# Science Unit 1- Plan

## Solids and Liquids

## Grade 2

## Unit Length:

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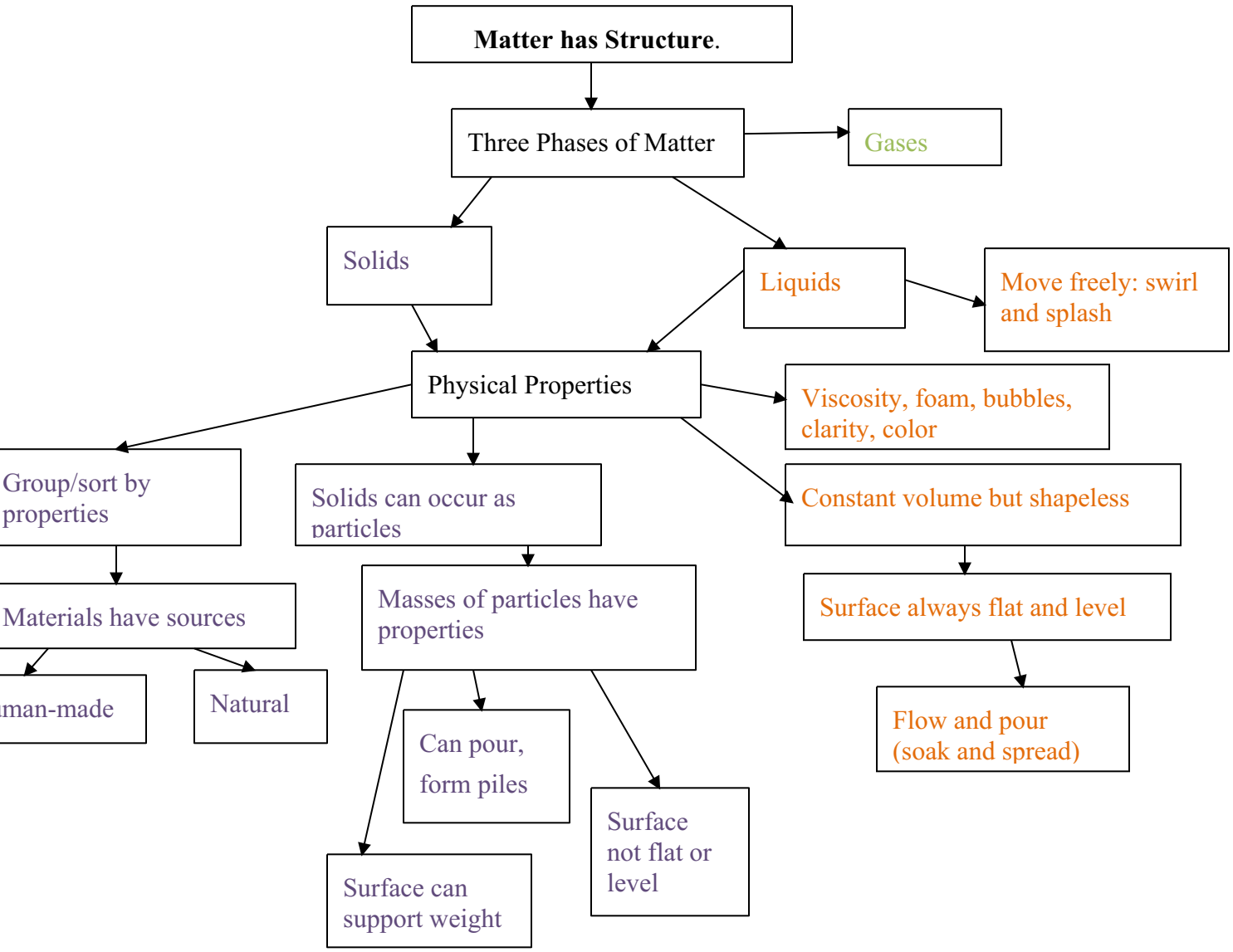
## Conceptual Flow



# UNIT OVERVIEW

## Solids and Liquids – Unit 1
## Grade 2

***Summary***

The Solids and Liquids Module provides experiences that heighten primary students' awareness, curiosity, and understanding of the physical world and provides opportunities for young students to engage in scientific and engineering practices. Matter with which we interact exists in three fundamental states: solid, liquid, and gas. In this module students investigate and sort objects based on their properties. They observe, describe and compare the properties and behaviors of solids and liquids. They record their observations with pictures, numbers, and words. Students will recognize the properties of solid materials that make them appropriate for tower construction; build towers. They will combine and separate solid materials of different particle sizes using tools. They will observe, describe, and record what happens when solids and water4 are mixed and when liquids and water are mixed. Students will use knowledge to conduct an investigation on an unknown material and observe and describe changes when solids and liquids are heated and cooled.

**Unit Rational**

The Solids and Liquids Module emphasizes the development of observation and description skills and building explanations based on experience. It begins with hands-on investigations, and then moves towards abstract ideas related to those investigations.

