic plates
- Paper towels
- Newspaper
- 1 Marking pen
- White glue
- Bleach, 50 ml
- Transparent tape
- 1 Flip chart

Investigation 2: Growing Further

- Paper towels
- 32 Scissors
- White glue
- Paper, unlined
- Transparent tape
- Masking tape

Investigation 3: Meet the Crayfish

- 12 Crayfish
- *Elodea* (water plant)
- 1 Marking pen, permanent
- Paper towels
- Aged water
- 1 Overhead projector (optional)

Investigation 4: Meet the Land Snail

- 18 Land snails (See information on pages 5–6 and 8–9.)
- Carrots or spinach (snail food)
- Paper, unlined
- Rubber bands
- Chalk
- Flashlights
- Paper towels
- Thread
- 1 Knife
- Poster board (optional)

Investigation 5: Bess Beetles

- 12 Bess beetles
- Rotting hardwood
- Paper towels
- Scissors
- Dental floss
- Masking tape
- Flashlights (optional)
- Jump rope (optional)

End-of-Module Assessment

- Dry soup mix, 15-bean
- Transparent tape
- Isopods
- Paper towels
- Paper plate or sheet of paper

MATERIALS FROM THE MEASUREMENT KIT

You must have access to FOSS measurement tools. Items preceded by a delta (Δ) in the materials list for each part of the investigation are in the Measurement kit.

MEASUREMENT KIT ITEMS

- *8 FOSS balances*
- *8 Basins*
- *16 Hand lenses*
- *8 Mass sets*
- *2 Pitchers (1 optional)*

STORING EQUIPMENT

1. Clean all the containers, lids, crayfish houses, and bus trays with water only (no soap) and dry them thoroughly.
2. Make sure the gravel is dry before returning it to the kit.
3. Store the hydroponic plant holders between paper so they won't stick together.
4. Repackage any remaining seeds and label the package with the date they were resealed.
5. Make sure this kit is stored in a location free from critters that might enjoy a meal of dry cat food.

STANDARDS

New Jersey Common Core Standards

5.1 Science Practices	All students will understand that science is both a body of knowledge and an evidence-based, model-building enterprise that continually extends, refines, and revises knowledge. The four Science Practices strands encompass the knowledge and reasoning skills that students must acquire to be proficient in science.
Strand A	**Understand Scientific Explanations: Students understand core concepts and principles of science and use measurement and observation tools to assist in categorizing, representing, and interpreting the natural and designed world. Who, what, when, where, why, and how questions form the basis for young learners' investigations during sensory explorations, experimentation, and focused inquiry**
5.1.4.A.1	Fundamental scientific concepts and principles and the links between them are more useful than discrete facts.
5.1.4.A.2	Outcomes of investigations are used to build and refine questions, models, and explanations.
Strand B	**Generate Scientific Evidence Through Active Investigations: Observations and investigations form young learners' understandings of science concepts.**
5.1.4.B.1	Building and refining models and explanations requires generation and evaluation of evidence.
5.1.4.B.2	Tools and technology are used to gather, analyze, and communicate results.
5.1.4.B.3	Evidence is used to construct and defend arguments.
5.1.4.B.4	Reasoning is used to support scientific conclusions.
Stand C	**Reflect on Scientific Knowledge: Interacting with peers and adults to share questions and explorations about the natural world builds young learners' scientific knowledge.**
5.1.4.C.1	Scientific understanding changes over time as new evidence and updated arguments emerge.
5.1.4.C.2	Revisions of predictions and explanations occur when new arguments emerge that account more completely for available evidence.
Strand D	**Participate Productively in Science: Science practices include drawing or "writing" on observation clipboards, making rubbings, or charting the growth of plants.**
5.1.4.D.1	Science has unique norms for participation. These include adopting a critical stance, demonstrating a willingness to ask questions and seek help, and developing a sense of trust and skepticism.
5.1.4.D.2	In order to determine which arguments and explanations are most persuasive, communities of learners work collaboratively to pose, refine, and evaluate questions, investigations, models, and theories (e.g., scientific argumentation and representation).
5.1.4.D.3	Instruments of measurement can be used to safely gather accurate information for making scientific comparisons of objects and events.
5.3 Life Science:	All students will understand that life science principles are powerful conceptual tools for making sense of the complexity, diversity, and interconnectedness of life on Earth. Order in natural systems arises in accordance with rules that govern the physical world, and the order of natural systems can be modeled and predicted through the use of mathematics.
Strand A	**Organization and Development**: Living organisms are composed of cellular units (structures) that carry out functions required for life. Cellular units are composed of molecules, which also carry out biological functions. 5.3.4.A.1 Living Organisms: • Interact with and cause changes in their environment. • Exchange materials (such as gases, nutrients, water, and waste) with the environment. • Reproduce. • Grow and develop in a predictable manner.
Strand B	Matter and Energy Transformations: Food is required for energy and building cellular materials. Organisms in an ecosystem have different ways of obtaining food, and some organisms obtain their food directly from other organisms. 5.3.4.B.1 Almost all energy (food) and matter can be traced to the Sun.
Strand C	Interdependence: All animals and most plants depend on both other organisms and their environment to meet their basic needs. 5.3.4.C.1 Organisms can only survive in environments in which their needs are met. Within ecosystems, organisms interact with and are dependent on their physical and living environment.

