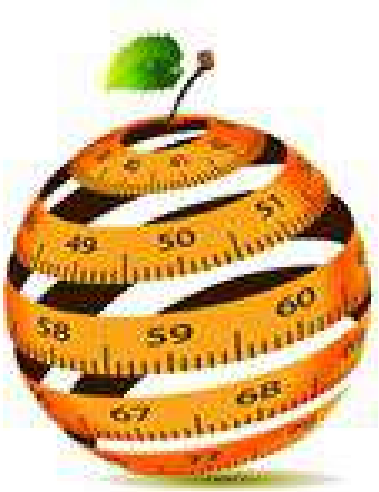
Science Unit 2- Plan
Water

Unit Length:



Grade 3
Water

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CONCEPTUAL FLOW

Big Idea

Water has identifiable characteristics and the characteristics can be altered and changed in various ways.

Properties of water, such as surface tension, etc., affect the way water behaves on different surfaces and how water flows down an incline.

Some earth materials absorb more water than other earth materials. Water contains different materials that affect its quality.

. Flowing water can do work.

Water has its own unique properties

Water flows more easily through some materials than others

Waterwheels are a kind of machine powered by flowing water.

Surface tension causes water to stick together to form a sphere

Liquid water and solid water have different properties.

Larger amounts of water flow downhill faster than smaller amounts

Water expands when it is heated and contracts when it is cooled

Water changes state in processes such as evaporation and condensation.

Evaporation can be used to detect materials dissolved in water.

UNIT OVERVIEW

Water

Summary

Water is one of Earth's most important resources and covers three-quarters of Earth's surface. An appreciation for and understanding of Earth's water is important for students as consumers of this critically important resource. The unit Water explores the properties of water, the cycle and the changes water undergoes as it moves through this cycle as well as the effects these changes have on Earth.

Enduring Understanding:	***Essential Questions: Overarching***
Students will understand that….. • Water has several observable properties, including transparency, shapelessness, and movement or flow. • Water beads up on some materials and is absorbed by other materials. • Surface tension is the skin-like surface of water that pulls it together into the smallest possible volume. • Drops of water from domes on pennies because of surface tension. • Surface tension can be disrupted by the addition of some other substances. • Water flows downhill. • Larger amounts of water flow more quickly. • Increasing the slope over which water flows makes it flow more quickly. • Water expands when heat is added. • Water contracts when heat is taken away. • Warm water is less dense than room-temperature water. • Cold water is denser than room-temperature water. • Cold water is denser than warm water. • A material that floats in water is less dense than the water; a material that sinks is denser. • Evaporation is the process by which liquid water changes into water vapor, a gas. • Temperature affects the rate of evaporation. • The surface area of a volume of water affects the rate of evaporation. • Condensation occurs when water vapor touches a cool surface and changes into liquid. • Evaporation and condensation contribute to the movement of water through the water cycle. • Some earth materials, like soils, absorb more water than other earth materials. • Water flows more easily through some earth materials than through others. • Flowing water can be used to do work. • Waterwheels are a kind of machine powered by flowing water. • Water contains different materials that affect its quality. • Evaporation can be used to detect materials dissolved in water	• What happens when water gets spilled, splashed, or dropped on something? • Why does water form a dome on flat surfaces? • How can you change the surface tension of plain water? • How does changing the slope or quantity of water change the speed at which it flows downhill? • What is the best design for a waterwheel that will efficiently lift objects? • What are some of the properties of water that affect its quality? • What types of water can be used for different purposes?