| ***Enduring Understanding:*** | ***Unit Essential Questions:*** |
|---|---|
| **Students will understand that…..**<br>▪ Solids, liquids and gas are states of matter.<br>▪ Solid, liquids and gases have properties that separates them form one another.<br>▪ Solids and liquids can be sorted by their properties.<br>▪ Mixtures of solid particles and liquids can be separate.<br>▪ Adding or removing heat to water changes its state of matter.<br>▪ Some solids dissolve in water; evaporation leaves the solid behind<br>▪ Some liquids mix with water; other liquids form a layer above or below water. | ▪ Which physical properties determine if something is a solid or liquid?<br>▪ How do the physical properties of solids and liquids determine their use?<br>▪ How do the similarities and differences of a solid or a liquid determine how they should be sorted and grouped?<br>How do the senses provide information about the physical properties of a solid or a liquid? |
| ***Knowledge:*** | ***Skills:*** |
| ***Students will know….***<br>▪ Solids are one state of matter.<br>▪ Solid materials have properties that separate them from other states of matter.<br>▪ Solids can be sorted by their properties. Solid materials have distinct uses based on their properties.<br>▪ Liquids are one state of matter.<br>▪ Liquids have many properties.<br>▪ Liquids pour and flow.<br>▪ Liquids take the shape of their container. | ***Student will be able to ….***<br>▪ Observe several kinds of solid materials.<br>▪ Compare properties of solids materials.<br>▪ Sort solid in different ways.<br>▪ Observe and describe properties of different liquids in bottles.<br>▪ Compare the appearance and behavior of different liquids in containers.<br>▪ Observe properties of solid particles in different containers.<br>▪ Separate a mixture of solids by using screens. |

| ***Evidence of Understanding:*** | |
|---|---|
| Pre- Assessment<br>Notebook and Journal Entries<br>Student Sheets<br>Writing Prompts<br>Performance Assessments<br>Reading Prompts<br>Teacher Observations/Anecdotal Notes<br>• Assess ability to hypothesize orally and in writing<br>• Assess ability to draw conclusions from experimentation<br>• Observations of small group activities<br>• Student and teacher rubrics to assess collaboration with others<br>Homework<br>Checkpoint Assessments<br>I-Check Assessments<br>• Unit Assessments | ***Assessment Data Due for District Analysis***<br><br>Pre –Assessment<br>Notebook Entry<br>Journal Entry<br>I-Check 1and 4<br>Unit Assessment |

**Preconception /Misconceptions/Myths**

- Matter is always small.
- There is air between air molecules.
- Materials can only have properties of one state of matter.
- Food is a solid, toys are, window, something that is hard, it doesn't break, wood, you can feel it, you can look at it.
- Particles of solids have no motion.
- Solids are never hollow, have no holes.
- Solids are heavy, hard to carry.
- A liquid is flat, runny.
- A liquid is gas (gasoline).
- Liquids are not matter because we drink them.
- Liquids are things you drink.
- Liquids can be compressed (liquids in a plastic bottle).
- Liquids have water in them.
- The thicker the liquid the heavier, more dense it is.
- Only water can melt, boil, freeze
- 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.
- Condensation is water vapor in the air that cools enough to become a liquid.

***List other that you discover in your class:***

_____
_____
_____
_____
_____
_____

.***Before beginning unit administer pretest. (Week of 9/8/2014)***

Check that all materials are available, usable, and ready

## Materials

There are 3 boxes for this kit. Boxes 1 & 2 contain Permanent and Consumable materials and equipment. Box 3contains 5 "Bus Trays" used to organize materials and contain materials when transferring solids and liquids between containers. "Materials Supplied by the Teacher" (items not included in your kit), pp. 4-5;"Preparing a New Kit," pp. 6-8; "Preparing the Kit for Your Classroom," pp. 9-11.

View the FOSS Solids and Liquids Module Introduction and Before You Begin segments of the FOSS Teacher Preparation Video / DVD (also available online at http://www.fossweb.com/modulesK-2/SolidsandLiquids/index.html )

Collect the "Materials Supplied by the Teacher" needed to prepare a new kit. Many items will be gathered from your classroom. Grocery items are needed for Investigations 2, 3 and 4. Other items are also needed,

**Investigation 1Soilids**
Flip Chart or chart paper *
Marking pen*

**Investigation 2 Liquids**
Liquids (Preview the FOSS Teacher Preparation Video / DVD, Investigation 2, Part 1: Liquids in Bottles.) The bottles in Investigation 2 (5 sets of 7 bottles) are filled with liquids and once filled considered "permanent equipment" and NEVER opened. In new you will need to purchase:
Cooking oil, (1/2 liter) 16 oz. = 1 pint
Corn syrup, (1/2 liter) 16 oz. = 1 pint
Liquid fabric softener or starch, (1/2 liter) 16 oz. = 1 pint
Large book or piece of cardboard*
Approximately 10 oz. are used to fill bottles for Investigation 2; the remaining liquids will be consumed in Investigation 4. You will need small amounts (8oz. = 1 cup) of each liquid in subsequent years each time you use the module. If you have several kits in your school, calculate the volume of the liquids you will need for a few uses for all teachers and purchase accordingly.

**Investigation 3 Bits and Pieces**
15-bean Soup mix (optional) but fun!

**Investigation 4: Solids and Liquids with Water**
This is a whole class activity – you may need twice as much of each item if you wish to conduct this as a Center.
Raisins (2-3 'snack' size boxes)
(6) small cookies (broken in pieces)

The Foss kit comes with most of the supplies that are needed to teach the unit. Make sure to check the kit to see that all needed supplies are there.

# 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.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 | **Properties of Matter:** 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. |
| 5.2.2.A.1 | Living and nonliving things are made of parts and can be described in terms of the materials of which they are made and their physical properties. |
| 5.2.2/A.2 | Matter exists in several different states; the most commonly encountered are solids, liquids, and gases. Liquids take the shape of the part of the container they occupy. Solids retain their shape regardless of the container they occupy |

# Next Generation Science Standards

## Performance Expectations

**2-PS1-1** ***Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.*** **Observations could include color, texture, hardness, and flexibility. Patterns could include the similar properties that different materials share.**

**2-PS1-2** ***Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.*** **Examples of properties could include strength, flexibility, hardness, texture, and absorbency.**

**2-PS1-3** ***Make observations to construct an evidence-based account of how an object of a small set of pieces can be disassembled and made into a new object.*** **Examples of pieces could include blocks, building bricks, or other assorted materials.**

**2-PS1-4** ***Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot.***

## NGSS Science and Engineering Practices

- Planning and Carrying Out Investigations to answer questions or test solutions to problems K-2 builds on prior experiences 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-PS1-2)
- Analyzing and Interpreting Data: Builds on prior experiences and progresses to collecting, recording, and sharing observations.
  *Analyze data from test of an object or tool to determine if it works as intended. (2-PS1-2)
- Constructing Explanations and Designing Solutions: builds on prior expe4riences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions.