Strand D	Heredity and Reproduction : Organisms reproduce, develop, and have predictable life cycles. Organisms contain genetic information that influences their traits, and they pass this on to their offspring during reproduction. 5.3.4.D.1 Plants and animals have life cycles (they begin life, develop into adults, reproduce, and eventually die). The characteristics of each stage of life vary by species.

Performance Expectations

3-LS1-1. **Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.** [Clarification Statement: Changes organisms go through during their life form a pattern.] [*Assessment Boundary: Assessment of plant life cycles is limited to those of flowering plants. Assessment does not include details of human reproduction.*]

3-LS3-1. **Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms.** [Clarification Statement: Patterns are the similarities and differences in traits shared between offspring and their parents, or among siblings. Emphasis is on organisms other than humans.] [*Assessment Boundary: Assessment does not include genetic mechanisms of inheritance and prediction of traits. Assessment is limited to non-human examples.*]

3-LS3-2. **Use evidence to support the explanation that traits can be influenced by the environment.** [Clarification Statement: Examples of the environment affecting a trait could include normally tall plants grown with insufficient water are stunted; and, a pet dog that is given too much food and little exercise may become overweight.]

3-LS4-2. **Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.** [Clarification Statement: Examples of cause and effect relationships could be plants that have larger thorns than other plants may be less likely to be eaten by predators; and, animals that have better camouflage coloration than other animals may be more likely to survive and therefore more likely to leave offspring.]

NGSS Science and Engineering Practices

Developing and Using Models

Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.

- Develop models to describe phenomena. (3-LS1-1)

Analyzing and Interpreting Data

Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used.

- Analyze and interpret data to make sense of phenomena using logical reasoning. (3-LS3-1)

Constructing Explanations and Designing Solutions

Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems.

- Use evidence (e.g., observations, patterns) to support an explanation. (3-LS3-2)
- Use evidence (e.g., observations, patterns) to construct an explanation. (3-LS4-2)

Connections to Nature of Science

Scientific Knowledge is Based on Empirical Evidence

- Science findings are based on recognizing patterns. (3-LS1-1)

Disciplinary Core Ideas

LS1.B: Growth and Development of Organisms

- Reproduction is essential to the continued existence of every kind of organism. Plants and animals have unique and diverse life cycles. (3-LS1-1)

LS3.A: Inheritance of Traits

- Many characteristics of organisms are inherited from their parents. (3-LS3-1)
- Other characteristics result from individuals' interactions with the environment, which can range from diet to learning. Many characteristics involve both inheritance and environment. (3-LS3-2)