Knowledge:	***Skills:***
Student will Know…. • Water is absorbed by some materials. • Water beads up on some materials. • Surface tension makes a drop of water form beads and domes with a skin-like surface. • The speed at which a bead of water flows on a smooth surface depends on the slope of the surface and the size of the water bead. • Water may exist as a solid, liquid or gas, depending on its temperature. • Changing the temperature of water may change its properties. • Cold water is denser than warm water. • Liquid water becomes solid water (ice) when it cools to 0o C. • Warming ice to a temperature above 0oC causes it to melt into liquid water. • Evaporation is the process by which liquid water changes into water vapor. • Temperature affects the rate of evaporation. • The surface area of a liquid affects the rate of evaporation. • Condensation occurs when water vapor contacts a cool surface and changes into a liquid. • Evaporation and condensation contribute to the movement of water through the water cycle. • Some earth materials absorb more water than other earth materials do. • Water flows more easily through some earth materials than through others. • Flowing water can be used to do work. • Water contains different materials that affect its quality. • Evaporation can be used to detect materials that may be dissolved in water.	***Students will be able to…*** • Observe the interaction of water with different materials. • Investigate the property of water surface tension • Investigate and observe the movement of water on a slope. • Use Scientific thinking processes to conduct investigations and build explanations; observing, communicating, comparing, and organizing. • Construct a thermometer to observe that water expands as it warms and contracts as it cools. • Observe and describe the interaction between two masses of water at different temperatures. • Compare properties of two states of water: solid (ice) and liquid. • Investigate the effect of surface area and air temperature on evaporation. • Observe condensation. • Investigate the effect of temperature on condensation. • Investigate what happens when water is poured through two earth materials, soil and gravel. • Construct a waterwheel and use it to lift objects. • Compare the properties of local water samples.
Evidence of Understanding:	
Diagnostic Assessment: Pre- Assessment **Authentic Assessment:** Notebook and Journal Entries **Classwork:** FOSS Reading Prompt **Class work/Authentic:** Writing Prompts **Participation:** Teacher Observation/Anecdotal Notes **Homework:** Readorium, extensions, others **Benchmark Assessments:** I-Check Assessments **Unit Assessment:** Post Test	***Assessment Data – Propagated to Genesis*** **Diagnostic Assessment**: Pre- Assessment **Authentic Assessment:** Notebook and Journal Entries **Benchmark Assessments:** I-Check Assessments **Unit Assessment:** Post Test
Preconception /Misconceptions	
Water	
• When water boils and bubbles, the bubbles are air, oxygen or hydrogen, or heat. • Steam is hot air • When steam is no longer visible it becomes air.	

- Water in an open container is absorbed by the container, disappears, changes into air, or dries up and goes into the air.
- Ice molecules are colder than water molecules.
- Condensation is when air turns into a liquid.
- Condensation on the outside of a container is water that seeped (or sweated) through the walls of the container.
- Expansion of matter is due to the expansion of the particles rather than increased space between the particles.

List other that you discover in your class:

_____
_____
_____
_____

Water cycle

- The water cycle involves freezing and melting of water.
- Water only gets evaporated from the ocean or lakes
- The water cycle only includes rain and snow.

- That Clouds are made of smoke, pillows, cotton or wool.
- Clouds are supernatural events (God, or Angels)
- Water is absorbed into surfaces, rather than evaporated into air
- When water evaporates it disappears or ceases to exist.
- The Sun and Clouds combine to make it rain.
- Water come from a tap then you drink it or it disappears down the drain.

List other that you discover in your class:

_____
_____
_____
_____

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.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.
5.2 Physical Science	All students will understand that physical science principles, including fundamental ideas about matter, energy, and motion, are powerful conceptual tools for making sense of phenomena in physical, living, and Earth systems science.
Strand A	All objects and substances in the natural world are composed of matter. Matter has two fundamental properties: matter takes up space, and matter has inertia.
5.2.4.A.2	Each state of matter has unique properties (e.g., gases can be compressed, while solids and liquids cannot; the shape of a solid is independent of its container; liquids and gases take the shape of their containers).
5.2.4.A.3	Objects and substances have properties, such as weight and volume, that can be measured using appropriate tools. Unknown substances can sometimes be identified by their properties.
5.4 Earth Science	All students will understand that Earth operates as a set of complex, dynamic, and interconnected systems, and is a part of the all-encompassing system of the universe.
Strand G	**Biogeochemical Cycles:** The biogeochemical cycles in the Earth systems include the flow of microscopic and macroscopic resources from one reservoir in the hydrosphere, geosphere, atmosphere, or biosphere to another, are driven by Earth's internal and external sources of energy, and are impacted by human activity..
5.4.4.G.3	Most of Earth's surface is covered by water. Water circulates through the crust, oceans, and atmosphere in what is known as the water cycle.

