Science Unit 1- Plan

Unit Length:
16 Weeks

Grade 5

Diversity of Life
Unit Plan

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Science Unit 1
Food and Nutrition
Grade 5
Marking Period 1

Unit Overview

Students are able to recognize that living things can be subdivided into smaller groups. As an introduction to the formal biological classification system, students will focus on plants, animals, and microorganisms. Students will have the opportunity to learn about an increasing variety of living organisms, both familiar and exotic, and will become more precise in identifying similarities and differences among them.

Primary Interdisciplinary Connections: writing, math, reading, social studies, technology
21st Century Theme: Global Awareness

Unit Rational

Students will be involved in closely observing living things (plants, animals and microorganisms), noting their features, and constructing classification schemes that group organisms with like features together. They will also be introduced to formal classification schemes by focusing mainly on some animal classifications. Students will gain an appreciation for the diversity of life in their local habitat, in their province, in the world, and through fossil studies, over time.

UNIT GOALS

The FOSS Diversity of Life Course emphasizes the use of knowledge and evidence to construct explanations for the structures and functions of living organisms. Students observe and maintain protists, plants, and animals in the classroom and study their characteristic features. The study progresses from macroscopic to microscopic observation to discover the fundamental unit of life, the cell. Students then investigate organism subsystems and behaviors and consider their diversity of adaptive structures and strategies.

Unit Essential Questions:

- How are living things different from non-living things?
- How are the structures (parts) of living things related to the jobs they do?
- How are living things composed of cells?
- What must all living things do or have in order to survive?
- How are living things similar to each other and how are they different?
- How can we learn more about living things?
- How do organisms meet their basic needs?

Enduring Understanding:

Students will understand that…..

- Living things have definite characteristics that distinguish them from non-living things.
- The structures present in living things are related to the functions performed by those structures.
- The cell is the basic unit of life.
- Living things need appropriate environments to survive.
- Living things are highly diverse: there are millions of species of plants, animals, and microorganisms.
- Water is the basis of life on Earth.
- We learn more about living things through the use of careful and ethical observation, investigation, and technological tools.
- H. All living things have the same basic needs which are met through a variety of structures and behaviors.

Knowledge:	***Skills:***

Students will know….	***Student will be able to ….***
• Living systems at all levels of organization demonstrate the complementary nature of structure and function. Important levels include cells, tissues, organs, organ systems, and whole organisms. • All organisms are composed of cells—the fundamental unit of life. Most organisms are single cells; other organisms are multi-cellular. • Cells carry on the many functions needed to sustain life. • Specialized cells perform specialized functions in multi-cellular organisms. • All organisms must be able to obtain and use resources, grow, reproduce, and maintain stable internal conditions while living in a constantly changing external environment. • Behavior is one kind of response an organism can make to an internal or environmental stimulus. • Millions of species of animals, plants, and microorganisms are alive today. • Technology influences society through its products and processes. • Scientists formulate and test their explanations of nature, using observations, experiments, and models. Although all scientific ideas are tentative and subject to change and improvement in principle, for most major ideas in science, there is much experimental and observational confirmation.	• Identify questions that can be answered through Scientific investigations. • Design and conduct a scientific investigation. • Use appropriate tools and techniques to gather, analyze, and interpret data. • Develop descriptions, explanations, predictions, and models using evidence. • Recognize and analyze alternative explanations and predictions. • Communicate scientific procedures and explanations.

Evidence of Understanding:

Pre- Assessment
Investigation 1: What is Life?
KINGDOMS NOTES/LESSON, 5 KINGDOM CARD SORT
5 Materials Observation Lab Sheet Evaluation
Life in Different Environment Lab Sheet Evaluation, Mid Sum Exam 1
Activity Journal
Investigation 2: Introduction to the Microscope
Microscope Quiz
Microscope Images Lab Sheets Evaluation, Field of View Lab Sheet Evaluation
Focal Plane Lab Sheet Evaluation, Brine Shrimp Alive Lab Sheet Evaluation
Mid Sum Exam 2
Activity Journal
Investigation 3: Microscopic Life
Looking at Elodea Lab Sheet Evaluation, Paramecia Lab Sheet Evaluation
Feeding Time Lab Sheet Evaluation, Microscopic Life Response Sheet
Protists Lab Sheets Evaluations, Activity Journal,