LS3.B: Variation of Traits

- Different organisms vary in how they look and function because they have different inherited information. (3-LS3- 1)
- The environment also affects the traits that an organism develops. (3-LS3-2)

LS4.B: Natural Selection

- Sometimes the differences in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing. (3-LS4-2)

Cross Cutting Concepts

Patterns

- Similarities and differences in patterns can be used to sort and classify natural phenomena. (3-LS3-1)
- Patterns of change can be used to make predictions. (3-LS1-1)

Cause and Effect

- Cause and effect relationships are routinely identified and used to explain change. (3-LS3-2),(3-LS4-2)

Common Core State Standards

CCSS: English Language Arts	
Reading Informational Text	
RI.4.1	Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.
RI.4.7	Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears
CCSS: Writing-	
W.4.2	Write informative/explanatory texts to examine a topic and convey ideas and information clearly
CCSS: Speaking and Listening:	
SL.4.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 4 topics and texts, building on others' ideas and expressing their own clearly.
CCSS: Mathematics	
2.MD.10	Measurement and data: Represent and interpret data: Draw a picture graph and a bar graph (with single unit scale) to represent a data set with up to four categories.

Before beginning unit administer pretest.

Check that all materials are available, usable, and ready

INVESTIGATION 1

Origin of Seeds

Summary

Students will explore common fruits to find seeds. They will observe and compare properties of seeds and fruits. They will organize and communicate information about seeds. Students will set up a seed sprouter and maintain a watering schedule for a week. They will monitor and record changes I seeds over days. They will investigate the effect of water on seeds. They will compare the mass of dry seeds and those soaked in water. Students use scientific thinking processes to conduct investigations and build explanations: observing communicating comparing and organizing.

Core Conceptual Ideas

- Seeds are found in the plant part called a fruit
- Different kinds of fruits have different kinds and numbers of seeds
- Seeds have a variety of properties
- Seeds undergo changes in the presence of water
- A seed is an organism, a living thing
- Seeds store food and provide protection for the young plant

New Vocabulary

estimate, fruit, property, seed, dormant, mold, embryo, seed coat, cotyledon, adaptation

Assessments

(Should be scored in Genesis)

Pretest – No grade in Genesis

Embedded Assessment

Science Notebook Entry (minimum 4)
Student Response Sheets No. 2,3,4 and 5
Teacher Observation

Benchmark Assessment

• I-Check 1

Assessments Data –Propagated to Genesis

Pre Assessment – no grade
Notebook Investigation Entry Part 1
I-Check 1

PART 1

Investigation 1
Part 1 - “”

Summary

Seed Search: Students will start a seed hunt using various fruits. Students will locate the seeds, describe the seed properties, and estimate the number of seeds in each fruit.

Focus Questions

- Where do seeds come from?
- Where are seeds found on plants?

Teacher Preparation/Notes	Body Of Evidence	Est. Time
• Send Letter to Parents Home Student Sheet 1 ***BEFORE the start of the unit.*** • Download optional tool: Benchmark and I-Checks Assessment coding sheets at www.fossweb.com or curriculum page. • Kit preparation: see Teacher Guide, Materials, pp 1-6 • Teacher Preparation Video or DVD (or view at www.fossweb.com/ • Read Teacher Guide, Materials, p. 3 for Materials Supplied by the Teacher and Materials from the M&E Tool Kit Unit • Read TE “At A Glance”, “ • Review “ Materials” “Getting Ready” & “Guiding the Investigation” • Read Background for the Teacher and Teaching Children about the Structures of Seeds • Read Teacher Guide Science Stories Folio. Prepare materials	• Survey/Pre- Assessment • Notebook Investigation 1 Entry 1 • Student Sheet No. 2 • FOSS Science Stories: *Seeds Are Everywhere?* • Writing Prompt: Respond to Focus Questions • Journal Entry • Student Observation/ Anecdotal Notes Individual Work Scores sent to District Data to be recorded in Genesis	2 Sessions

