SOLIDS AND LIQUIDS

The **Solids and Liquids Module** provides experiences that heighten students' awareness of the physical world. Matter with which we interact exists in three fundamental states: solid, liquid, and gas. In this module first and second graders have introductory experiences with two of these states of matter, solid and liquid.

FOSS Expects Students To

- Develop curiosity and interest in the objects that make up their world.
- Investigate materials constructively during free exploration and in a guided discovery mode.
- Recognize differences between solids and liquids.
- Explore a number of liquids.
- Observe and describe the properties of solids and liquids.
- Sort materials according to properties.
- Combine and separate solids of different particle sizes.
- Observe and describe what happens when solids are mixed with water.
- Observe and describe what happens when other liquids are mixed with water.
- Use information gathered to conduct an investigation on an unknown material.
- Acquire the vocabulary associated with the properties of solids and liquids.
- Use written and oral language to describe observations.

Solids	Content	Thinking Processes
Students explore solid objects, such as pieces of wood, plastic, and metal. They observe, describe, and sort the objects according to their properties. They construct towers (and other structures), using the properties inherent in the materials to accomplish the task	• Solids are one state of matter. • Solid materials have properties that separate them from other states of matter. • Solids can be sorted by their properties. • Solid materials have distinct uses based on their properties	• Observe several kinds of solid materials. • Compare properties of solid materials. • Sort solids in different ways.

Liquids	Content	Thinking Processes
Students investigate liquids in a variety of settings to become familiar with their properties. A number of games are used to rehearse precise liquids vocabulary.	Liquids are one state of matter. • Liquids have many properties. • Liquids pour and flow. • Liquids take the	• Observe and describe properties of different liquids in bottles. • Compare the appearance and behavior of different liquids in containers.

Students also use representational materials to enhance their understanding of the unique behaviors of liquids.	shape of their container. • The surface of liquid is level with respect to the ground.	

Bits and Pieces	Content	Thinking Processes
Students work with beans, rice, and cornmeal to find out how solids behave when the pieces are small. They shake, rattle, and roll the materials in bottles, pour them from container to container, and separate them using screens.	• Solid materials come in all sizes and shapes. • Particles of solid materials can pour like liquids, but maintain their shape. • Solid materials can support denser materials on their surface. • Mixtures of solid particles can be separated with a screen.	• Observe properties of solid particles in different containers. • Separate a mixture of solids by using screens. • Observe and describe the properties of solid particles in closed bottles. • Use representational materials to separate particles based on size.

Solids And Liquids With Water	Content	Thinking Processes
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.	• Some solids change when mixed with water; others do not. • Some solids dissolve in water; evaporation leaves the solid behind. • Some liquids mix with water; other liquids form a layer above or below water.	• Observe and describe what happens when solids and water are mixed. • Observe and describe what happens when liquids and water are mixed. • Organize observations of mixtures.

Interdisciplinary Extensions	Foss Science Stories	Technology/Home Connection
Solids Language Extensions Make "My Book of Solids." •Draw and label constructions. • Make solid collages. • Sort by geometric shapes.	• Everything Matters	Students play I Spy with family members, describing the properties of solids spied at home and guessing at their identity.

• Build towers from clues. • Introduce Venn diagrams. • Set up a solids sorting center. • Build a paper bridge.		
Liquids Language Extension • Write about being a chemist. • Graph water amounts in containers. • Buy solids and liquids. • Make a picture collage of liquids. • Make a museum of liquids. • Conduct float and sink investigations. • Evaporate water. • Student projects	• Solids and Liquids	Students record their observations and the identity of a liquid found at home. In class they complete their recordings to form a class book of liquid riddles.
Bits and Pieces Language Extensions • Discuss and compare solids and liquids. • Create sound and touch poetry. • Graph a trail-mix snack. • Estimate number of beans in a handful. • Create 15-bean soup-mix art. • Make bottle art. • Separate mixtures with magnets or sifters. • Investigate fine powders. • Mix solids to make layers.	• Solids to Liquids and Back Again	Students investigate what happens when solids and liquids are poured on porous and nonporous surfaces, such as plastic and paper towels.
Solids and Liquids with Water Language Extensions • Time ice melting. • Enlarge a recipe. • Change states of matter. • Make an ocean in a bottle.	• Mix It Up!	Students use solids and liquids to make a salad dressing and observe what happens when the materials are mixed.

• Make liquid layers. • Mix colors and media. • Make soft drinks.		

FOSS AND NATIONAL STANDARDS

The Solids and Liquids Module emphasizes the development of observation and description skills and building explanations based on experience. This module supports the following National Science Education Standards.

SCIENCE AS INQUIRY

Develop students' abilities to do and understand scientific inquiry.

- Ask and answer questions.
- Plan and conduct simple investigations.
- Employ tools and techniques to gather data.
- Use data to construct reasonable explanations.
- Communicate investigations and explanations.
- Understand that scientists use different kinds of investigations and tools to develop explanations using evidence and knowledge.

CONTENT: PHYSICAL SCIENCE

Develop students' understanding of the characteristics of matter.

- Objects have many observable properties, such as size, weight, shape, sound, texture, and the ability to react with other substances, such as water.
- Objects can be described by the properties of the materials from which they are made, and those properties can be used to separate or sort a group of objects or materials.
- Materials can exist in different states—solid, liquid, and gas. Some common materials, such as water, can be changed from one state to another by heating or cooling.

SCIENCE AND TECHNOLOGY

Develop students' abilities in technological design.

- Identify a simple problem and propose a solution.
- Evaluate a product or design.
- Communicate a problem, design, and solution.