Mid Exam 3 Revised
Mid Assessment
Investigation 4: The Cell
Cheek Cell Lab Sheet Evaluation
Activity Journal
Investigation 5: Seeds of Life
Seed Dissection Lab Sheet
Seed Sprouter Lab Sheet – Roots and Shoots
Seeds of Life Response Sheet
Mid Sum Exam 5
Investigation 6: Transpiration
Celery Investigation Plan Wandering Jew/Elodea Observation
Mid Sum Exam 6
Investigation 7: Plant Reproduction
Flower Dissection Lab Sheet Evaluation, Flower Dissection Mount
Mid Sum Exam 7
Investigation 9: Roaches
Cockroach Lab Report
Mid Sum Exam 9
Final Assessment

Notebook and Journal Entries
Writing Prompts
Performance Assessments
Reading Prompt
Teacher Observations/Anecdotal Notes

- Assess ability to hypothesize orally and in writing
- Assess ability to draw conclusions from experimentation
- Observations of small group activities
- Student and teacher rubrics to assess collaboration with others

Homework
Mid Exams Assessments
Unit Assessment

Preconceptions /Misconceptions

Cells

- All cells are same shape and size
- There are no single-celled organisms
- Some living parts of an organism are not made of cells
- Plants are not made of cells
- Cells of bacteria or living organism do not make molecules for their own growth and repair
- Plant/animal/bacteria cells do not extract their own waste
- Cells do not need a way to eliminate waste materials to function
- Cells are not organized into the body structures of the organism they are part of
- Animal cells do not carry out essential life functions for themselves
- Cells do not need water to function
- The interior of a cell is: filled with water, is solid, or with air.

List other that you discover in your class:

_____

_____
_____
_____

Plants

- Seeds are not alive
- Plants take in all substances they need to grow through their roots
- Plants get their energy from the soil through roots.
- Plants breathe by inhaling carbon dioxide and exhaling oxygen

List other that you discover in your class:

_____
_____
_____
_____

Before beginning unit administer pretest. (Week of 3/2/2015) Check that all materials are available, usable, and ready

Standards Addressed in Unit 1
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.
5.3.6.A.2	Essential functions of plant and animal cells are carried out by organelles
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.
5.3.6.D.1	Reproduction is essential to the continuation of every species; Molecular building blocks from which needed materials are assembled.

Next Generation Science Standards

Performance Expectations
• MS-LS1-1. Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells. • MS-LS1-2. Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function. • MS-LS1-4. Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively
NGSS Science and Engineering Practices
• Developing and Using Models Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems. ♣ Develop and use a model to describe phenomena. (MS-LS1-2) • Planning and Carrying Out Investigations Planning and carrying out investigations in 6-8 builds on K- 5 experiences and progresses to include investigations that use multiple variables and provide evidence to support explanations or solutions. ♣ Conduct an investigation to produce data to serve as the basis for evidence that meet the goals of an investigation. (MS-LS1-1) • Engaging in Argument from Evidence Engaging in argument from evidence in 6–8 builds on K–5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world(s). ♣ Use an oral and written argument supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem. (MS-LS1-4)
Disciplinary Core Ideas
• LS1.A: Structure and Function ♣ All living things are made up of cells, which is the smallest unit that can be said to be alive. An organism may consist of one single cell (unicellular) or many different numbers and types of cells (multicellular). (MS-LS1-1) ♣ Within cells, special structures are responsible for particular functions, and the cell membrane forms the boundary that controls what enters and leaves the cell. (MS-LS1-2) • LS1.B: Growth and Development of Organisms ♣ Animals engage in characteristic behaviors that increase the odds of reproduction. (MS-LS1-4) ♣ Plants reproduce in a variety of ways, sometimes depending on animal behavior and specialized features for reproduction. (MS-LS1-4)
Cross Cutting Concepts
• Scale, Proportion, and Quantity ♣ Phenomena that can be observed at one scale may not be observable at another scale. (MS-LS1-1) • Structure and Function ♣ Complex and microscopic structures and systems can be visualized, modeled, and used to describe how their function depends on the relationships among its parts, therefore complex natural structures/systems can be analyzed to determine how they function. (MS-LS1-2) • Cause and Effect ♣ Phenomena may have more than one cause, and some cause and effect relationships in systems can only be described using probability. (MS-LS1-4)

Common Core State Standards

CCSS: English Language Arts	
Reading Informational Text	
RI.5.1	Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.
RI.5.2	Determine two or more main ideas of a text and explain how they are supported by key

	details; summarize the text.
RI.5.1	Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text.
	CCSS: Writing-
W.5.1	Write opinion pieces on topics or texts, supporting a point of view with reasons and information
W.5.2	Write informative/explanatory texts to examine a topic and convey ideas and information clearly
	CCSS: Speaking and Listening:
SL.5.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grade 5 topics and texts*, building on others' ideas and expressing their own clearly.
SL.5.2	Summarize a written text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally
SL.5.3	Summarize the points a speaker makes and explain how each claim is supported by reasons and evidence.
	CCSS: Mathematics
5.MD.A.1	Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems
5.MD.B.2	Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots.