Next Generation Science Standards

Performance Expectations
2-PS1-1 Plan and conduct an investigation to describe and classify kinds of materials by their observable properties. 2-PS1-4 Construct an argument with evidence that some changes caused by heating or cooling can be reversed an some cannot.
NGSS Science and Engineering Practices
Planning and Carrying Out Investigations: Planning and carrying out investigations to answer questions or test solutions to problems in K-2 builds on prior expe3rience and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions. • Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, to answer a question. (2-PS1-1) *Constructing Explanations and Designing solutions* in 3-5 builds on K-2 experiences and progresses the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions * Obtain and combine information from books and other reliable media to explain phenomena. *Engaging in Argument from Evidence* Builds on prior knowledge and progresses to comparing ideas and representations about the natural and designed worlds –Construct an argument with evidence to support a claim (2-PS1-4) *Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena* Scientistws search for cause and effect relationships to explain natural events (2-PS1-4)
Disciplinary Core Ideas
• Different kinds of matter exist and many of them can be either solid or iquid, depending on temperature. Matter can be described and classified by its observable properties. **PS1.A** • Heating or cooling a substance may cause changes that can be observed. Sometimes these changes are reversible, and sometimes they are not. **PS1.B Chemical Reactions 2-** PS1-4
Cross Cutting Concepts
Patterns. Patterns in the natural and human designed world can be observed. (2-PS1-1) *Cause and Effect,* Events have causes that generate observable patterns (2-PS1-4)

Common Core State Standards

CCSS: English Language Arts	
Reading Informational Text	
RI.3.10	Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.
RI3.3	Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect.
RI3.9	Compare and contrast the most important points and key details presented in two texts on the same topic
CCSS: Writing-	
W.3.1	Write opinion pieces on topics or texts, supporting a point of view with reasons.
W.3.2	Write informative/explanatory texts to examine a topic and convey ideas and information clearly.
CCSS: Speaking and Listening:	
SL.3.1	Write informative/explanatory texts to examine a topic and convey ideas and information clearly..
SL3.2.	Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.
SL.3.2	Ask and answer questions about information from a speaker, offering appropriate elaboration and detail
CCSS: Mathematics	
3.MD.B.3	Measurement and data: Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs.

Before beginning unit administer pretest.

Check that all materials are available, usable, and ready

Investigation 1

Water Observations

Summary

Students investigate the properties of water. They compare the way water interacts with four different surfaces, observe the property of surface tension, and investigate how to change this property. They compare the rates of different amounts of water flowing downhill.

Core Conceptual Ideas

- Water is absorbed by some materials
- Water beads up on some materials
- Surface tension makes a drop of water form beads and dome with a skin-like surface.
- The speed at which a bead of water flows on a smooth surface depends on the loped of the surface and the size of the water bead.

Goals and Objectives

Students…

New Vocabulary

Water, property, absorb, bead, surface tension, dome, slope, flow

Interdisciplinary Connections

Body of Evidence

Diagnostic Assessment	***Propagated to Genesis***
Survey/Pretest ***Embedded Assessments*** Notebook Entries **(minimum of 3)** Student Response Sheets No. 2, Teacher Observation Assessment Sheet No 1 ***Benchmark*** **I-Check 1**	Pre-Assessment – No Grade I-Check 1

Part 1 - "Looking at Water"

Summary

Students conduct investigations to observe the properties of water, an important earth material. They compare how water interacts with four materials, paper towel, waxed paper, aluminum, foil, and writing paper.

Core Ideas/Understandings	S & E Practices	*CC Concepts*
➢ Water has observable **properties**, including **transparency**, **shapelessness**, and movement or flow. ➢ Water beads up on some materials and is absorbed by other materials		

Focus Questions

- ➢ What happens when water gets spilled, splashed or dropped on something?
- ➢ Does water do the same thing on all surfaces?

Teacher Preparation	Body Of Evidence	Est. Time
➢ Send Letter to Parents Home (Teacher Master) ➢ Read TE "At A Glance", "Background for the Teacher" &"Teaching Children About Water Properties" ➢ Watch Video Demonstration of Inv. 1 Part1 ➢ Review " Materials" "Getting Ready"& "Guiding the Investigation" ➢ Prepare materials	• Diagnostic Assessment: Survey/Pre- Assessment • **Notebook:** Investigation 1 Entry 1 • **Student Sheet:** No.2 • **FOSS Science Story:** *A Report from the Blue Planet*.pg. 2 • **Writing Prompt:** Respond to Focus Questions • **Journal Entry:** • **Teacher Observation:** Assessment Sheet No. 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
-

Addition Activity

Where does the water from your faucet come from? Where will it go after you use it? Why is it important not to pour things other than waste water down the drain?

Part.2 – Surface Tension

Summary

Students investigate surface tension and its properties.