Homework/Center Activities/Extra Practices

- Rising Readorium (20 min/night),
- Spelling City(vocab);
- FOSS Digital Resources: eBook, Audio Stories
- Suggested websites
- Word wall activities
- Cross Curriculum Extensions
- Informational Text–Reading
- Home School Connection. Student Sheet

Part 2

Investigation 1 ***Part 2–Investigation More Magnetic Properties***		
The Sprouting Seed: Students will use two different types of sprouting devices to investigate the effects of water on seeds.		
Focus Questions • Can a seed grow without soil? • What effect does water have on seeds?		
Teacher Preparation	**Body Of Evidence**	**Est. Time**
Read Teacher's Guide • " Materials" "Getting Ready" & "Guiding the Investigation Watch Video Demo of Inv.1 Part 2	• Notebook Investigation 1 Entry Part 2 • Reading: FOSS Student Stories: *The Most Important Seed?* • Writing Prompt: Respond to Focus Questions • Journal Entry • Assessment Chart for Investigation 1, Part 2 – Teacher Observation	2 sessions
Homework/Center Activities/Extra Practices		
• Rising Readorium (20 min/night), • Spelling City(vocab); • FOSS Digital Resources: eBook, Audio Stories • Suggested websites	• Word wall activities • Cross Curriculum Extensions • Informational Text–Reading • Math Extension, Student Sheet No. 29	
Culminating Activity		
TBA		

Part 3

Investigation 1 ***Part 3 – Breaking The Force***		
Seed Soak: Students will calculate and compare the mass of seeds that have been soaked and those that are dry to determine how much water a seed has soaked up...		
Focus Questions How much water does a seed soak up?		
Teacher Preparation	**Body Of Evidence**	**Est. Time**
Read Teacher's Guide • Review " Materials" "Getting Ready" & "Guiding the Investigation" Watch Video Demo of Inv.1 Part 3	• Notebook Investigation 1 Entry 3 • Student Sheet No. 6 • Reading: FOSS Student Stories: *Barbara McClintock?* • Writing Prompt: Respond to Focus Question • Journal Entry • Assessment Chart for Investigation 1, Part 3 – Teacher Observation	2 sessions
Homework/Center Activities/Extra Practices		
• Rising Readorium (20 min/night), • Spelling City(vocab); • FOSS Digital Resources: eBook, Audio Stories • Suggested websites	• Word wall activities • Cross Curriculum Extensions • Informational Text -Reading	
Culminating Activity		
TBA		

Investigation 2

"Growing Further"

Summary

Germination: Students will compare/contrast different seeds that have begun to germinate. Students will then begin to identify and describe the structures of a seed including seed coats, cotyledons, stems, leaves, embryos, and roots. Hydroponics: Students will begin to observe the growth of the bean seedlings in a hydroponics setup. Life Cycle of the Bean: Students grow their seedlings in a nutrient solution to observe their development through the life cycle. Students will also sequence through illustrations the different stages in the life cycle of the bean plant.

Concepts:

- .Germination is the onset of a seed's growth
- Plants need water, light, and nutrients to grow
- Hydroponics is the technique of growing plants in water
- The life cycle is the process of a seed growing into a mature plant, which in turn produces seeds.
- Fruit of the plant develops from the flower

New Vocabulary Investigation 2

Germination, organism, growth, seedling, root, stem, leaf, nutrient, hydroponics, flower, life cycle, change

Assessments	***Assessments Data –Propagated to Genesis***
(Should be scored in Genesis)	
Embedded Assessment	
Science Notebook Entry (minimum 4)	I Check 2
Student Response Sheets	Student Observation/ Anecdotal Notes
Teacher Observation	
Benchmark Assessment	
• I-Check 2	

Part 1

Investigation 2
Part 1: Germination

Summary

Students will compare/contrast different seeds that have begun to germinate. Students will then begin to identify and describe the structures of a seed including seed coats, cotyledons, stems, leaves, embryos, and roots

Focus Questions

- What effect does water have on the seeds in the minisprouter?
- How do the plants change over time?