Overview Investigation 1 – What is Life?

Summary

Organisms are any living things that meet the characteristic properties of: gas exchange, water usage, energy usage, eliminating waste, responding, growing, and reproduction

Core Conceptual Ideas	***Performance***
• All organisms have needs of: gas exchange, water, energy, and the elimination of waste. • All organisms engage in functions of: response, growth, and reproduction. • Any free-living thing- plant, animal, or other- is an organism. • All living organisms exhibit common characteristics; they grow, consume nutrients, exchange gases, respond to stimuli, reproduce, need water, eliminate waste, and are composed of cells.	• Differentiate between living, non-living, dead, and dormant things. • Defend classification of objects based on whether they are living or not. • Conduct an investigation to determine whether unknown objects are living or non-living
New Vocabulary Dormant, Dead, Living, Non-Living, Organism	***Language Development*** Polyacrylate crystals, brine shrimp
Extensions Science Extension • modify the environment	***Assessments*** **Pre-Assessment** • Survey Embedded Assessment - • Science Notebook • *Lab notebook pg 6* Benchmark Assessment • *Mid-summative exam 1*

Focus Questions

- How can we distinguish life from non-life?
- What is Life?
- What evidence do we have of life?
- How can we test objects to determine if they are living organisms?

Teacher Preparations	Body of Evidence	Time Frame
-Read "At A Glance" TE -Read "-Scientific and Historical Background for the Teacher" -Read "Why Do I Have To Learn This?" -Review " Materials", "Getting Ready" and "Guiding the Investigation" -View Teacher Prep video -Prepare materials Note: some materials may take several days to be prepared, check and plan ahead Scores sent to District Data to be recorded in Genesis	-Pre- Assessment -Notebook Investigation Entry - Reading: *Life on Earth, pg 21* -Writing Response -Journal Entry -Student Observation/Anecdotal Notes -Homework (Suggestions) - Cross Curriculum -Extensions - Readorium	3 sessions 1 session = 90 minutes

Suggested Center Activities: Readorium computer time, Foss suggested websites, word wall activities, extensions, additional supporting Science Activities, Spelling City

Culminating Activity: Students should begin planning and working on culminating project.

Overview Investigation 2 - Introduction to the Microscope Parts 1-3

Summary

Introduction to the microscope acquaints students with the microscope as a tool used by scientists to study organisms in detail.

Core Concepts:	***Performance:***
• Optical microscopes are a two lens system that magnifies an image. In so doing, the image is reversed and upside down. • How focal planes, field of view, and slide movement interact to impact objects viewed under a microscope. • Optical power or total magnification is a product of the magnification properties of both lenses in a microscope.	• Measure the field of view of a microscope at various magnifications. • Estimate and measure the size of objects placed under a microscope at different magnifications. • Draw scale representations of objects viewed under a microscope at different magnifications. • Calculate optical power (total magnification) of a microscope. • Demonstrate proper usage of a microscope in a variety of situations. • Demonstrate techniques of dry mount and wet mount slides.
New Vocabulary Eyepiece, ocular lens, body tube, base, arm, fine adjustment, course adjustment, stage clips, diaphragm, light source, revolving nosepiece, objectives/LENSES, scanning lens	***Language Development***
Extensions Science: Maintain brine shrimp	***Assessments*** Embedded Assessment - • Science Notebook • *Lab notebook pg 7, 9, 11, 12, 13* Benchmark Assessment *Mid-summative exam 2*

Focus Questions

- What are microscopes and how do they function as a scientific tool?
- What are the parts and functions of a microscope?
- How do we properly use a microscope?
- What are some patterns we can recognize from viewing an object under a microscope?
- What is the "Field of View"?
- What is a focal plane?
- What is optical power?
- How can we apply microscope techniques to a living organism?

Teacher Preparation	Body of Evidence	Time Frame
-Set up materials for the week - Read "-Scientific and Historical Background for the Teacher" -Read "Why Do I Have To Learn This?" -Watch Teacher Video Demo of Inv.2 - Review "Materials" and "Getting Ready"	-Notebook Investigation Entry Student resource book: *The Lowly Paramecium*, pg 24 -Journal Entry -Student Observation/Anecdotal Notes -Homework (Suggestions) - Cross Curriculum Extensions - Readorium -Mid-Summative Exam 2	3sessions

Suggested Center Activities: Spelling City, Foss suggested websites, word wall activities, extensions, additional supporting Science Activities, **Readorium** Computer time
Culminating Activity: Continue working on culminating project.

