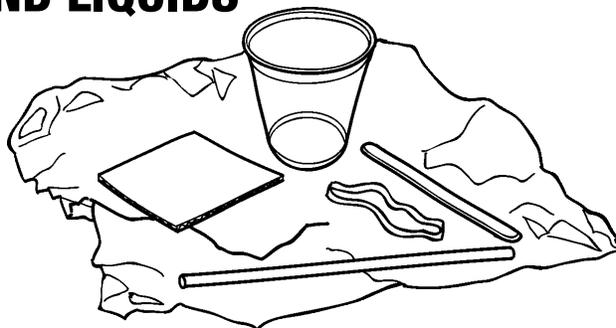




OVERVIEW

SOLIDS AND LIQUIDS



CONTENT GOALS

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 graders have introductory experiences with two of these states, 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, liquids, and gases.
- 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.
- Observe and describe what happens when materials are mixed, cooled, and heated.
- Use information gathered to conduct an investigation on an unknown material and make new observations when discrepancies exist between descriptions.
- Draw pictures that portray features of objects.
- Record observations and data with pictures, numbers, and words.
- Organize observations on a bar graph.

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SOLIDS AND LIQUIDS MODULE MATRIX

SYNOPSIS

CA SCIENCE CONTENT STANDARDS

1. SOLIDS

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.

- PS1a Students know solids, liquids, and gases have different properties.
- I&E4a Draw pictures that portray some features of the thing being described.
- I&E4b Record observations and data with pictures, numbers, or written statements.

2. LIQUIDS

Students investigate liquids in a variety of settings to become familiar with their properties. They play games to rehearse precise liquids vocabulary. Students use representational materials to enhance their understanding of the unique behaviors of liquids.

- PS1a Students know solids, liquids, and gases have different properties.
- I&E4b Record observations and data with pictures, numbers, or written statements.
- I&E4c Record observations on a bar graph.

3. BITS AND PIECES

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.

- PS1a Students know solids, liquids, and gases have different properties.
- I&E4b Record observations and data with pictures, numbers, or written statements.
- I&E4c Record observations on a bar graph.

4. SOLIDS AND LIQUIDS WITH WATER

Students investigate interactions between solids and water and liquids and water. They observe, describe, record, and organize the results. They test toothpaste to determine if it is a solid or a liquid. They investigate melting and freezing of familiar liquids.

- PS1a Students know solids, liquids, and gases have different properties.
- PS1b Students know the properties of substances can change when the substances are mixed, cooled, or heated.
- I&E4a Draw pictures that portray some features of the thing being described.
- I&E4b Record observations and data with pictures, numbers, or written statements.
- I&E4c Record observations on a bar graph.
- I&E4e Make new observations when discrepancies exist between two descriptions of the same object or phenomenon.

- 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.

- *FOSS Science Resources: Solids and Liquids, "Everything Matters"*
- Science Notebook: Students draw and write about solids. They draw and label their tower constructions.

Preassessment (optional)

Teacher Observation/Notebook Sheet

- Identifies properties of solid objects and sorts objects based on a property.
- Compares different solids.
- Identifies properties of a solid used for specific purposes in construction.

- Liquids are one state of matter.
- Liquids have many properties.
- Liquids pour and flow.
- Liquids take the shape of their container.
- The surface of liquid is level with respect to the ground.

- *FOSS Science Resources: Solids and Liquids, "Solids and Liquids"*
- Science Notebook: Students draw and write about liquids and their properties. They use prepared sheets to record observations and respond to writing prompts. They make a bar graph indicating the number of vials of water it takes to fill four different containers.

Teacher Observation/Notebook Sheet

- Describes observations.
- Uses new vocabulary accurately.
- Draws liquids taking the shape of their container.
- Observes that the liquid surface remains level as the bottle tips.

- 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.

- Science Notebook: Students draw and write about small solids and their properties. They record which screen is used to separate each material.

Teacher Observation/Notebook Sheet

- Compares properties of solids and liquids.
- Chooses screens of appropriate size to separate solids.

- 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.
- Heating and cooling solids and liquids can change them from one state to another.

- *FOSS Science Resources: Solids and Liquids, "Mix It Up!" and "Solids to Liquids and Back Again"*
- Science Notebook: Students record the results of mixing solids and liquids with water. They make a bar graph of the results.

Teacher Observation/Notebook Sheet

- Accurately records observations.
- Supports opinions with evidence.

End-of-Module Assessment



FOSS AND CALIFORNIA STANDARDS

The **Solids and Liquids Module** supports the following Physical Sciences Content Standards for grade 1.*

PHYSICAL SCIENCES

PS1 *Materials come in different forms (states), including solids, liquids, and gases. As a basis for understanding this concept:*

- PS1a Students know solids, liquids, and gases have different properties.
- PS1b Students know the properties of substances can change when the substances are mixed, cooled, or heated.