Teacher Preparation	Body Of Evidence	Est. Time
Read Teacher's Edition • "At A Glance", "Background for the Teacher" & "Teaching Children About Growth and Life Cycles" pp 6-7 • " Materials" "Getting Ready" &"Guiding the Investigation" pp 8-13 **Watch** Video Demonstration of Inv. 2 Part1 **P**repare materials ***Note*** – schedule this to take place 7-8 days after starting seeds in the minisprouter. Seeds should be germinated, with the roots and stems emerging.	• Notebook Investigation 2 Entry 1 • Student Sheet No. 7 • Writing Prompt: Respond to Focus Questions • Journal Entry • Assessment Chart for Investigation 2, Part 1 – Student Sheet – Comparing Germinated seeds • Journal Entry	1 session

Homework/Center Activities/Extra Practices

- Rising Readorium (20 min/night)
- FOSS Digital Resources: eBook, Audio Stories
- Suggested websites
- Word wall activities
- Cross Curriculum Extensions
- Informational Text–Reading

Part 2

Investigation 2
Part 2 – Hydroponics

Summary

Students will begin to observe the growth of the bean seedlings in a hydroponics setup.

Focus Questions

- How can you grow plants without soil?
- What conditions do plants need in order to grow?

Teacher Preparation	Body Of Evidence	Est. Time
Read Teacher' Edition • " Materials" "Getting Ready" &"Guiding the Investigation" *Note*: conduct this part within a few days after part 1, when the leaves and stems on the bean seeds are apparent.	• Notebook Investigation 2 Entry 2 • Response Sheet No. 8 Growing further • Writing Prompt: Respond to Focus Questions • Journal Entry • Assessment Chart for Investigation 2, Part 2 – Response Sheet – Growing further	*1 session*

Homework/Center Activities/Extra Practices	
• Rising Readorium (20 min/night) • FOSS Digital Resources: eBook, Audio Stories • Suggested websites	• Word wall activities • Cross Curriculum Extensions • Informational Text -Reading
Culminating Activity: Continue to work on projects.	

Part 3

Investigation 2 ***Part 3 – Life Cycle of the Bean***		
Summary Students grow their seedlings in a nutrient solution to observe their development through the life cycle. Students will also sequence through illustrations the different stages in the life cycle of the bean plant.		
Focus Questions • What is the sequence of the bean plant's cycle?		
Teacher Preparation	**Body Of Evidence**	**Est. Time**
• Teacher Guide Inv. 2: Making Connections, pp. 20-21 • Teacher Guide Science Stories folio	• Notebook Investigation 2 Entry 3 • Student Sheets • Reading: FOSS Science Stories: • Writing Prompt: Respond to Focus Questions • Journal Entry • Assessment Chart for Investigation 2, Part 3 – Teacher Observation	*1 session*
Suggested Center **Activities:** Readorium, Spelling City, Foss suggested websites, word wall activities, extensions, additional supporting Science Activities,		
Culminating Activity: Continue to work on projects.		

INVESTIGATION 3

Investigation 3

"Meet the Crayfish"

Summary

Meet the Crayfish: Students will observe and record the structures and functions of crayfish through direct interaction. Crayfish Habitat: Students will set up crayfish habitats and begin to learn on how to care for and feed a living organism in the classroom. Crayfish at Home: Students investigate and observe the behavior of crayfish in their current habitat. Students will then observe any behavior changes as the habitat is changed with shelter added and the incorporation of other crayfish. Crayfish Territory: Students will perform on-going observations of the territorial behavior of crayfish.

Concepts

- Crayfish have observable structures such as legs, eyes, antennae, a carapace, swimmerets, a tail, pincers, and mouth parts.
- Crayfish have particular requirements for life, including clean, cool water, food, and shelter.
- Habitat is where an animal lives.
- Behavior is what an animal does.