## Disciplinary Core Ideas

- **PS1.A** Structure and Properties of Matter:
  Different kinds of matter exist and many of them can be either solid, liquid, depending on temperature. Matter can be described and classified by its observable properties. (2-PS1-1)

  Different properties are suited to different purposes. (2-PS1-2, 2-PS1-3)

- **PS1.B**: Chemical Reactions:
  Heating or cooling a substance may cause changes that can be observed. Sometimes these changes are reversible, and sometimes they are not. (2-PS1-4)

## Cross Cutting Concepts

- ***Energy and Matter:***
  Objects may break into smaller pieces and are put together into larger pieces or may change shapes. . (2-PS1-3)

- ***Patterns:***
  Patterns in the natural world can be observed, used to describe phenomenon, and used as evidence. Patterns of change can be used to make predictions.

- ***Cause and Effect, Mechanism and Explanation:***
  Events have causes that generate observable patterns. (2-PS1-4)
  Simple test can be designed to gather evidence to support or refute student ideas about causes. (2-PS1-2)

# Common Core State Standards

| CCSS: English Language Arts | |
|---|---|
| ***Reading Informational Text*** | |
| RI.2.1 | By the end of the year, read and comprehend informational texts, including science and technical texts, in the grades 2-3 text complexity band proficiently, with scaffolding as needed at the high end of the range. |
| *CCSS: Writing-* | |
| W.1.8 | With guidance and support from adults, recall information from the experiences to gather information from provided sources to answer a question. |
| W.2.2 | Write informative/explanatory texts in which they introduce a topic, use facts and definitions to develop points and provide a concluding statement or section. |
| CCSS: Speaking and Listening: | |
| SL.1.5 | Add drawing or other visual displays to descriptions when appropriate to clarify ideas, thoughts, and feelings. |
| SL.2.1 | Participate in collaborative conversations with diverse partners about grade 2 topics and texts: with peers and adults in small and large groups. |
| **CCSS: Mathematics** | |
| 2.MD.10 | Draw a picture graph and a bar graph (with single unit scale) to represent a data set with up to four categories. |

**Investigation 1**
**" Solids"**

***Summary***

Students conduct investigations to identify solid objects and materials by their properties. They will sort objects into collections based on their properties. Students will use a table to record properties and materials of objects. They will discover that some properties of solid objects and materials make them appropriate for tower construction. Additionally, they will search for solid objects outdoors and sort them into two collections –natural and human-made.

***Core Conceptual Ideas***

- Solid is one state or phase of matter
- Objects are described and identified by their properties.
- Objects are made of one or more materials.
- Natural and human-made objects occur outdoors.

| ***New Vocabulary*** | ***Language Development*** |
|---|---|
| Bend, color, curve, cylinder, flat, flexible, gas, hard, liquid, matter, object, pointy, properties, property, rigid, rough, rubber, shape, smooth, soft, solid, straight, texture | Gestures, demonstrate, equipment |
| ***Assessments*** | ***Assessment Data Due to District for Analysis*** |
| Pre- Assessment<br>-Notebook Investigation Entry<br>Student Sheet No 1,2<br>Assessment Duplication No1,2,3<br>- Reading: FOSS Student text: Everything Matters<br>-Journal Entry<br>-Writing Prompt<br>-Student Observation/Anecdotal Notes | ***Pre Assessment***<br>***Notebook Investigation Entry***<br>***I-Check 1*** |

## *Investigation 1*
## *Part 1: "Solid Objects"*

### *Summary*

Students identify three states of matter and observe a variety of solid objects. After a period exploration students describe properties of the objects and develop vocabulary in order to communicate their thinking about those properties.

| *Core Ideas/Understandings* | *S&E Practices Alignment* | *CC Concepts Alignment* |
|---|---|---|
| • Solid is one state or phase of matter<br>• Objects are described and identified by their properties.<br>• We use our senses to observe the properties of solids. | ***NGSS***<br>Planning and Carrying Out Investigations (2-PS1-1) | ***NGSS***<br>Patterns (2-PS1-1) |

### *Focus Questions*

1. How can solid objects be described?
2. What are solid objects made of?

| Teacher Preparations | Assessments and Grading Opportunities | Time Frame |
|---|---|---|
| -Read "At A Glance" TE<br>-Read "-Background for the Teacher"<br>-Read "Teaching Children About Solids"<br>-Review " Materials", "Getting Ready" and "Guiding the Investigation 1"<br>-View Teacher Prep video<br>Prepare Materials | *-Pre- Assessment*<br>*-Notebook Investigation Entry*<br>*Student Sheet No 1,2*<br>*Assessment Duplication No1,2,3*<br>*- Reading*: FOSS Student text*: Everything Matters*<br>*-Journal Entry*<br>*-Writing Prompt*<br>*-Student Observation/Anecdotal Notes*<br><br>***Note:***<br>*Recording in the student notebook takes the place of Student Sheet No. 2.* | *2 sessions* |

### Homework/Center Activities/Extra Practices

- Spelling City(vocab)
- FOSS Digital Resources: eBook, Audio Stories
- Suggested websites
- Word wall activities
- Cross Curriculum Extensions
- FOSS Homeschool Connection
- Informational Text -Reading

***Investigation 1***
***Part 2. Solid Material***

***Summary***

Students observe eight similar rectangular objects that vary in the material from which they are made (fabric, plastic, rubber, wood, metal, paper, leather, ceramic) Students examine the objects used in Part 1 as we3ll as classroom objects to determine their materials.

| ***Core Ideas/Understandings*** | ***S&E Practices Alignment*** | ***CC Concepts Alignment*** |
|---|---|---|
| • Solid is one state or phase of matter<br>• Objects are described and identified by their properties.<br>• We use our senses to observe the properties of solids. | ***NGSS***<br>Planning and Carrying Out Investigations (2-PS1-1) | ***NGSS***<br>Patterns (2-PS1-1) |

***Focus Questions***

1. In what way are some solids the same?
2. Which objects are useful for building towers?
3. Are there solid objects outdoors?