<table>
<tr><th colspan="2"><u>Overview Investigation 3 – “Microscopic Life” Parts 1-3</u></th></tr>
<tr><td colspan="2"><u>Summary</u>
Students discover cells and begin to understand their importance as the basic units of life.</td></tr>
<tr><td><u>Core Concepts:</u>
The cell is the basic unit of life.
Cells have the same needs and perform the same functions as more complex organisms.
Some organisms are microscopic and single celled while others are multi-celled.
Microscopic organisms display diversity.</td><td><u>Performance:</u>
Generate evidence that paramecium are single celled, living organisms.
Describe differences between living cells that are organisms and living cells that are NOT organisms.
Modify the characteristics of life to include cells.</td></tr>
<tr><td><u>New Vocabulary</u>
Elodea, prokaryotic, eukaryotic, cells, dependent cells, single celled, independent, membrane, cilia, oral grove, nucleus, vacuole, organelles, protists, water expelling vacuoles</td><td><u>Language Development</u>
There are key terms associated with microscopic life.</td></tr>
<tr><td><u>Extensions</u>
Science Extension
• model paramecium feeding</td><td><u>Assessments</u>
Embedded Assessment -
• Science Notebook
• Lab notebook pgs 15 -17, 19 - 21, 23, 25
Benchmark Assessment
Mid-summative exam 3</td></tr>
<tr><td colspan="2"><u>Focus Questions</u>
What evidence of life can we find through cells?
What are cells and what evidence do we have of them from Elodea?
What are cells and what evidence do we have of them from Paramecium?
What are Protists and how do they reflect the diversity of life?</td></tr>
<tr><td colspan="2"><table>
<tr><th>Teacher Preparation</th><th>Body of Evidence</th><th>Time Frame</th></tr>
<tr><td>-Read “At A Glance” TE
-Read “Scientific and Historical Background for the Teacher”
-Read “Why Do I Have To Learn This?”
- Watch Video Demonstration of Inv. 3
-Review “ Materials” “Getting Ready” and “Guiding the Investigation”
-Prepare materials</td><td>-Notebook Investigation Entry
DOL Student resource book: The Lowly Paramecium, pg 24
-Journal Entry
-Student Observation/ Anecdotal Notes
-Homework (Suggestions)
- Cross Curriculum
-Extensions
- Readorium
Mid-summative exam 3</td><td>3-4 sessions</td></tr>
</table></td></tr>
<tr><td colspan="2">Suggested Center Activities: Spelling City, Foss suggested websites, word wall activities, extensions, additional supporting Science Activities, Readorium Computer time</td></tr>
<tr><td colspan="2">Culminating Project: Continue monitoring student progress of projects.</td></tr>
</table>

Overview Investigation 4 – "The Cell" Parts 1-2

Summary

The cell teaches students to recognize cells as the basic unit of life and to appreciate the diversity of cells that contribute to the diversity of life on earth.

Core Concepts:	***Performance:***
• Cells are the basic unit of all life. • Cells have defining patterns or structures, such as membranes, cell walls, nuclei, chloroplasts, ribosomes, mitochondria, and cytoplasm • Cells exhibit diversity based on their structure and function. • A major subdivision in cells is whether they have a nucleus (eukaryotic) or not (prokaryotic). • Bacteria are made of prokaryotic cells, all other life is made of eukaryotic cells. • Humans and other complex life forms are made of cells. • Multi-celled organisms have an inherent structural organization from atoms, molecules, organelles, cells, tissues, organs, organ systems, multi-celled organisms. • All life is aquatic at the cellular level	• Prepare a wet mount slide of a human cheek cell to observe that humans are made of cells. • Obtain information about cellular and organism organization to develop an understanding of how complex organisms are organized via the Internet and textbooks.
New Vocabulary Prokaryotic, eukaryotic, plant cell, animal cell, nucleus, cytoplasm, cell membrane, cell wall, mitochondria, chloroplasts, ribosomes, vacuoles, atoms, molecules, organelles, cells, tissues, organs, organ systems, organisms	***Language Development*** Wet mount for slides
Extensions Language Extension • make posters	***Assessments*** Embedded Assessment • Science Notebook Notebook pgs 27, 28, 29 Benchmark Assessment • Mid-Summative Exam 4

Focus Questions

- What are the basic units of life and how are those units organized to form complex organisms?
- What makes up a human, and other complex organisms?
- What are the two major subdivisions of cells?
- What are the defining structures of cells?
- How are complex organisms organized from atoms to an organism?
- Why is the cell considered the basic unit of life?
- Why is life aquatic?

