

5E Lesson Plan # 2

NAME: Julie Cervantes

TITLE: Challenging Substances

TECHNOLOGY LESSON (circle one): Yes No

DATE OF LESSON: Day 4 of Matter Unit

LENGTH OF LESSON: 45-60 Minutes

NAME OF COURSE: 3rd grade Science, Matter

SOURCE: GEMS Teacher's Guide for Grades 1-3, Matter: Solids, Liquids, and Gases

TEKS ADDRESSED:

3.1(A) demonstrate safe practices during field and laboratory investigations

3.2(C) analyze and interpret information to construct reasonable explanations from direct and indirect evidence

3.2(D) communicate valid conclusions

3.4(A) collect and analyze information using tools including calculators, microscopes, cameras, safety goggles, sound recorders, clocks, computers, thermometers, hand lenses, meter sticks, rulers, balances, magnets, and compasses

3.7(B) identify matter as liquids, solids, and gases

CONCEPT STATEMENT:

Many substances are challenging to classify because they combine attributes of a liquid, solid, gas, or a combination of these. A colloid is a mixture of two or more things so they can't be categorized as either a solid or a liquid. In scientific terms, a colloid is a mixture of small particles of a substance that does not dissolve and is dispersed in another substance.

Resource: Gems Guide background information

PERFORMANCE OBJECTIVES:

Students will be able to:

- Use definitions of solids and liquids to classify substances
- Define colloid and give examples of colloids
- Use simple tools to collect and measure substances
- Explain and justify their explanations for classifying substances as solids, liquids, or colloids

RESOURCES:

Materials Needed:

For the class:

- Solids and Liquids display from previous sessions
- A rock and a few other solid and items from previous sessions
- 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 making the Glook:

- 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

SAFETY CONSIDERATIONS:

- Students need to keep the materials contained at their station
- Any spills should be immediately cleaned up
 - Have a broom and mop easily available for cleanup
- None of the substances should ever be put in their mouths
- Don't touch eyes or face until after washing hands
- Hands should be washed after exploring the toothpaste and shaving cream station
 - Have buckets of water available at the station if there is not a sink

SUPPLEMENTARY MATERIALS, HANDOUTS:

- Student Handout, Activity 3: Solid or Liquid

ENGAGEMENT		Time: 5 min.
What the Teacher Will Do	Probing Questions	Student Responses Potential Misconceptions
<p><i>Today we are going to act as scientists exploring and classifying challenging substances.</i></p> <p>Hold up the glook in the bag. Take it out of the bag. Mold it in your hands as the students are trying to decide.</p> <p><i>You are going to carefully explore different substances and decide if it is a solid or liquid.</i></p>	<p><i>Do you think glook is a solid, liquid, or are you unsure? Why?</i></p>	<p><i>Solid, maybe solid and liquid, or not sure</i></p> <p><i>Misconception: It is a solid because it doesn't make a puddle. It is a liquid because it takes the shape of the bag.</i></p>
<p>Check for prior knowledge. <i>Name some things in the classroom that are a solid or liquid.</i></p>	<p><i>What else can you name? How do you know that?</i></p>	<p>Students should be able to name several things in the classroom and refer to the class bulletin board for definitions if needed.</p>

EXPLANATION		Time: 10 min.
What the Teacher Will Do	Probing Questions	Student Responses Potential Misconceptions
<p><i>not really solids or liquids, but I wanted you to have a chance to discuss them and think about the definitions, just like scientist do.</i></p> <p><i>Sand is solid because scientist look have to think about each individual grain of sand.</i></p>	<p><i>Did you get to see the sand using a hand lens? What did you see?</i></p>	<p><i>Students may think sand is a liquid because a pile of sand seems like it can be poured and takes the shape of its container.</i></p>

ELABORATION		Time: 10 min.
What the Teacher Will Do	Probing Questions	Student Responses Potential Misconceptions
<p>Hold up a bottle of hand sanitizer or gel.</p>	<p><i>Can you think of any other substances that can be classified as a colloid?</i></p> <p><i>Did you know milk is considered a colloid? Why do you think that?</i></p>	<p><i>Hand sanitizer, Hair gel, Whip Cream...</i></p>
<p>Optional reading for elaboration, Read the story: <i>Two Bad Ants</i> by Chris Van Allsburg</p> <p><i>When scientist look at a substance like sand or salt, they have to look at each individual grain.</i></p>	<p><i>How about sugar? salt?</i></p> <p><i>How do you think ants see the grains of sand?</i></p>	<p><i>It seems like sugar or salt can take the shape of a container. It seems like it can also be poured.</i></p> <p><i>Sugar looks huge to the ants. Ants can carry a grain of sand and it won't make a puddle if they drop it.</i></p>

EVALUATION		Time: 10 min.
What the Teacher Will Do	Probing Questions	Student Responses Potential Misconceptions
<p>Using new substances: a book, water bottle with water, glue bottle, etc., ask the students to show you hand signals identifying the different things as a solid or liquid.</p> <p>Fist=solid Slowly waving hand=liquid <i>What about glook?</i></p> <p>Their ideas of what a solid and liquid are should now be reinforced by this activity.</p>	<p><i>What is the hand signal for everything I'm holding in my hand?</i></p> <p><i>Can we think of a new hand signal to represent a colloid?</i></p>	<p><i>Students should use both hands showing both signals for the water bottle with water and glue bottle with glue.</i> <i>Book=Fist</i></p> <p>Students can be creative and think of their own hand signals. Possible responses: A fist opening and closing, or fingers flickering.</p>
<p><i>Now add the new substances we explored today to your concept map.</i></p>	<p><i>How would you define a colloid in your own words?</i></p>	<p><i>Students will add the new substances to a new section, describing them as not being a solid, liquid, or gas.</i></p>

EVALUATION		Time: 10 min.
What the Teacher Will Do	Probing Questions	Student Responses Potential Misconceptions
Hold up a grain up sand and the hand lens.	<i>Why is sand a solid and not a liquid?</i>	<p><i>A colloid has characteristics of both solids and liquids, or liquids and gases.</i></p> <p><i>Tiny pieces of solid mixed into liquid.</i></p> <p>Students will add sand to the solids section.</p> <p><i>Sand is a solid because we only look at the grain of sand, not a bucketful that seems like it takes the shape of the container and can be poured.</i></p> <p><i>We can think of it like how an ant would look at a grain of sand. It would be like a rock to them.</i></p>