***New Vocabulary***

Ceramic, fabric, leather material, metal, paper, plastic, wood

| **Teacher Preparation** | **Assessments and Grading Opportunities** | **Time Frame** |
|---|---|---|
| *-Prepare materials for the week*<br>*-Watch Teacher Video Demo of Inv.1 part 2*<br>*- Review "Materials" and "Getting Ready"* | *-Notebook Investigation Entry*<br>*-Student Sheet No 3*<br>*- Reading*: FOSS Student text*: Solid Objects and Materials*<br>*-Assessment Dupl. No1-3*<br>*-Journal Entry*<br>*-Writing Prompt*<br>*-Student Observation/Anecdotal Notes* | *2 sessions* |

**Homework/Center Activities/Extra Practices**

- Spelling City(vocab);
- FOSS Digital Resources: eBook, Audio Stories
- Suggested websites
- Word wall activities
- Cross Curriculum Extensions
- FOSS Homeschool Connection
- Informational Text -Reading

## ***Investigation 1.***
## ***Part 3 & 4. Group Solid Objects & Construct with Solids***

***Summary***

Students group solid objects in a variety of ways to discover that many objects can have the same property and that different objects can be made of the same material. Students use solid materials to build towers finding the best objects for building tall structures and proving stability.

| ***Core Ideas/Understandings*** | ***S&E Practices Alignment*** | ***CC Concepts Alignment*** |
|---|---|---|
| • Solids can be sorted by their properties<br>• Different properties are suited to different purposes.<br>• Some properties of solid objects and materials make them appropriate for tower construction.<br>• A great variety of objects can be built from a small set of pieces. | ***NGSS***<br>Analyze and Interpret Data (2-PS1-2)<br>Construct Explanation and Design Solution (2-PS1-3) | ***NGSS***<br>Cause and Effect (2-PS1-2)<br>Energy and Matter (2-PS1-3) |

***Language Development***

Flexible, rigid, flat, round, circle, reasonable explanation

| **Teacher Preparation** | **Assessments and Grading Opportunities** | **Time Frame** |
|---|---|---|
| *-Prepare materials for the week*<br>*-Watch Teacher Video Demo of Inv.1 part 3and 4*<br>*- Review "Materials" and "Getting Ready"* | *-Notebook Investigation Entry*<br>*-Student Sheet 4,5*<br>*- Reading*: FOSS Student text*: Towers*<br>*-Journal Entry*<br>*-Writing Prompt*<br>*-Student Observation/Anecdotal Notes*<br>*-Homework (Suggestions)*<br>*- Cross Curriculum*<br>*-Extensions - Cross Curriculum Extensions* | 2 sessions |

**Homework/Center Activities/Extra Practices**

- Spelling City(vocab);
- FOSS Digital Resources: eBook, Audio Stories
- Suggested websites
- Word wall activities
- Cross Curriculum Extensions
- FOSS Homeschool Connection
- Informational Text -Reading

***Investigation 1***
***Part 5. Outdoor Solids***

***Summary***

Students take a field trip to discover solid objects in the schoolyard environment. They sort the found objects into two groups- natural and human-made.

| ***Core Ideas/Understandings*** | ***S&E Practices Alignment*** | ***CC Concepts Alignment*** |
|---|---|---|
| • Natural and human-made objects occur outdoors. | ***NGSS***<br>Analyze and Interpret Data (2-PS1-2)<br>Construct Explanation and Design Solution (2-PS1-3) | ***NGSS***<br>Cause and Effect (2-PS1-2)<br>Energy and Matter (2-PS1-3) |

***Language Development***

Human, natural

| **Teacher Preparation** | **Assessments and Grading Opportunities** | **Time Frame** |
|---|---|---|
| *-Prepare materials for the week*<br>*-Watch Teacher Video of Inv.1 part 5*<br>*- Review "Materials" and "Getting Ready"*<br><br>*-Administer I-check and record data* | *-Notebook Investigation Entry*<br>*-Journal Entry*<br>*-Writing Prompt*<br><br>*I-Check 1* | *1 sessions*<br>***Assign for Homework*** |

**Homework/Center Activities/Extra Practices**

- Spelling City(vocab);
- FOSS Digital Resources: eBook, Audio Stories
- Suggested websites
- Word wall activities
- Cross Curriculum Extensions
- FOSS Homeschool Connection
- Informational Text -Reading

| ***Overview Investigation 2***<br>***"Liquids"*** | |
|---|---|
| ***Summary***<br>Students will investigate the properties and behaviors of liquids. They will practice vocabulary associated with liquids. Students will draw the level surface of liquids in containers as the containers change position. They will investigate puddles outdoors and create puddles where none pre4viously existed. | |
| ***Core Concepts:***<br>• Liquid is one common state of matter.<br>• Liquids move freely in containers and they have properties that help identify them.<br>• Liquids take the shape of their containers and the surfaces of liquids are flat and level.<br>• They pour and flow. | ***Performance:***<br>• Describe properties of seven different liquids<br>• Use a table to record properties<br>• Tip, swirl, shake, roll to investigate properties of liquids<br>• Observe liquid in different containers and draw to record the observations<br>• Communicate observations and results |
| ***New Vocabulary***<br>Bubble, colorless, dish soap, fabric softener, flow, foam, hand soap, has color, level, oil, pour, puddle, shake, starch, surface, syrup, thick, thick, thin, translucent, transparent, viscous | ***Language Development***<br>Move freely, container |
| ***Assessments***<br>Pre- Assessment<br>Notebook Investigation Entry(s) Part 1 &2<br>Reading: Foss Student text(s)<br>Writing Prompt: Review(s)<br>Journal Entry (s)<br>Student Observation/ Anecdotal Notes<br>Individual Work | ***Assessments Data Due for District Analysis*** |