Teacher Preparation	Body of Evidence	Time Frame
-Prepare materials for the week. - Read "At A Glance" TE -Read "Scientific and Historical Background for the Teacher" -Read "Why Do I Have To Learn This?" *-Read Getting Ready and Guiding the Investigation* *-Watch Teacher Video Demo of Inv.4* *- Review "Materials"* *-Administer and Record information from*	*-Notebook Investigation Entry* *-Reading in Science Resource Cell: Basic Unit of Life pg 27* *-Journal Entry* *-Student Observation/Anecdotal Notes* *-Homework (Suggestions)* *- Cross Curriculum Extensions* *- Rising Readorium* • Mid-Summative Exam 4	*3 sessions*

assessments		
Suggested Center Activities: *Spelling City, Foss suggested websites, word wall activities, extensions, additional supporting Science Activities,* ***Readorium*** *Computer time*		
On Going Project: Students work on a culminating project through-out the unit to be assessed at the end of unit.		

Overview Investigation 5 – "Seeds of Life" Parts 1-3

Summary

Students recognize that seeds are living organisms in a dormant state. They will alsio observe and describe the first development stages of a plant.

Core Concepts:	***Performance:***
• Seeds contain the dormant, living embryo of a plant. • Germination is the onset of growth and differentiation in plants. • Growing roots typically have a root tip where cell division takes place, a zone of elongation, and a zone of maturation where root hairs develop. • The cotyledon is the primary source of energy for seed germination. • Seeds must be dispersed from the parent so they don't compete for resources. • The role of cotyledons in early plant growth. • The development and function of roots in early plant growth. Plants have a variety of adaptations to disperse their seeds.	• Dissect seeds to discover their structures and functions. • Observe germinating seeds to determine their sequence of development. • Use good lab procedures and data recording to investigate the early development of two groups of complex plants, monocots and dicots. • Investigate the effects of light on germinating seeds. • Identify seed dispersal methods.
New Vocabulary Cotyledon, seed coat, embryo, germination, zone of elongation, zone of maturation, root hairs, root cap, xylem, phloem, monocot, dicot, dispersal	***Language Development*** Chlorophyll, pigment
Extensions	***Assessments*** Embedded Assessment • Science Notebook Notebook pgs 27, 28, 29 Benchmark Assessment • Mid-Summative Exam 5

Focus Questions

- How do organisms grow, develop, and increase their structural complexity through differentiation?
- What evidence do we have that seeds are living organisms?
- What are the parts of a seed?
- What is germination and how is it sequenced?
- What are cotyledons and how do they aid in germination?
- What are the structures & functions of roots?
- How does light effect the germination of roots?
- How can we compare and contrast monocots & dicots?
- What are methods and reasons for seed dispersal?

Teacher Preparation	**Body of Evidence**	**Time Frame**

-Prepare materials for the week. - Read "At A Glance" TE -Read "Scientific and Historical Background for the Teacher" -Read "Why Do I Have To Learn This?" *-Read Getting Ready and Guiding the Investigation* *-Watch Teacher Video Demo of Inv.5* *- Review "Materials"* *-Administer and Record information from assessments*	*-Notebook Investigation Entry* - Student reading*: Cell: Basic Unit of Life pg 27* *-Journal Entry* *-Student Observation/Anecdotal Notes* *-Homework (Suggestions)* *- Cross Curriculum Extensions* *- Readorium* Mid-Summative Exam 5	*3 sessions*
Suggested Center Activities: *Spelling City, Foss suggested websites, word wall activities, extensions, additional supporting Science Activities,* ***Readorium*** *Computer time*		
On Going Project: Students work on a culminating project through-out the unit to be assessed at the end of unit.		

Overview Investigation 6 – "Transpiration" Parts 1-3

Summary

Transpiration teaches students how the vascular system transports water through a plant and how stomas on leaves regulate the rate of water flow through a plant.

Core Concepts:	***Performance:***
• A plant is a system that is comprised of tissues and cells that allow vital life functions to occur. • Through experimentation, we can observe and explain evidence of water flow (transpiration) through a plant and is directly influenced by specialized plant parts and natural events. • The basic mechanisms of photosynthesis and respiration	• Describe the flow of water from entering to leaving a plant. • Explain how stomates regulate the flow of water in a plant. • Relate transpiration as a component of the water cycle. • Identify products and reactants in photosynthesis and respiration
New Vocabulary Vascular Bundles, xylem, stomates, guard cells, cuticle, phloem, transpiration, photosynthesis, respiration	***Language Development*** water cycle
Extensions Language Extension	***Assessments*** Embedded Assessment • Science Notebook Notebook pgs 39 Benchmark Assessment • Mid-Summative Exam 6

Focus Questions

- How can we explain how water flows through a plant?
- Where does water go in a plant?
- What role do leaves play in plant water flow?
- What is a plant's role in the water cycle?
- What is the relationship between photosynthesis and respiration?

