

Lawrence Hall of Science
Matter:
Solids, Liquids, & Gases
Gems Teacher's Guide for Grades 1-3

Foreword: We chose this particular Gems® guide, because it addresses several core elementary science TEKS dealing with solids, liquids, and gasses. Additionally, since Julie Cervantes is a second grade teacher at Valley View Elementary School, we decided to focus on lessons that would be applicable to her second grade students.

Overview: This Gems® manual covers the three core science concepts of solids, liquids, and gases. It addresses these topics in five in-depth and interactive lessons. The first four lessons are designed to take 45-60 minutes to accomplish. However the fifth lesson actually involves two sessions, or lessons.

Activities:

1. Solids and Liquids
2. Collecting Solids and Liquids
3. Challenging Substances
4. What's the Matter
5. Gases–Discovery & Investigating

Review: The Gems® manual is very user- friendly because it clearly outlines all supplies and steps that are required. The non-consumables, consumables, general supplies, and everything else required for all the activities is listed in detail. The printed format of these pages facilitates ease for organization. The guide also includes a master copy of handouts, what to do the day before the activity, and trouble shooting ideas in the margin. The pictures of students participating in the activities help the teacher get an image of what it is suppose to look like. Samples of student completed handouts are also very useful.

Chosen Activity:

Activity 3: Challenging Substances

Learning Objectives for Activity 3

Students will: (some are not written as behavioral objectives in the guide)

- Reinforce their understanding of solids and liquids
- Understand that materials such as powders and sand are solids
- Apply definitions of solids and liquids
- Base their explanations on evidence
- Use simple tools to collect and measure substances
- Follow directions, work cooperatively in groups, and record data

Brief Description of Lesson: Students are going to move in pairs to different learning stations exploring four new substances; shaving cream, toothpaste, sand, and “Glook”. They are going to categorize these challenging substances into either the solid or liquid category which are terms that were previously defined and explored. They will also learn hand signals to show if something is a solid or a liquid. They will record their ideas on the handout and justify their reasoning. In closing, the students will share their ideas and thinking and any misconceptions will be discussed.

Materials Needed:

For the class:

- Solids and Liquids display from previous sessions
- A rock and a few other solid and items from previous sessions
- A small amount of baking soda
- 1 clear plastic cup

For each student:

- Journal from previous sessions
- One copy of the Solid or Liquid? Student sheet (page 54)
- For pre-writers: sticky notes instead of student sheet
- Pencils

For the toothpaste, shaving, and sand stations:

- 4 cafeteria trays
- 4 trash containers
- About a cup of shaving cream
- About ½ tube of toothpaste
- Toothpicks
- About a cup of sand
- 6 wide-mouth plastic cups
- 8 hand magnifying lenses or handheld microscopes
- 4 dish tubs for washing hands
- Paper towels
- Water
- 2 dustpans and brooms for cleanup
- (optional) dissecting microscopes

For the Glook station:

- A 1-teaspoon measuring spoon
- A 1-tablespoon measuring spoon
- 2 sealable plastic bags or other airtight containers
- 8 tablespoons of white glue
- 8 tablespoons of water
- 2 cups
- 1 stirrer
- 4 teaspoons of Borax powder (sodium tetra borate, used in laundering and as a household cleaner)
- 1 cup of warm water