## ***Overview Investigation 2***
## ***Part 1 "Liquid in Bottles"***

***Summary***

Students working at a learning center investigate seven different liquids to develop the concept of liquid. They tip, swirl, shake, roll, and otherwise to investigation the liquids in plastic bottles: plain water, corn syrup, liquid dish soap, liquid hand soaps, cooking oil, fabric softener(or laundry starch) and water with color.

| ***Core Ideas/Understandings*** | ***S&E Practices Alignment*** | ***CC Concepts Alignment*** |
|---|---|---|
| • Liquid is one state or phase of matter<br>• Objects are described and identified by their properties.<br>• We use our senses to observe the properties of solids. | ***NGSS***<br>Planning and Carrying Out Investigations (2-PS1-1) | ***NGSS***<br>Patterns (2-PS1-1) |

***Focus Questions***

1. How are liquids different from each other?
2. How can liquids be described?
3. How do liquids change in containers?
4. Where are liquids outdoors?

| **Teacher Preparation** | **Assessments and Grading Opportunities** | **Time Frame** |
|---|---|---|
| *-Prepare materials for the week*<br>*-Read "At A Glance" TE*<br>*-Read "-Background for the Teacher"*<br>*-Read "Teaching Children About Liquids"*<br>*- Watch Video Demonstration of Inv. 2*<br>*-Review " Materials" "Getting Ready" and "Guiding the Investigation"* | *-Notebook Investigation Entry*<br>*Student Sheet No. 5*<br>*- Reading*: FOSS Student text*: additional informational text*<br>*-Journal Entry*<br>*-Writing Prompt*<br>*-Student Observation/Anecdotal Notes* | 2 sessions |

**Homework/Center Activities/Extra Practices**

- Spelling City(vocab);
- FOSS Digital Resources: eBook, Audio Stories
- Suggested websites
- Word wall activities
- Cross Curriculum Extensions
- FOSS Homeschool Connection
- Informational Text -Reading

## ***Investigation 2***
## ***Part 2. Properties of Liquids***

***Summary***

Students observe the seven liquids, describe their properties and record the descriptions in their own words. Their descriptive language is used as a springboard to develop precise vocabulary for properties of liquids. Vocabulary is supported by posters and practiced with liquid –properties card.

| ***Core Ideas/Understandings*** | ***S&E Practices Alignment*** | ***CC Concepts Alignment*** |
|---|---|---|
| • Liquids take the shapes of the containers.<br>• The surfaces of liquids are flat and level. | ***NGSS***<br>Planning and Carrying Out Investigations (2-PS1-1) | ***NGSS***<br>Patterns (2-PS1-1) |

***Focus Questions***

1. How are liquids different from each other?

| **Teacher Preparation** | **Assessments and Grading Opportunities** | **Time Frame** |
|---|---|---|
| *-Prepare materials for the week.*<br>*-Watch Teacher Video Demo of Inv.3 part 3*<br>*- Review "Materials" and "Getting Ready"* | *-Notebook Investigation Entry*<br>*Student Sheet No. 7,8*<br>*- Reading*: FOSS Student text*: informational text*<br>*-Journal Entry*<br>*-Writing Prompt*<br>*-Student Observation/Anecdotal Notes*<br><br>***Note:***<br>*When recording in the student notebook takes the place of Student Sheet No. 8;* | *2 sessions* |

**Homework/Center Activities/Extra Practices**

- Spelling City(vocab);
- FOSS Digital Resources: eBook, Audio Stories
- Suggested websites
- Word wall activities
- Cross Curriculum Extensions
- FOSS Homeschool Connection
- Informational Text -Reading

## ***Investigation 2***
## ***Part 3. Liquid Level***

***Summary***

Students work with liquids in different containers, observing them, recording shape, location, and appearance as it rotates and falls.

| ***Core Ideas/Understandings*** | ***S&E Practices Alignment*** | ***CC Concepts Alignment*** |
|---|---|---|
| • How are liquids different from each other?<br>• How can liquids be described?<br>• How do liquids change in containers?<br>• Where are liquids outdoors? | ***NGSS***<br>Planning and Carrying Out Investigations (2-PS1-1) | ***NGSS***<br>Patterns (2-PS1-1) |

***Focus Questions***

1. How do liquids flow when a bottle is tipped upside down?
2. How does the same amount of liquid look in various shapes of containers?
3. In what ways are liquids the same?

| **Teacher Preparation** | **Assessments and Grading Opportunities** | **Time Frame** |
|---|---|---|
| *-Prepare materials for the week.*<br>*-Watch Teacher Video Demo of Inv.3 part 3*<br>*- Review "Materials" and "Getting Ready"* | *-Notebook Investigation Entry*<br>*Student Sheet No. 17,18,19,20*<br>*- Reading*: FOSS Student text*: Liquids*<br>*-Journal Entry*<br>*-Writing Prompt*<br>*-Student Observation/Anecdotal Notes* | *2 sessions* |

**Homework/Center Activities/Extra Practices**

- Spelling City(vocab);
- FOSS Digital Resources: eBook, Audio Stories
- Suggested websites
- Word wall activities
- Cross Curriculum Extensions
- FOSS Homeschool Connection
- Informational Text -Reading