The **Solids and Liquids Module** supports the following Investigation and Experimentation Content Standards for grade 1.*

INVESTIGATION AND EXPERIMENTATION

I&E4 *Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:*

- I&E4a Draw pictures that portray some features of the thing being described.
- I&E4b Record observations and data with pictures, numbers, or written statements.
- I&E4c Record observations on a bar graph.
- I&E4e Make new observations when discrepancies exist between two descriptions of the same object or phenomenon.

**Science Content Standards for California Public Schools: Kindergarten through Grade Twelve (Sacramento: California Department of Education, 2000).*

SAFETY IN THE CLASSROOM



Young children must be allowed to demonstrate that they can act responsibly with materials, but they must be given guidelines for safe and appropriate use of materials. Work with students to develop those guidelines so they participate in making behavior rules and understand the rationale for the rules. Encourage responsible actions toward other students. Look for the safety-note icon in the Getting Ready section, which will alert you to safety concerns throughout the module.

General classroom safety rules to share with students include

1. Listen carefully to your teachers's instructions. Follow all directions. Ask questions if you don't know what to do.
2. Tell your teacher if you have any allergies.
3. Never put any materials in your mouth. Do not taste anything unless your teacher tells you to do so.
4. Never smell any unknown material. If your teacher asks you to smell something, wave your hand over the material to draw the smell toward your nose.
5. Do not touch your face, mouth, ears, nose, or eyes while working with chemicals, plants, or animals.
6. Always protect your eyes. Wear safety goggles when necessary. Tell your teacher if you wear contact lenses.
7. Always wash your hands with soap and warm water after handling chemicals, plants, or animals.
8. Never mix any chemicals unless your teacher tells you to do so.
9. Report all spills, accidents, and injuries to your teacher.
10. Treat animals with respect, caution, and consideration.
11. Clean up your work space after each investigation.
12. Act responsibly during science investigations.

These safety rules are on the FOSS safety poster.

Materials Safety Data Sheets (MSDS) for materials used in the FOSS program can be found on the Delta Education website. If you have questions regarding any MSDS, call Delta Education toll free at 800-258-1302 (Monday–Friday 8 a.m. to 6 p.m. EST).



SCHEDULING THE MODULE

The Getting Ready section for each part of the investigation helps you prepare. It provides information on scheduling the activities and introduces the tools and techniques used in the activity. Be prepared—read the Getting Ready section first.

The first item in the Getting Ready section gives an estimated amount of time the part should take. Parts generally take one or two class sessions of 40–50 minutes.

Plan ahead for the scheduling of the parts. Below is a suggested teaching schedule for the module. In addition to the main lesson plans, each investigation suggests additional activities for home and school. Each extension requires additional class time.

The investigations are numbered, and we suggest that they be conducted in that order, as the concepts build upon each other from investigation to investigation. We suggest that a minimum of 8 weeks be devoted to this module. Take your time and explore the subject thoroughly.

SUGGESTED 8-WEEK TEACHING SCHEDULE FOR GUIDING THE INVESTIGATIONS

WEEK	1	2	3	4	5	6	7	8
Solids	2 sessions	3–4 sessions						
Liquids			3 sessions	4 sessions				
Bits and Pieces					3 sessions	1 session		
Solids and Liquids with Water						3 sessions	4 sessions	3 sessions

The chart below provides information on the class organization for each part. If the chart says “whole class,” all students will have shared in the experience at the end of the session. If this column says “center,” however, the session will have to be repeated for each group. An investigation may require as many as seven sessions. You may find that it takes even more sessions to complete an investigation in a way that is satisfactory to you and the class.

INVESTIGATION	PART	NO. OF SESSIONS	ORGANIZATION
1. Solids	1. Introduce Solids	1 session	whole class
	2. Sort Solid Objects	1 session	whole class
	3. Construct with Solids	3–4 sessions	whole class
2. Liquids	1. Liquids in Bottles	2 sessions	center
	2. Properties of Liquids	1 session	whole class
	3. Liquid Level	4 sessions	center
3. Bits and Pieces	1. Solids in Containers	1 session	center
	2. Separating Soup Mix	1 session	center
	3. Solids in Bottles	1 session	center
	4. Separating Beads with a Screen	1 session	whole class
4. Solids and Liquids	1. Solids and Water	3 sessions	whole class
	2. Liquids and Water	2 sessions	whole class
	3. Toothpaste Investigation	2 sessions	whole class
	4. Changing Properties	3 sessions	whole class



SOLIDS AND LIQUIDS OVERVIEW

SCOPE AND SEQUENCE FOR FOSS CALIFORNIA 2007 EDITION

GRADE	PHYSICAL SCIENCES	LIFE SCIENCES	EARTH SCIENCES
5	Mixtures and Solutions	Living Systems	Water Planet
4	Magnetism and Electricity	Environments	Solid Earth
3	Matter and Energy	Structures of Life	Sun, Moon, and Stars
2	Balance and Motion	Insects and Plants	Pebbles, Sand, and Silt
1	Solids and Liquids Air and Weather	Plants and Animals	Air and Weather
K	Wood and Paper	Animals Two by Two Trees	Wood and Paper Trees

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