New Vocabulary Investigation 3

Structure, crustaceans, antennae, bristles, carapace, swimmerets, pincers, elodea, habitat, behavior, territory, system, interaction

Assessments

(Should be scored in Genesis)

Embedded Assessment

Science Notebook Entry (minimum 3)
Student Response Sheets No.11, 12,13, 14, 15, & 16
Home school connection student sheet #30
Teacher Observation

Benchmark Assessment

• I-Check 3

Assessments Data –Propagated to Genesis

I Check 3

Homework/Center Activities/Extra Practices

- Rising Readorium (20 min/night)
- FOSS Digital Resources: eBook, Audio Stories
- Suggested websites
- Word wall activities
- Cross Curriculum Extensions- Math Extension,
- Informational Text -Reading

Part 1

Investigation 3
Part 1: Building a Series Circuit

Summary

Meet the Crayfish: Students will observe and record the structures and functions of crayfish through direct interaction with live crayfish through direct interaction with live crayfish. They learn firsthand how to hand them carefully so that no harm will come to the crayfish.

Focus Question

- What are the structures of a crayfish?

Teacher Preparation	Body Of Evidence	Est. Time
Read Teacher Guide • Review " Materials" "Getting Ready" & "Guiding the Investigation" • Read "Background for the Teacher" and " Teaching Children about Crayfish" • Watch Video Demonstration of Inv. 3 Part1 • Teacher Guide Science Stories folio • Prepare materials	• Notebook Investigation 3 Entry 1 • Student Sheet No. 13 • Writing Prompt: Respond to Focus Questions • Journal Entry • Assessment Chart for Investigation 3, Part 1 ***NOTE***: Classroom Vignette is included in this lesson (Taking the Time to Find Out)	1-2 sessions

Homework/Center Activities/Extra Practices

- Rising Readorium (20 min/night)
- Spelling City(vocab);
- FOSS Digital Resources: eBook, Audio Stories
- Suggested websites
- Word wall activities
- Cross Curriculum Extensions
- Informational Text–Reading
- Home School Connection, Student Sheet No. 36

Part 2

Investigation 3:
Part 2. Crayfish Habitat

Summary

Students will set up crayfish habitats and begin to learn on how to care for and feed a living organism in the classroom.

Focus Question

What do we need to think about in order to build a suitable habitat for crayfish in the classroom?

Teacher Preparation	Body Of Evidence	Est. Time
• Review "Materials" and "Getting Ready" & Guiding the Investigation" • Watch Video Demo of Inv.3 Part 2	• Notebook Investigation 3 Entry 2 • Student Sheets No. 13-15 • Response Sheet No. 16 • Writing: Respond to Focus Questions • Journal Entry • Reading: FOSS Science Stories: *Answering Kid's Questions: Crayfish, Crawfish, Crawdaddy* • Assessment Chart for Investigation 3	*4 sessions*

Homework/Center Activities/Extra Practices	
• Rising Readorium (20 min/night) • Spelling City(vocab); • FOSS Digital Resources: eBook, Audio Stories • Suggested websites	• Word wall activities • Cross Curriculum Extensions-Math Extension, • Informational Text–Reading

Part 3

Investigation 3: ***Part 3. Crayfish at Home***		
Summary Crayfish at Home: Students investigate and observe the behavior of crayfish in their current habitat. Students will then observe any behavior changes as the habitat is changed with shelter added and the incorporation of other crayfish.		
Focus Question What do crayfish do when something happens to them?		
Teacher Preparation	**Body Of Evidence**	**Est. Time**
• *Watch Video Demo of Inv.3 Part 3* • *Review "Materials" and "Getting Ready"*	• Notebook Investigation 3 Entry 3 • Student Sheets #14, #15 • Assessment Chart for Investigation 3, Part 3 – Teacher Observations and Student Sheet • Writing: Respond to Focus Questions • Journal Entry	*1 session*