<table>
<tr><th colspan="2"><u>Overview Investigation 3</u><br><u>“Bits and Pieces”</u></th></tr>
<tr><td colspan="2"><u>Summary</u><br>Liquid Students will investigate the properties and behaviors of liquids. They will practice vocabulary associated with liquids. Students will draw the level surface of liquids in containers as the containers change position. They will investigate puddles outdoors and create puddles where none pre4viously existed.</td></tr>
<tr><td><u>Core Concepts:</u><ul><li>Solid Material can occur as masses of small particles</li><li>A mass of particular matter can form piles and support a denser object on its surface</li><li>The surface of a mass of particles is not flat and level</li><li>Particulate solids can be separated by size</li><li>Particulate matter occurs naturally in the outdoors.</li></ul></td><td><u>Performance:</u><br>• Experience solid material a pieces, grains, and particles<br>• Observe the behavior of small solids in various settings<br>• Combine and s3epartate solid materials of different particle sizes<br>• Compare the behavior of solids and liquids in similar settings<br>• Communicate observations and results</td></tr>
<tr><td><u>New Vocabulary</u><br>Cornmeal, different, funnel, grain, largest, lima bean, mixture, mung bean, particle, pile, pinto bean, power, rice, scoop, screen, separate, size, smallest</td><td><u>Language Development</u></td></tr>
<tr><td><u>Investigation Assessments</u><br>Notebook Investigation Entry<br>Student Sheets<br>- Reading: FOSS Student text: additional informational text<br>-Journal Entry<br>-Writing Prompt<br>-Student Observation/Anecdotal Notes</td><td><u>Assessments Due to District for Analysis</u><br><br>Journal Entry<br>I-Check 3</td></tr>
</table>

***Investigation 3***
***Part 1& 2 – "Solids in Containers, Separating Soup Mix"***

***Summary***

Students work with solid materials that represent five particle sizes and investigate their properties.

| ***Core Ideas/Understandings*** | ***S&E Practices Alignment*** | ***CC Concepts Alignment*** |
|---|---|---|
| • Solid materials can occur as masses of small particles.<br>• A mass of particulate matter can form poles and support a denser objects on its surface | ***NGSS***<br>Planning and Carrying Out Investigations (2-PS1-1) | ***NGSS***<br>Patterns (2-PS1-1) |

***Focus Questions***

1. Are these materials solid or liquid?

| **Teacher Preparation** | **Assessments and Grading Opportunities** | **Time Frame** |
|---|---|---|
| *Prepare materials for the week.*<br>*-Read: At a Glance Background for the Teacher, Teaching Children about Bits and Pieces, Working at Learning Center*<br>*-Read Getting Ready and Guiding the Investigation*<br>*-Watch Teacher Video Demo of Investigation 3 Part.1* | *-Notebook Investigation Entry*<br>*-Student Sheet No. 21,22*<br>*- Reading*: FOSS Student text*:*<br>*-Journal Entry*<br>*-Writing Prompt*<br>*-Student Observation/Anecdotal Notes* | ***2 sessions*** |

**Homework/Center Activities/Extra Practices**

- Spelling City(vocab);
- FOSS Digital Resources: eBook, Audio Stories
- Suggested websites
- Word wall activities
- Cross Curriculum Extensions
- FOSS Homeschool Connection
- Informational Text -Reading

***Investigation 3***
***Part 3 & 4 – "Solids in Bottles, Spills"***

***Summary***

Using funnels students will pour four particulate solid materials into cle3ar bottles with caps. They will observe how the particulate materials look, sound and move when the shake and roll the bottles. Students will compare the properties of particulate solid material to liquids.

| ***Core Ideas/Understandings*** | ***S&E Practices Alignment*** | ***CC Concepts Alignment*** |
|---|---|---|
| • Masses of particulate matter can pour.<br>• The surface of a mass of particles is mot flat and level. | ***NGSS***<br>Planning and Carrying Out Investigations (2-PS1-1) | ***NGSS***<br>Patterns (2-PS1-1) |

| **Teacher Preparation** | **Assessments and Grading Opportunities** | **Time Frame** |
|---|---|---|
| *-Prepare materials for the week.*<br>*-Read Getting Ready and Guiding the Investigation, Wrap-up/Warm-up*<br>*-Watch Teacher Video Demo of Investigation 3 Part.3 & 4*<br><br>***-Administer assessment and record data*** | *-Notebook Investigation Entry*<br>*-Student Sheet Mo. 24,25,26*<br>*- Reading*: FOSS Student text*: Pouring, Comparing Solids and Liquids*<br>*-Journal Entry*<br>*-Writing Prompt*<br>*-Student Observation/Anecdotal Notes*<br>*-I-Check 3* | ***2 sessions*** |

**Homework/Center Activities/Extra Practices**

- Spelling City(vocab);
- FOSS Digital Resources: eBook, Audio Stories
- Suggested websites
- Word wall activities
- Cross Curriculum Extensions
- FOSS Homeschool Connection
- Informational Text -Reading

| ***Overview Investigation 4***<br>**"Solids and Liquids with Water"** | |
|---|---|
| ***Summary***<br>Students investigate interactions between solids and water and liquids and water. They observe, describe, record, and organize the results. In the culminating activity students test toothpaste to determine if it is a solid or a liquid. | |
| ***Core Concepts:***<br>• Some solids change when mixed with water; others do not.<br>• Some solids dissolve in water.<br>• Water mixtures can be separated using evaporation.<br>• Some liquids mix with water; others do not.<br>• Some materials are mixtures of solids and liquids<br>• Melting occurs when material changes from liquid to solid.<br>• Heat causes materials melt; cold cause4s them to freeze. | ***Performance:***<br>• Experience interactions between water and solids and liquids.<br>• Make observations. |
| ***New Vocabulary***<br>Cornmeal, different, funnel, grain, largest, lima bean, mixture, mung bean, particle, pile, pinto bean, power, rice, scoop, screen, separate, size, smallest | ***Language Development*** |
| ***Investigation Assessments***<br>*Notebook Investigation Entry*<br>*Student Sheets*<br>- *Reading*: FOSS Student text*: additional informational text*<br>*-Journal Entry*<br>*-Writing Prompt*<br>*-Student Observation/Anecdotal Notes* | ***Assessments Due to District for Analysis***<br><br>**I-Check 4**<br>**Unit Assessment** |