Understandings

- **Surface tension** is the skin-like surface of water that pulls it together into the smallest possible volume
- Drops of water form domes on pennies because of **surface tension**
- **Surface tension** can be disrupted by the addition of some other substances

Focus Questions

- What shape does water make on a flat surface?
- Why does water forma dome on a flat surface?
- How can you change the surface tension of plain water?

Teacher Preparation	Body Of Evidence	Est. Time
➢ Watch Video Demo of Inv.1 Part 2 ➢ Review "Materials" and "Getting Ready" &"Guiding the Investigation" ➢ Prepare materials	➢ Notebook Investigation Entry ➢ Reading: FOSS Student text *Surface Tension* pg. 3 ➢ Writing Prompt: Review Questions p.8 ➢ Journal Entry ➢ Student Observation/Anecdotal Notes ➢ Homework Individual work ➢ Cross Curriculum Extensions ➢ Information Text ➢ I Check 1 – Step 20 ➢	3 sessions

Part 3 – Water on a Slope

Students investigate what happens to a drop of water on a slope.

Understandings

- Water flows downhill
- Larger amounts of water flow more quickly
- Increasing the slope over which the water flows makes it flow more quickly

Focus Questions

- What happens to beads of water when they are placed at the top of a slope?
- How does changing the amount of water in a bead change the speed at which water flows downhill?
- How does changing the slope change the speed at which water flows downhill?

Teacher Preparation	Body Of Evidence	Est. Time
➢ Read TE "At A Glance", "Background for the Teacher" &"Teaching Children About Water Properties" ➢ Watch Video Demonstration of Inv. 1 Part 3 ➢ Review " Materials" "Getting Ready" &"Guiding the Investigation" ➢ Prepare materials	➢ Notebook Investigation Entry ➢ Reading: FOSS Student text *Which Way Does it Go?* pg. 4 ➢ Writing Prompt: Review Questions ➢ Journal Entry ➢ Student Observation/Anecdotal Notes ➢ Homework Individual work ➢ Cross Curriculum Extensions ➢ Information Text ➢ I Check 1 – Step 12	

Suggested Center Activities: Spelling City; FOSS Digital Resources: eBook, Audio Stories; suggested websites; word wall activities; extension activities; and additional supporting Science activities.

Culminating Activity: Begin planning with students culminating project. Suggestions: Students create a full inquiry activity based on one of following topics.1. What materials besides soap can change the surface tension of water? 2. How much water can a sponge absorb? A wash cloth? 3 How fast does a drop of water travel down a slope? On a steeper slope? Different sized slope? What units should you use to describe the speed? 4. What happens when you freeze different kinds of liquids, like milk or juices? Do they expand, contract, or stay the same volume when they freeze? 5. Can you find a way to make ice sink in water? 6. What happens when you float different objects in salt water? In other liquids> What do your observations tell you about the density of the objects compared to the liquid? 7. How do different types of thermometers work? The students can develop hypothesis, procedure, collect data, conclude, and explain.

Investigation 2 "Hot Water, Cold Water"

Summary

Students observe the properties of water as it is heated, cooled, and frozen. They make a water thermometer and find that water expands as it is heated. Students compare the density of water at different temperatures and find that warm water Is less dense than cool water, and ice is less dense that liquid water.

Concepts:

- Water may exist as a solid, liquid, or gas, depending on its temperature.
- Changing the temperature of water may change3 its properties
- Cold water is denser than warm water
- Liquid water becomes solid water (ice) when it cools to 0°C.
- Warming ice to a temperature above 0°C causes it to melt into liquid water.

New Vocabulary Investigation 2

Expand, contract, sink, denser, float, less dense

Part 1: Build a Thermometer

Summary

Students construct a thermometer to observe that water expands as it warms and contracts as it cools.

Understandings

- Water **expands** when heat is added
- Water **contracts** when heat is taken away

Focus Questions

- What happens to water when it is heated?
- What happens to water when it is cooled?

Teacher Preparation	Body Of Evidence	Est. Time
➢ **Read TE** "At A Glance", "Background for the Teacher"& "Teaching Children About Hot and Cold" ➢ **Watch** Video Demonstration of Inv. 2 Part1 ➢ **Review** " Materials" "Getting Ready" &"Guiding the Investigation" ➢ Prepare materials	➢ Notebook Investigation Entry ➢ Writing Prompt: Review Questions p. 18 ➢ Journal Entry ➢ Student Observation/Anecdotal Notes ➢ Journal Entry ➢ Homework (Suggestions) ➢ Cross Curriculum Extensions ➢ Information Text	2 sessions

Part 2 – Sinking and Floating Water

Summary

Students compare properties of two states of water: solid and liquid.