Homework/Center Activities/Extra Practices	
• Rising Readorium (20 min/night) • Spelling City(vocab); • FOSS Digital Resources: eBook, Audio Stories • Suggested websites	• Word wall activities • Cross Curriculum Extensions • Informational Text –Reading • Math Extension, Student Sheet No. 31

Part 4

Investigation 3: ***Part 4. Crayfish at Home***		
Summary Students will perform on-going observations of the territorial behavior of crayfish.		
Focus Question • Does each crayfish have its own house that it always goes to? • How can we keep track of crayfish movements over many days?		
Teacher Preparation	**Body Of Evidence**	**Est. Time**
• *Watch Video Demo of Inv.3 Part 4* • *Review "Materials" and "Getting Ready"*	• Notebook Investigation 3 Entry 4 • Student Sheet #16 • Assessment Chart for Investigation 3, Part 3 – Teacher Observations and Student Sheet • Writing: Respond to Focus Questions • Journal Entry • Reading: FOSS Science Stories: *Life Cycle of a Crayfish, Life on Earth, and A Change in the Environment*	*2 -20 min. sessions with four or more 5 min. observations in between*

	• I Check 3	

Homework/Center Activities/Extra Practices

- Rising Readorium (20 min/night)
- Spelling City(vocab);
- FOSS Digital Resources: eBook, Audio Stories
- Suggested websites
- Word wall activities
- Cross Curriculum Extensions
- Informational Text –Reading
- Math Extension, Student Sheet No. 31

INVESTIGATION 5

Investigation 5

Bess Beetles

Summary

Students observe Bess beetles and learn how to handle them carefully. They become familiar with beetle structures and behaviors. They are introduced to the habitat that will provide for the needs of the beetles in the classroom.

Concepts

- Bess beetles are insects, with six legs, three body parts, antennae, and a variety of other structures.
- Bess beetles need water, food, air and space
- The structures found on different kinds of organisms sow some similarities and some differences
- An organism's structures have functions that help it survive in its habitat
- We must take care not to harm animals as we learn about them.

New Vocabulary Investigation 5

Bess beetle, insect, thorax, abdomen, head, mite, terrarium, Venn diagram, function, balance, pattern

Assessments

(Should be scored in Genesis)

Embedded Assessment

Science Notebook Entry (minimum 3)
Student Response Sheets No. 31, -33 & 20
Teacher Observations

Benchmark Assessment

• I-Check 4

Assessments Data Due for District Analysis

I Check 5

Part 1

Investigation 5
Part 1: Bess Beetles at Home

Summary

Students observe Bess beetles and learn how to handle them carefully. They become familiar with beetle structures and behaviors. They are introduced to the habitat that will provide for the needs of the beetles in the classroom.

Focus Questions

- What structures do Bess beetles have?
- What does a Bess beetle need in its habitat?

Teacher Preparation	Body Of Evidence	Est. Time
Read TE • "At A Glance", "-Background for the Teacher"& "Teaching Children About Bess Beetles" • " Materials" "Getting Ready" &"Guiding the Investigation" Watch Video Demonstration of Inv. 5 Part1 Prepare materials	• Notebook Investigation 5 Entry 1 • Reading: FOSS Science Stories: *The Life of Bess Beetles* • Assessment Chart for Investigation 5, Part 1 – Teacher Observation • Writing Prompt: Respond to Focus Question • Journal Entry	1-2 sessions

Homework/Center Activities/Extra Practices

- Rising Readorium (20 min/night)
- Spelling City(vocab);
- FOSS Digital Resources: eBook, Audio Stories
- Suggested websites
- Word wall activities
- Cross Curriculum Extensions
- Informational Text –Reading
- Home School Connection, Student Sheet No. 37

Part 2

Investigation 5
Part 2: Comparing Crayfish and Beetles

Summary

Students observe and record a beetle's structures and behaviors. Using a Venn diagram, they compare crayfish and beetle structures. Finally, they discuss the functions of the various structures.