## ***Investigation 4***
## ***Part 1 "Solids, Liquids, and Water"***

### ***Summary***

Students observe what happens when solids and water are mixed, and what happens when liquids and water are mixed. They will conduct systematic investigation of toothpaste and observe solids and liquids when heated and cooled.

| ***Core Ideas/Understandings*** | ***S&E Practices Alignment*** | ***CC Concepts Alignment*** |
|---|---|---|
| • Some solids change when mixed with water; others do not.<br>• Some solids dissolve in water.<br>• Water mixtures can be separated using evaporation.<br>• Melting occurs when material changes from liquid to solid.<br>• Heat causes materials melt; cold cause4s them to freeze. | ***NGSS***<br>Engaging in Argument from Evidence (2-PS1-4) | ***NGSS***<br>Cause and Effect (2-PS1-4) |

### ***Focus Questions***

1. What happens when solids are mixed with water?
2. What happens when liquids are mixed with water?
3. Is toothpaste solid or liquid?
4. How do properties of materials change when they are heated or cooled?
5. What happens when you mix water with solid plant material collected outdoors?

| **Teacher Preparation** | **Assessments and Grading Opportunities** | **Time Frame** |
|---|---|---|
| *Prepare Materials for the week*<br>*-Read "At A Glance" TE*<br>*-Read "-Background for the Teacher"*<br>*-Read "Teaching Children About Solids, Liquids, and Water"*<br>*-Review " Materials", "Getting Ready" and "Guiding the Investigation"*<br>*-View Teacher Prep video* | *-Notebook Investigation Entry*<br>*-Student Sheets No. 27,28*<br>*- Reading*: FOSS Student text*: informational text*<br>*-Journal Entry*<br>*-Writing Prompt*<br>*-Student Observation/Anecdotal Notes* | ***2 sessions*** |

### **Homework/Center Activities/Extra Practices**

- Spelling City(vocab);
- FOSS Digital Resources: eBook, Audio Stories
- Suggested websites
- Word wall activities
- Cross Curriculum Extensions
- FOSS Homeschool Connection
- Informational Text -Reading

| ***Investigation 4***<br>***Part 2 "Liquids and Water"*** | | |
|---|---|---|
| ***Summary***<br>Students add water to bottles of familiar liquids and observe the changes that occur immediately. Students observe and record results from investigation with mixtures. | | |
| ***Core Ideas/Understandings*** | ***S&E Practices Alignment*** | ***CC Concepts Alignment*** |
| • Some liquids mix with water; others form layers. | ***NGSS***<br>Engaging in Argument from Evidence (2-PS1-4) | ***NGSS***<br>Cause and Effect (2-PS1-4) |

| **Teacher Preparation** | **Assessments and Grading Opportunities** | **Time Frame** |
|---|---|---|
| *Prepare Materials for the week*<br>*-Review " Materials", "Getting Ready" and "Guiding the Investigation"*<br><br>*-View Teacher Prep video* | *--Notebook Investigation Entry*<br>*- Student Sheets No. 29*<br>*- Reading*: FOSS Student text*: Mix it Up!*<br>*-Journal Entry*<br>*-Writing Prompt*<br>*-Student Observation/Anecdotal Notes* | ***1 sessions*** |

**Homework/Center Activities/Extra Practices**

- FOSS Digital Resources: eBook, Audio Stories
- Spelling City (vocab)
- Suggested websites
- Word wall activities
- Cross Curriculum Extensions
- FOSS Homeschool Connection
- Informational Text -Reading

| ***Investigation 4***<br>***Part 3 "Toothpaste Investigation"*** | | |
|---|---|---|
| ***Summary***<br>Students add water to bottles of familiar liquids and observe the changes that occur immediately. Students observe and record results from investigation with mixtures. | | |
| ***Core Ideas/Understandings*** | ***S&E Practices Alignment*** | ***CC Concepts Alignment*** |
| • Some liquids mix with water; others form layers. | ***NGSS***<br>Engaging in Argument from Evidence (2-PS1-4) | ***NGSS***<br>Cause and Effect (2-PS1-4) |

| Teacher Preparation | Assessments and Grading Opportunities | Time Frame |
|---|---|---|
| *Prepare Materials for the week*<br>*-Review " Materials", "Getting Ready" and "Guiding the Investigation"*<br><br>*-View Teacher Prep video* | *-Notebook Investigation Entry*<br>*Student Sheet No.30*<br>*- Reading*: additional informational text<br>*-Journal Entry*<br>*-Writing Prompt*<br>*-Student Observation/Anecdotal Notes* | ***2 sessions*** |