Understandings

- Warm water is less **dense** than room-temperature water
- Cold water is more **dense** than room-temperature water. Cold water is **denser** than warm water
- A material that floats in water is less **dense** than the water; a material that sinks is more **dense**

Focus Questions

- Is hot water denser or less dense than room temperature water?
- Is cold water denser or less dense than room temperature water?

Teacher Preparation	Body Of Evidence	Est. Time
➢ Watch Video Demo of Inv.2 Part 2 ➢ Review "Materials" and "Getting Ready" Prepare materials	➢ Notebook Investigation Entry ➢ Reading: FOSS Student text *The Pond* pg 5 ➢ Questions to Explore pg 7 student Foss text ➢ Writing Prompt: Review Questions pg. 29, Summary questions pg 33 ➢ Journal Entry ➢ Student Observation/Anecdotal Notes ➢ Homework (Suggestions) ➢ Cross Curriculum Extensions Interdisciplinary Extensions	*2 sessions*

Part 3 – Water as Ice

Summary

Students compare properties of two states of water: solid and liquid.

Understandings

- Water begins to **expand** when its temperature reaches 4 degrees C
- Water is densest at 4 degrees C
- Ice is less **dense** than liquid water
- A solid has definite **volume** and **shape**; a liquid has only definite **volume**

Focus Questions

- What happens to water when it freezes?
- What happens to ice when it is heated?
- How do the masses of equal volumes of ice and water compare?

Teacher Preparation	Body Of Evidence	Est. Time
➢ Watch Video Demo of Inv.2 Part 2 ➢ Review "Materials" and "Getting Ready" Prepare materials	➢ Notebook Investigation Entry ➢ Reading: FOSS Student text *Ice is Everywhere and Ice History pg. 8& 10* ➢ Writing Prompt: Review Questions pg. 29, Summary questions pg 33 ➢ Journal Entry ➢ Student Observation/Anecdotal Notes ➢ Homework (Suggestions) ➢ I Check 2: Step 16	***3 sessions***

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

Culminating Activity: Continue to work on projects.

Investigation 3
Water Vapor

Summary

Students are introduced to water vapor and evaporation. They explor4e the effects of environmental conditions and surface area on rates of evaporation. They set up condensation and consider how evaporation and condensation contribute to the water cycle.

Concepts

- Evaporation is the process by which liquid water changes into water vapor.
- Temperature affects the rate of evaporation
- The surface area of a liquid affects the rate of evaporation
- Condensation occur when water vapor contacts a cool surface and changes into a liquid
- Evaporation and condensation contribute to the movement of water through the water4 cycle.

New Vocabulary Investigation 3

Evaporate, water vapor, seriate, thermometer, surface area, condense, water cycle

Part 1: Evaporations

Summary

Students observe and consider a demonstration in which two paper towels are soaked with equal amounts of wat4r and then left to evaporate; one in a cup with a lid, and the other in an open cup.

Understandings

- **Evaporation** is the process by which liquid water changes into water vapor, a gas

Focus Questions

- What happens when two paper towels are allowed to dry, one in a cup with a lid, and the other in an open cup?

Teacher Preparation	Body Of Evidence	Est. Time
➢ Read TE "At A Glance", "-Background for the Teacher"&"Teaching Children About Water Vapor" ➢ Watch Video Demonstration of Inv. 3 Part1 ➢ Review " Materials" "Getting Ready" &"Guiding the Investigation" ➢ Prepare materials	➢ Reading: FOSS Student text *Wet and Dry Places* pg. 12 ➢ Writing Prompt: Review Questions pg. 43 ➢ Notebook Investigation Entry ➢ Journal Entry ➢ Student Observation/Anecdotal Notes ➢ Homework (Suggestions) ➢ Cross Curriculum Extensions ➢ Informational Text Reading	3 sessions 2 sessions of 15 minutes on two consecutive days (or early am and end of day) Part 2 can be right after results read.