Teacher Preparation	Body of Evidence	Time Frame
-Prepare materials for the week. - Read "At A Glance" TE -Read "Scientific and Historical Background for the Teacher" -Read "Why Do I Have To Learn This?" *-Read Getting Ready and Guiding the Investigation* *-Watch Teacher Video Demo of Inv.6* *- Review "Materials"* *-Administer and Record information from assessments*	*-Notebook Investigation Entry* *-Reading in Science Resource "Stems and Leaves" pg 35* *-Journal Entry* *-Student Observation/Anecdotal Notes* *-Homework (Suggestions)* *- Cross Curriculum Extensions* *- Readorium* *Mid-Summative Exam 6*	*4 sessions*

Suggested Center Activities: *Spelling City, Foss suggested websites, word wall activities, extensions, additional supporting Science Activities,* ***Readorium*** *Computer time*

On Going Project: Students work on a culminating project through-out the unit to be assessed at the end of unit.

<table>
<tr><th colspan="3">Overview Investigation 7 – “Plant Cell Reproduction” Parts 1-2</th></tr>
<tr><td colspan="3">Summary
Students investigate the reproductive systems in flowers to understand the origin of seeds, and to explore plant adaptations for seed dispersal.</td></tr>
<tr><td colspan="2">Core Concepts:
• A flower’s structure is related to its function.
• Pollination is a step that precedes fertilization.
• Seed production and dispersal are key to a plant’s survival.</td><td>Performance:
• Explain the function of flowers and pollination
• Describe the production of seeds as a means of sexual reproduction.
• Explain seed dispersal mechanisms as they contribute to a plant’s survival.</td></tr>
<tr><td colspan="2">New Vocabulary
Reproduction, Sexual Reproduction, Petals, Sepals, Stamens, Filament, Anther, Pollen grains, Sperm, Pistil, Stigma, Ovary, Ovules, Eggs, Fertilize, Pollination, Fruit, Seed Dispersal</td><td>Language Development
collection</td></tr>
<tr><td colspan="2">Extensions
Language Extension
• make posters</td><td>Assessments
Embedded Assessment
• Science Notebook
Notebook pgs 41-43, 45, 47,
Benchmark Assessment
• Mid-Summative Exam 7</td></tr>
<tr><td colspan="3">Focus Questions
• What are the structures & functions of flowers?
• What is pollination and how does it differ from fertilization?
• How and why are seeds dispersed?</td></tr>
<tr><th>Teacher Preparation</th><th>Body of Evidence</th><th>Time Frame</th></tr>
<tr><td>-Prepare materials for the week.
- Read “At A Glance” TE
-Read “Scientific and Historical Background for the Teacher”
-Read “Why Do I Have To Learn This?”
-Read Getting Ready and Guiding the Investigation
-Watch Teacher Video Demo of Inv.7
- Review “Materials”
-Administer and Record information from assessments</td><td>-Notebook Investigation Entry
-Reading in Science Resource “Flowers to Seed” pg 40
-Journal Entry
-Student Observation/Anecdotal Notes
-Homework (Suggestions)
- Cross Curriculum Extensions
- Readorium
Mid-Summative Exam 7</td><td>3 sessions</td></tr>
<tr><td colspan="3">Suggested Center Activities: Spelling City, Foss suggested websites, word wall activities, extensions, additional supporting Science Activities, Readorium Computer time</td></tr>
<tr><td colspan="3">On Going Project: Students work on a culminating project through-out the unit to be assessed at the end of unit.</td></tr>
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Overview Investigation 9 – "Roaches" Parts 1-3

Summary

Roaches investigation introduces the concept of adaptation by pointing out the structures and behaviors of an insect and relates those adaptations to the roach's natural history and habitat.