**Homework/Center Activities/Extra Practices**

- FOSS Digital Resources: eBook, Audio Stories
- Spelling City(vocab)
- Suggested websites
- Word wall activities
- Cross Curriculum Extensions
- FOSS Homeschool Connection
- Informational Text -Reading

| ***Investigation 4 Part 4***<br>***"Changing Properties"*** | | |
|---|---|---|
| ***Summary***<br>Students use hot water bath to see if they can change small samples of ice, margarine, and chocolate. They discover that heat can melt some materials and they put liquids in a freezer to discover some materials freeze in the cold. | | |
| ***Core Ideas/Understandings*** | ***S&E Practices Alignment*** | ***CC Concepts Alignment*** |
| • Melting occurs when material changes from solid to liquid.<br>• Freezing occurs when material changes from liquid to solid.<br>• Heat causes materials to melt; cold causes them to freeze. | ***NGSS***<br>Engaging in Argument from Evidence (2-PS1-4) | ***NGSS***<br>Cause and Effect (2-PS1-4) |

| **Teacher Preparation** | **Assessments and Grading Opportunities** | **Time Frame** |
|---|---|---|
| *Prepare Materials for the week*<br>*-Review " Materials", "Getting Ready" and "Guiding the Investigation"*<br>*-View Teacher Prep video* | *-Notebook Investigation Entry*<br>*- Reading*: FOSS Student text*: Heating and Cooling*<br>*-Journal Entry*<br>*-Writing Prompt*<br>*-Student Observation/Anecdotal Notes*<br>*I-Check 4*<br>*Unit Post Test* | ***2 sessions*** |

| **Homework/Center Activities/Extra Practices** | |
|---|---|
| • Spelling City(vocab);<br>• FOSS Digital Resources: eBook, Audio Stories<br>• Suggested websites | • Word wall activities<br>• Cross Curriculum Extensions<br>• FOSS Homeschool Connection<br>• Informational Text -Reading |

# ***Writing Prompts Overview***

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 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 2 DISTRICT Check point Assessment s given throughout the unit may also be included in the body of evidence.

Recommended Body of Evidence – Grade 2 Solids and Liquids

Prompt 1: FOSS: Solids and Liquids- Investigation 1 -Solids

4. How can solid objects be described?
5. What are properties?

Prompt 2: FOSS : : Solids and Liquids- Investigation 1 –Part 2 -Solid Materials

1. What are solid objects made of?
2. How are materials different from objects?

Prompt 3FOSS: : Solids and Liquids- Investigation 1 –Part 3-Group Solid Objects

1. Can two or more objects have the same property?

Prompt 4: FOSS: : Solids and Liquids- Investigation 1 –Part 4 – Const4ruct with Solids

1. Which objects are useful for building towers?
2. What would make a good starting object?
3. How can you attach two objects to make the tower taller?

Prompt 5: FOSS: Solids and Liquids- Investigation 1 –Solids Part 5 Outdoor Solids

1. Are there solid objects outdoors?
2. What is the object you found, and what materials is it made of?

Prompt 6 FOSS: : Solids and Liquids- Investigation 2 –Liquids Part 1-Liquids in Bottles

1. How are liquids different from each other?
2. Are all liquids the same?
3. Do all liquids move the same?
4. What happens to the liquids when yu slowly tip the bottles on their sides? When you turn them upside down?

Prompt 8: FOSS: Solids and Liquids- Investigation 2 –Liquids Part 2-Properties of Liquids

1. How can liquids be described?
2. Is water transparent?

Prompt 9: FOSS: Solids and Liquids- Investigation 2 –Liquids Part 3-Liquid Level

1. How do liquids change in containers?
2. What part of the bottle is the liquid in as the bottle turns?
3. What happens to the surface of the liquid as the bottle turns?
4. Does the water stay the same shape, or does it change shape as the bottle turns?

Prompt 10: FOSS: Solids and Liquids- Investigation 2 –Liquids Part 4-Puddles

1. Where are liquids outdoors?
2. Is the puddle water viscous? Bubbly? Foamy? Translucent? How do you know?
3. What is a puddle?
4. How could you make a puddle?

Prompt 11: FOSS: Solids and Liquids- Investigation 3 –Bits and Pieces Part 1-Solids in Containers

1. Are these materials solid or liquid?
2. Describe how the materials flow. Can you put them in a pile, a line, a circle, or a square?
3. How is the surface of a container of particles of solid material differe4nt from the surface of a liquid?

Prompt 12: FOSS: Solids and Liquids- Investigation 3 –Bits and Pieces Part 2-Separating Soup Mix

1. How can mixtures of particles be separated?
2. Were you able to separate the soup mixture? How did you do it?

Prompt 13: FOSS: Solids and Liquids- Investigation 3 –Bits and Pieces Part 3-Solids in Bottles

1. How do particles of solids move in bottles?

Prompt 14: FOSS: Solids and Liquids- Investigation 3 –Bits and Pieces Part 4-Beads and Screens

1. Which screens can separate beads? Will any other screens work?

Prompt 15: FOSS: Solids and Liquids- Investigation 3 –Bits and Pieces Part 5-Spills

1. Are there little pieces of solid material outdoors?
2. How can we find out?
3. How do you think the the little pieces of solids and water will pour? Will they pour the same or differently?

Prompt 16: FOSS: Solids and Liquids- Investigation 4 – Solids, Liquids, and Water Part 1-Solids and Water

1. What happens when solids are mixed with water?
2. Does the solid material look the same or different?
3. Does th4e water look the same or different?

Prompt 17: FOSS: Solids and Liquids- Investigation 4 – Solids, Liquids, and Water Part 2-Liquids and Water

1. What happens when liquids are mixed with water?
2. Describe what you see.

Prompt 18: FOSS: Solids and Liquids- Investigation 4 – Solids, Liquids, and Water Part 3-Toothpaste Investigation

1. Is toothpaste solid or liquid?
2. What could you do to find out if this is a mixture of solid and liquid?

Prompt 19: FOSS: Solids and Liquids- Investigation 4 – Solids, Liquids, and Water Part 4-Changing Properties

1. How do properties of materials change when they are heated or cooled?

Prompt 20: FOSS: Solids and Liquids- Investigation 4 – Solids, Liquids, and Water Part 5-Tea Time

1. What happens when you mix water with solid plant material collected outdoors?

## Unit Resources:

Content books-

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

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

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