Investigation 3: Part 2. Evaporation Locations

Summary

Students investigate the effect of location /air temperature on the rate of evaporation,. They measure equal amounts of wate4r into four cups, place th4e cups in four different locations, and monitor the temperatures at he locations for 4 days. They measure and compare the amount of water remaining in the cups.

Understandings

Temperature effects the rate of evaporation

Focus Question

What effect does air temperature have on evaporation?

Teacher Preparation	Body Of Evidence	Est. Time
➢ *Watch Video Demo of Inv.3Part 2* ➢ *Review "Materials" and "Getting Ready" & "Guiding the Investigation"* *Prepare Materials*	➢ Writing: Summary questions pg 50 ➢ *Notebook Investigation Entry* ➢ *Journal Entry* ➢ *Student Observation/Anecdotal Notes* ➢ *Homework* ➢ *Cross Curriculum Extensions*	*3 sessions* *First part 25-30 min* *5-18 min in AM and afternoon to monitor evaporation* 20-30 Fifth day

Investigation 3: Part 3. Surface Area

Summary

Students measure equal amounts of water into four containers of different shapes. The surface area of the water is different in each container, After four days, students measure and compare the amount of water remaining in each container.,

Understandings

The **surface area** of a **volume** of water affects the rate of **evaporation**

Focus Question

What effect does surface area have on the rate of evaporation?

Teacher Preparation	Body Of Evidence	Est. Time
➢ *Watch Video Demo of Inv.3Part 3* ➢ *Review "Materials" and "Getting Ready" & "Guiding the Investigation"* *Prepare Materials*	➢ Reading: FOSS Student text *Evaporation and Condensation?* Pg. 13 ➢ Writing: Summary questions pg 50 ➢ *Notebook Investigation Entry* ➢ *Journal Entry* ➢ *Student Observation/Anecdotal Notes* ➢ *Homework* ➢ *Cross Curriculum Extensions*	***3 sessions***

Investigation 3: Part 4. Surface Area

Summary

Students observe cups of ice water and room-temperature water and observe the process of condensation. They set up a condensation chamber and consider the factors that cause condensation. The water cycle is introduced.

Understandings

- **Condensation** occurs when water vapor touches a cool surface and changes into a liquid
- **Evaporation** and **condensation** contribute to the movement of water through the water cycle

Focus Question

What happens when the surface area of an object or material is cooler than the air surrounding it?

Teacher Preparation	Body Of Evidence	Est. Time
➢ *Watch Video Demo of Inv.3Part 4* ➢ *Review "Materials" and "Getting Ready" & "Guiding the Investigation"* *Prepare Materials*	➢ Reading: FOSS Student text *The Water Cycle?* pg. 14 ➢ Questions to Explore pg 16 student Foss text ➢ Writing: Summary questions pg 50 ➢ *Notebook Investigation Entry* ➢ *Journal Entry* ➢ *Student Observation/Anecdotal Notes* ➢ *Homework* ➢ *Cross Curriculum Extensions* ➢ *I Check 3: After Step 14*	***3 sessions***

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

Culminating Project: Students work towards completing project.

Investigation 4
Waterworks

Summary

.Students compare what happens when water is poured through two different earth materials, soil and gravel. Students construct a waterwheel and see it to lift objects., learning about the power of water. They collect water from local sources examine the properties and are introduced to the concept of water quality.

Concepts

- Some earth materials absorb more water than other earth materials do.
- Water flows more easily through some earth materials than through others
- Flowing water can be used to do work
- Water contains different materials that affect its quality
- Evaporation can be used to detect materials dissolved in water.

New Vocabulary Investigation 4

Soak, drain, earth materials, blade, shaft, water quality, dissolve

Part 1:

Summary

.Students pour equal amounts of water through equal masses of two earth materials, soil and gravel. They measure the amount of water that drains though the earth materials and compare the resulting masses of soil and gravel, using a balance.

Understandings

- Some **earth materials**, like soils, **absorb** more water than other **earth materials**
- Water flows more easily through some **earth materials** that through others

Focus Questions

What happens when you pour water through different earth materials?

Teacher Preparation	Body Of Evidence	Est. Time
➢ Read TE "At A Glance", "-Background for the Teacher (ground water)"&"Teaching Children About The Water Works" ➢ Watch Video Demonstration of Inv. 4 Part1 ➢ Review " Materials" "Getting Ready" &"Guiding the Investigation" ➢ Prepare materials	➢ Reading: FOSS Student text *Water: A Vital Resource* pg. 17 ➢ Questions to Explore pg 21 student Foss text ➢ Writing Prompt: Review Questions pg. 43 ➢ Notebook Investigation Entry ➢ Journal Entry ➢ Student Observation/Anecdotal Notes ➢ Homework (Suggestions) ➢ Cross Curriculum Extensions ➢ Informational Text Reading	3 sessions .