Focus Questions

- How are the structures of the beetle and crayfish alike and how do they differ?

Teacher Preparation	Body Of Evidence	Est. Time
Read TE • " Materials" "Getting Ready" &"Guiding the Investigation" Watch Video Demonstration of Inv. 5 Part2 Prepare materials	• Notebook Investigation 5 Entry2 • Student Sheet No. 32 & 33 and Response Sheet No. 20 • Reading: FOSS Science Stories: *A Snail's Journey; Crayfish, Snails, and Kids* and *The Food Web* • Writing Prompt: Respond to Focus Questions • Journal Entry • Assessment Chart for Investigation 5, Part 2 – Teacher Observation	2 sessions

Homework/Center Activities/Extra Practices

- Rising Readorium (20 min/night)
- Spelling City(vocab);
- FOSS Digital Resources: eBook, Audio Stories
- Suggested websites
- Word wall activities
- Cross Curriculum Extensions- Math Extension, Student Sheet No. 32
- Informational Text –Reading
- Home School Connection, Student Sheet No. 37

Part 3

Investigation 5
Part 3: The Beetle Pull

Students attach loads to the beetles, using a dental-floss harness. They discover how much mass a beetle can pull and compare the load to the mass of the beetle itself. Students discuss what is important to consider when planning investigations of animals to ensure no harm comes to the animals.

Focus Questions

- How much mass can a beetle pull?
- What is important to consider when planning investigations of animals?

Teacher Preparation	Body Of Evidence	Est. Time
Read TE • " Materials" "Getting Ready" &"Guiding the Investigation" Watch Video Demonstration of Inv. 5 Part 3 Review Prepare materials	• Notebook Investigation 4 Entry 3 • Student sheet 20 • Reading: Magnets and Electricity in Your Life, pages 28-33. /Looking through Telescopes pg. 40-43 • Writing Prompt: Respond to Focus Questions • Journal Entry • Assessment Chart for Investigation 4, Part 3 –Teacher Observation and Electromagnet Investigation • I Check 4	1 session

Homework/Center Activities/Extra Practices

- Rising Readorium (20 min/night)
- Spelling City(vocab);
- FOSS Digital Resources: eBook, Audio Stories
- Suggested websites
- Word wall activities
- Cross Curriculum Extensions
- Informational Text –Reading
- Home School Connection, Student Sheet

Resources

FOSS Website:
www.fossweb.com (additional resources and web sites found there)

Spelling City:
www.spellingcity.com

United Streaming Videos
http://www.discoveryeducation.com//?ref=streaming&returnUrl=http%3A%2F%2Fstreaming%2Ediscoveryeducation%2Ecom%2Findex%2Ecfm

Brainpop (see if your school has license for this)
http://www.brainpopjr.com/

Content books-

- FOSS Student Book with Unit
    - FOSS Science Stories: Investigation 1: Part 1 – Seeds are Everywhere (page 1-4) Copyright 2008 Delaware Department of Education Page 13 of 13 Part 2 – The Most Important Seed (page 4-5) Part 3 – Barbara McClintock (page 6-9) Investigation 2: Part 2 – Hydro-growing (page 10-11) Part 3 – Seeding Space (page 12-16) Investigation 3: Part 2 – Answering Kids Questions: Crayfish, Crawfish, Crawdaddy (page 17-19) Part 3 – Life Cycle of a Crayfish (page 20-21)
- See Reading Extensions in TE
- FOSS Reading Supplemental Books
- Magnetism and Electricity Series

Body of Evidence

This guide is intended to support the collection of a Body of Evidence. A student's Body of Evidence should, at a minimum, include work form the listed prompts and in-class investigations that demonstrate a student's level of proficiency. The FOSS pre-assessment given at the beginning of the unit, the I-checks given after each investigation and Grade 4 DISTRICT Earth Science Benchmark Assessment given at the end of the unit (Post-assessment) may also be included in the body of evidence.