Core Concepts:	***Performance:***
• That insects are highly adapted and belong to a group of invertebrates called arthropods • Insects have three body parts, six legs, antenna and an exoskeleton. • Cockroach behaviors can be tested and explained through scientific investigations.	• Demonstrate respect for handling organisms. • Explain how hissing cockroaches structural and behavioral adaptations help them survive. • Make inferences about the hissing cockroaches natural habitat based on experimental observations. • Communicate results of a cockroach investigation through a formal lab report.
New Vocabulary Insects, metamorphosis, molting, adaptations, head, thorax, abdomen, exoskeleton, spiracles, Arthropods	***Language Development*** Connectedness, dependence
Extensions	***Assessments*** Embedded Assessment • Science Notebook Notebook pgs 56-57, 59,62-63, Benchmark Assessment • Mid-Summative Exam 9

Focus Questions

- How can we investigate a cockroach's adaptations as they relate to habitat preferences?
- What are insects and how are they adapted for survival?
- What are the structural and behavioral adaptations of a hissing cockroach?How can we infer the habitat of a hissing cockroach based on lab investigation results?

Teacher Preparation	Body of Evidence	Time Frame
-Prepare materials for the week. - Read "At A Glance" TE -Read "Scientific and Historical Background for the Teacher" -Read "Why Do I Have To Learn This?" *-Read Getting Ready and Guiding the Investigation* *-Watch Teacher Video Demo of Inv.9* *- Review "Materials"* *-Administer and Record information from assessments*	*-Notebook Investigation Entry* *-Reading in Science Resource "Insect Adaptations" pg 56-57* *-Journal Entry* *-Student Observation/Anecdotal Notes* *-Homework (Suggestions)* *- Cross Curriculum Extensions* *- Readorium* Mid-Summative Exam 9	*3 sessions*

Suggested Center Activities: *Spelling City, Foss suggested websites, word wall activities, extensions, additional supporting Science Activities,* ***Readorium*** *Computer time*

On Going Project: Students work on a culminating project through-out the unit to be assessed at the end of unit.

Overview Investigation 10 – "Kingdoms of Life" Parts 1-3

Summary

In *Kingdom of Life* students explore the Monera (bacteria), Protista (algae), and Fungi kingdoms to understand their roles in the scheme of life.

Core Concepts:	***Performance:***
• Microbes are microscopic bacteria, fungi, & viruses that can be both helpful and harmful. • Bacteria and fungi have the characteristics of life but viruses do not. • Bacteria are prokaryotes and do not have a nucleus or complex organelles. • Microbes are on all surfaces, in water, and in the air. • There are five/six kingdoms that all life is classified into • How to use a dichotomous key and evolution chart.	• Demonstrate their ability to test for the presence of microbes utilizing sterile agar and bread as growing mediums. • Describe how microbes are used to transform foods and recycle nutrients. • Create a dichotomous key to classify organisms.
New Vocabulary Microbe, Moneran, Protist, Fungi, Plant, Animal, Kingdoms, Taxonomist, Bacteria, Prokaryotes, Eukaryotes, Microbes, Sterile, Inoculate, Dichotomous Key, Virus, exponential growth, decomposer, cocci, spirilli, bacilli, genus, species	***Language Development*** kingdoms
Extensions	***Assessments*** Embedded Assessment • Science Notebook Notebook pgs *67, 68-69,70, 71, 72-73* Benchmark Assessment • Mid-Summative Exam10

Focus Questions

- How do scientist classify life… even life that is as small and simple as microbes?
- Where can we find microbes (bacteria & fungi)?
- What is exponential growth?
- How to microbes influence the food we eat?
- What are the Kingdoms of Life?

Teacher Preparation	Body of Evidence	Time Frame
-Prepare materials for the week. - Read "At A Glance" TE -Read "Scientific and Historical Background for the Teacher" -Read "Why Do I Have To Learn This?" *-Read Getting Ready and Guiding the Investigation* *-Watch Teacher Video Demo of Inv.9* *- Review "Materials"* *-Administer and Record information from assessments*	*-Notebook Investigation Entry* *-Reading in Science Resource "Kingdoms of Life" pg 65* *-Journal Entry* *-Student Observation/Anecdotal Notes* *-Homework (Suggestions)* *- Readorium* Mid-Summative Exam 10	*3 sessions*

Suggested Center Activities: *Spelling City, Foss suggested websites, word wall activities, extensions, additional supporting Science Activities,* ***Readorium*** *Computer time*

On Going Project: Students finish working on a culminating project and are assessed

Body of Evidence

This guide is intended to support the collection of Body of Evidence Opportunities. A student's Body of Evidence should, at a minimum, include work from the listed prompts and in-class investigations that demonstrate a student's level of proficiency. Additionally, the FOSS pre-assessment given at the beginning of the unit, the Mid-Summative Exams given after each investigation, and the end if unit exam should be included in the body of evidence.

Materials

The Foss kit comes with most of the supplies that are needed to teach the unit. Be aware that the classroom teacher or school site 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 of those items.