Investigation 4: Part 2. Waterwheels

Summary

Students design and construct simple waterwheels. They use water to power their water wheels to lift objects. They refine their designs with each trail and determine how many syringes of water it takes to lift an object a specified distance.

Understandings

- Flowing water can be used to do work
- Waterwheels are a kind of a machine powered by flowing water

Focus Question

- How does a waterwheel work?
- What is the best design for a waterwheel that will efficiently lift objects?

Teacher Preparation	Body Of Evidence	Est. Time
➢ *Watch Video Demo of Inv.3Part 2* ➢ *Review "Materials" and "Getting Ready" & "Guiding the Investigation"* *Prepare Materials*	➢ *Notebook Investigation Entry* ➢ Reading: FOSS Student text *The Power of Water* pg. 22 ➢ Writing: Summary questions pg 50 ➢ *Journal Entry* ➢ *Student Observation/Anecdotal Notes* ➢ *Homework* ➢ *Cross Curriculum Extensions*	*3 sessions*

Investigation 4: Part 3. Water from Home		
Summary Students observe samples of water collected from their homes and community. They compare samples and evaporate the water to find out if any contain dissolved materials. They consider the different typ0es of water used for different purposes.		
Understanding ➢ Water contains different materials that affect its quality ➢ **Evaporation** can be used to detect materials dissolved in water		
Focus Question What are some of the properties of water that affect its quality?		
Teacher Preparation	**Body Of Evidence**	**Est. Time**
➢ *Watch Video Demo of Inv.3Part 3* ➢ *Review "Materials" and "Getting Ready" & "Guiding the Investigation"* *Prepare Materials*	➢ Reading: FOSS Student text *Ellen Swallow Richards: An Early Ecologist* pg. 24 ➢ Writing: Summary questions pg 50 ➢ *Notebook Investigation Entry* ➢ *Journal Entry* ➢ *Student Observation/Anecdotal Notes* ➢ *Homework* ➢ *Cross Curriculum Extensions* I-*Check 4: Step 13*	***3 10-20 min. sessions***
Investigation 3: Part 4. Choosing your own investigation		
Summary Students review the properties of water and identify a subject they would like to investigate in greater detail. They present the results of their projects to the class to share something new about water.		
Understandings ➢ Apply concepts developed concerning water, its properties and its uses		
Focus Question Students ask their own questions and plan investigations or research to answer them.		
Teacher Preparation	**Body Of Evidence**	**Est. Time**
Assess students using chart for investigation 4	➢ Reading: FOSS Student text *Moon Dreams?* pg. 27 ➢ Writing: Summary questions pg 50 ➢ *Journal Entry* ➢ *Student Observation/Anecdotal Notes* ➢ *Homework* ➢ *Cross Curriculum Extensions* ➢ *Unit Assessment*	***This project is worked on during the length of the unit and completed at presented at this time.***
Suggested Center Activities: *Spelling City, Foss suggested websites, word wall activities, extensions, additional supporting Science Activities,*		
Culminating Project: Students complete project, and present to class		

Unit ends . The Unit takes an estimated 37 session and there are sessions scheduled. (3 additional science days built in)
Session = 45 minutes

Assessments:

The following items are to be tracked by the teacher and recorded in Genesis for administration and parents to view.

Writing prompts
Notebook Investigation Entry
Journal Entries
Student Observations
Anecdotal Notes
Homework
Summative Assessments:
Pre-assessment, I-checks, End of Unit assessments, Post Assessment (data to be tracked)

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 3 DISTRICT Earth Science Benchmark Assessment given at the end of the unit (Post-assessment) may also be included in the body of evidence.

Writing Prompts Overview

These prompts support the investigations and can be used with their journaling.

Prompt 1: FOSS: Water: Investigation I – Water Observations – Part 1: Looking at Water

1. What happens when water gets spilled, splashed, or dropped on something?
2. Does water do the same thing on all surfaces?

Prompt 2: FOSS Water: Investigation I – Water Observations – Part 2: Surface Tension

1. What shape does water make on a flat surface?
2. Why does water form a dome on flat surfaces?
3. How can you change the surface tension of plain water?

Prompt 3: FOSS: Water: Investigation I – Water Observations – Part 3: Water on a Slope

1. Does water always flow downhill?
2. How does changing the slope or quantity of water change the speed at which it flows downhill?

Prompt 4: FOSS: Water: Investigation 2 –Hot Water, Cold Water – Part 1: Build A Thermometer

1. What happens to water when it is heated?
2. What happens to water when it is cooled?

Prompt 5: FOSS: Water: Investigation 2 –Hot Water, Cold Water – Part 2: Sinking and Floating Water

1. What happens to water when it is heated?
2. What happens to water when it is cooled?

Prompt 6: FOSS: Water: Investigation 2 –Hot Water, Cold Water – Part 3: Water as Ice

1. What happens to water when it freezes?
2. What happens to ice when it is heated?
3. How do the masses of equal volumes of ice and water compare?

Prompt 7: FOSS: : Water: Investigation 3 – Water Vapor – Part 1: Evaporation

1. What happens when two paper towels are allowed to dry, one in a cup with a lid and the other in an open cup?

Prompt 8: FOSS: : Water: Investigation 3 – Water Vapor – Part 2: Evaporation Locations

1. What effect does air temperature have on evaporation?

Prompt 9: FOSS: : Water: Investigation 3 – Water Vapor – Part 3: Surface Area

1. What effect does surface area have on the rate of evaporation?

Prompt 10: FOSS: : Water: Investigation 3 – Water Vapor – Part 4: Condensation

1. What happens when the surface of an object or materials is cooler than the air surrounding it?

Prompt 11: FOSS: : Water: Investigation 4 – Waterworks – Part 1: Water in Earth Materials

1. What happens when you pour water through different earth materials?

Prompt 12: FOSS: : Water: Investigation 4 – Waterworks – Part 2: Waterwheels

2. How does a waterwheel work?
3. What is the best design for a waterwheel that will efficiently lift objects?

Prompt 12: FOSS: : Water: Investigation 4 – Waterworks – Part 3: Water from Home

1. What are some of the properties of water that affect its quality?
2. • What types of water can be used for different purposes?

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.

Part Number	Description	Qty required	Qty In kit	Qty Need to order
03-003N	***Water, Non-consumables***	XXXX	XXXX	XXXX
2064	Bottle, dispensing, plastic	3		
2062	Bottle, glass, 60ml	10		
1035	Clothespins	20		
2067	Cups, filter with holes	20		
1010	Cup, plastic, Solo TP9, 9oz	50		
2063	Cup, plastic, 16oz	20		
5077	Dropper, plastic with black rubber end	36		
2085	Duplication Masters, Water (9)	1		
3046A	Gravel, aqua, 1 lb.	1		
1352	Inventory & Assessment Log, Water	1		
1095	Lid, plastic, container, 1/2 liter	20		
2065	Lid, plastic, dome	36		
2071	Limestone chips, 500g, 1 lb.	1		
4072	Marker, permanent	3		
2073	Objects set (2 beads, 2 corks)	1		
1455	Pesticide Awareness Extensions, Water	1		
2075	Poster, Water cycle, laminated	1		
1025	Rubber bands, #14	25		

2077	Rubber stoppers, 1-hole, #1	10		
2079	Sponge	8		
1027	Stick, popsicle	25		
2086	Teacher's Guide, Water	1		
1059	Tray, plastic, cafeteria	8		
2081	Tray, plastic, ice cube	1		
2014	Vial, 12 dram with lid	36		
2004	Vial, 7 dram, with caps	20		
2083	Vial, soft, 50-ml with caps	20		
5082	Video, teacher prep, Water	1		
03-003M	***Water, Measurement Parts***	XXXX	XXXX	XXXX
5055	Balance, equal arm	1		
5063	Beaker, 100-ml	8		
1062	Container, plastic, 1/2-L	8		
5064	Container, 1-L	8		
5065	Cylinder, graduated, 50-ml	8		
3019	Hand lens, one power	16		
5066	Pitcher	2		
5067	Spoon, 25-ml	1		

Unit Resources:

Content books-

- FOSS Student Book with Unit
- See Reading Extensions in TE
- FOSS Reading Supplemental Books
- Sun, Moon and Stars Series

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/