The following materials are not provided by Foss:

Dead leaves, potting soil, rubbing alcohol, ammonia, apple, banana, carrots, buttermilk, catsup, cheese, dish soap, plastic forks, honey, ice cream, kimchi, lettuce, mushrooms, seaweed, oatmeal, petroleum jelly, potato chip, root beer, sauerkraut, sour cream, sourdough bread, soy sauce, sugar, sweet potato, syrup, tooth paste, vegetable scaps, apple cider vinegar, white bread, yogurt, flowers, mint, newspaper, construction paper, paper plates, shoes, masking tape, transparent tape, knife, extension cord.

It is suggested you see what is available in your school, what co workers have and if possible coordinate securing of needed supplies.

The following lists are materials that should be in your kits:

DRAWER 1 - SHARED BY ALL CLASSES	
Quantity	**Item Description**
1	Acid-base indicator paper, pH range 1-14, 100/pkg
1 roll	Aluminum foil
1 box	Chalk, white (must fizz with acid)
10 pcs.	Construction paper, black
200	Cotton swabs
16	Flashlight cells, AA
8	Flashlights, small
16	Hand lenses
1	Hobby knife
100	Index cards, unlined, blue, 5" x 8"
840	Labels, removable, 1 cm x 4.5 cm
100	Paper clips, jumbo
1	Permanent marking pen, black
16	Picture sets, living/nonliving, 24 cards/set
1	Poster set, *living/nonliving*, 6 sheets/set
1	Poster, *FOSS Safety*
2 sheets	Sandpaper, coarse grit, #50
2 sheets	Sandpaper, fine grit, #150
1 roll	String, 30 m
1 pkg.	Transparencies, 13/package
2	Transparency sheets, *Millimeter Rulers*
1	Video, *Secret Garden*
1	Video, *The Unknown World*
2	Wax china markers, black
1 roll	Waxed paper
10	Zip bags, 1-liter
1	Teacher Guide
1	*FOSS Diversity of Life Lab Notebook*
•	FOSS *Diversity of Life Resources* books**
•	*FOSS Diversity of Life CD-ROM*
DRAWER 2 - SHARED BY ALL CLASSES	
4	Basins, clear plastic, with lid, 6-liter
1 vial	Brine shrimp eggs
1	Bottle brush
1	Camphor crystal block in plastic jar
1 cont.	Congo red stain, 10 g/container
2	Containers, 1/2-liter
2	Container lids for 1/2-liter

DRAWER 2 - SHARED BY ALL CLASSES (CONT	
Quantity	**Item Description**
1 pkg.	Cotton balls
25	Cups, plastic, 250-mL
10	Cup lids, plastic
24	Droppers, plastic
32	Dropper bottles, 1/2 oz.
1 btl.	Food coloring, red, 1 oz.
16	Feathers, natural color, small
16	Forceps, plastic
50 pcs.	Lens paper, 7.5 cm x 10 cm
1 btl.	Methylene blue, 0.1%, 250 mL
72	Microscope slides, glass
100	Microscope slide coverslips, plastic
8	Microscope tool kits
24	Minispoons
1 pc.	Nylon netting, 30-cm square
1 btl.	Plant fertilizer, liquid
1 pkg.	Polyacrylate crystals, 2 oz./pkg
4	Ribbons, organza, 4 colors, 45 cm each
1 cont.	Salt, kosher crystals, 310 g/container
1 bag	Red sand
3 pkgs.	Seeds, radish
1 pkg.	Seeds, rye grass, 4 oz.
1 pkg.	Shells, assorted
24	Spoons, plastic
1 set	Spoons, metric
1	Spray mister
1 box	Toothpicks, flat, 750/box
6 pkgs.	Yeast, 1/4 oz./pkg
48	Zip bags, small, 7 cm x 12 cm
DRAWER 3 - FOR ONE CLASS	
5 vials	Sterile nutrient agar, 20-ml/vial
8	Bags, plastic, 36 cm x 51 cm (14" x 20")
8	Containers, plastic, 1/2-liter with lids
40	Petri dishes, plastic, 100 mm x 15 mm (8 are consumable)
2	FOSS sprouting chambers, plastic
60	Vials, 12-dr, with caps
8	Vial holders, plastic, blue
8	Zip bags, 1-liter

Resources:

Foss *Diversity of Life* CD Rom – see TE for use in lessons

Content books-

- Foss Student Resource Book with Unit
- See Reading Extensions in TE
- Foss Reading Supplemental Books

Readorium: www.readorium.com

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

Spelling City: www.spellingcity.com

United streaming

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/