

# Bay Area Scientists in Schools Presentation Plan

Lesson Name Mysterious Liquids (adapted from Tilley Lab's presentation)

Presenter(s) BASIS Volunteers

Grade Level 1

## California Science Standards Connection(s):

1-PS: States of Materials

- 1) Solids, liquids, gases have different properties
- 2) Substances change properties with mixing, cooling, heating

## Next Generation Science Standards:

2-PS1-1. Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.

Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
<p>Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.</p> <p><input type="checkbox"/> Make observations (firsthand or from media) to collect data that can be used to make comparisons. (1-ESS1-2)</p> <p>Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.</p> <p><input type="checkbox"/> Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. (1-ESS1-1)</p>	<p>PS1.A: Structure and Properties of Matter</p> <p><input type="checkbox"/> Different kinds of matter exist and many of them can be either solid or liquid, depending on temperature. Matter can be described and classified by its observable properties. (2-PS1-1)</p>	<p>Patterns</p> <p><input type="checkbox"/> Patterns in the natural and human designed world can be observed. (2-PS1-1)</p> <p>Structure and Function</p> <p><input type="checkbox"/> The shape and stability of structures of natural and designed objects are related to their function(s). (1-LS1-1)</p>

## Common Core Standards:

### ELA/Literacy:

W.2.8 Recall information from experiences or gather information from provided sources to answer a question.

### Mathematics:

- MP.2 Reason abstractly and quantitatively.  
 MP.5 Use appropriate tools strategically.



**CRS**

**COMMUNITY RESOURCES FOR SCIENCE**  
*practical support for great science teaching*

1611 San Pablo Avenue, Suite 10 B  
 Berkeley, CA 94702

(510) 527-5212 | [www.crs-science.org](http://www.crs-science.org)

## FOSS Connections:

Grade 1 Module: Solids and Liquids

## Abstract:

We will be using simple chemistry to determine the differences between unknown liquids.

The chemistry will involve mixing, dissolving, color changes, and reactions that make gases. We will then use our knowledge of the unknown liquids to separate gold (glitter) from dirt (brown sugar).

## Vocabulary/Definitions:

- Solid - matter that holds its own shape and always takes up the same amount of space
- Liquid - matter that flows freely and takes the shape of its container
- Gas - matter that can't be seen but is all around. Air is an example of a gas.
- Mixture - two or more materials put together
- Dissolve - when a solid is mixed with a liquid, and the solid breaks apart into pieces so tiny they can't be seen in the liquid
- Reaction - when you mix two substances together and see unexpected results like a color change or bubbles of gas

## Materials:

*What you'll bring with you*

Clear plastic cups/petri dishes, waste container, food coloring, coffee filters, plastic spoons, rubberbands

### Mystery Liquids:

- A. Water + blue food color
- B. Vinegar + red food color
- C. Baby Oil
- D. Vegetable Oil
- E. Karo Syrup
- F. Dish Soap

### Mystery Solids:

1. Sand
2. Salt or Sugar
3. Baking Soda

*What students should have ready (pencils, paper, scissors)*

Pencils & Crayons/Colored Pencils

## Classroom Set-up:

Split the class into 3 groups

Chalkboard or dry erase board at front of room

Table or work area at front of room



# CRS

**COMMUNITY RESOURCES FOR SCIENCE**  
practical support for great science teaching

1611 San Pablo Avenue, Suite 10 B  
Berkeley, CA 94702

(510) 527-5212 | [www.crscience.org](http://www.crscience.org)

## Classroom Visit

### 1. Personal Introduction: 5 Minutes

We are graduate/undergraduate students in chemistry at UC Berkeley  
Each presenter will have their own intro/story to share  
Connect with chemistry students see all around them: fireworks, vitamins, swimming pools, etc...

### Topic Introduction: 5 Minutes

Go over vocabulary words. Focus on student examples rather than specific definitions.  
Explain what chemistry is, why it's important, and how it's related to the demo.

### 2. Learning Experience(s): 30-40 Minutes

Explain to kids that chemists do not eat or drink the chemicals they're working with, especially if it is an unknown, because it could taste bad and hurt them.

Remember that kids get distracted if you pass out materials too early. So, make sure to give clear instructions before giving the materials to the kids.

Ask the teacher to help split the class into 3 groups for Experiment #1. Each group will test a different mystery liquid, labelled A, B, and C. They should also take: 3 clear plastic cups, mystery solids 1-3, and a spoon

#### Experiment #1: Dissolving Solids

Sometimes solids can dissolve in liquids so that we can't see them anymore. One test that chemists use to learn about an unknown liquid is see what happens when we add different solids to them.

Label the cups 1, 2, 3

Add a small amount of your mystery liquid to each cup.

Let the students take turns adding one scoop of the mystery solids to the corresponding cup.

Record the results in a table that looks like this:

	Solid #1	Solid #2	Solid #3
Mystery Liquid			

Label each box with a letter: D = dissolve, R = react, N = no change



**CRS**

**COMMUNITY RESOURCES FOR SCIENCE**  
practical support for great science teaching

1611 San Pablo Avenue, Suite 10 B  
Berkeley, CA 94702

(510) 527-5212 | [www.crs-science.org](http://www.crs-science.org)

After each group has had a chance to test their mystery solids. Make a chart on the board & have students copy results onto their worksheet:

	Solid #1	Solid #2	Solid #3
Mystery Liquid A			
Mystery Liquid B			
Mystery Liquid C			

### Experiment #2: Mixing Liquids

Clear away all the cups. Have the students try mixing different liquids in the petri dishes and make observations on their worksheets.

### Experiment #3: Layering Liquids

- 1) Have students trade in all materials for a fresh beaker or test tube.
- 2) Show the students all the mystery liquids. Let them swirl the bottles around but don't let them open them yet.
- 3) Have the students make predictions

### (Optional) Experiment #4: Separating Mixtures

- 1) Have students trade in all materials for a fresh cup of Liquid A and some gold ore (glitter + brown sugar). Ask students if they think they could separate the gold ore mixture with their hands.
- 2) Have students pour the gold ore into Liquid A and stir with a plastic spoon.
- 3) Give students filters (coffee filters stretched loosely over plastic cup with rubberband) and lots of paper towels underneath. Have them CAREFULLY pour the gold mixture through the filter. They can also rinse their pure gold with a small amount of Liquid A.

### 3. Wrap-up: Sharing Experiences and Building Connections 5 Minutes

Review lesson. Conclude by tying to vocabulary, chemistry, and big picture.  
Ask students what their favorite part of the lesson was, etc..

### 4. Close: 5 Minutes

**TOTAL 50-60 Minutes**



**CRS**

**COMMUNITY RESOURCES FOR SCIENCE**  
practical support for great science teaching

1611 San Pablo Avenue, Suite 10 B  
Berkeley, CA 94702

(510) 527-5212 | [www.crscience.org](http://www.crscience.org)

## **Follow-up – After Presentation**

*Suggest students write a letter explaining “How we learned about \_\_\_\_\_?”*

*List or attach examples of activities, websites, connections for additional learning.*

*Attach worksheets, hand-outs, visuals used in classroom presentation.*

### **Reading Connections:**

- A Drop of Water by Walter Wick <http://www.amazon.com/Drop-Of-Water-Science-Wonder/dp/0590221973>
- Everything Is Matter by David Bauer (also available in Spanish)  
<http://www.amazon.com/Everything-Matter-Yellow-Umbrella-Books/dp/0736829423>
- Matter by Christine Webster <http://www.amazon.com/Matter-First-Facts-Physical-World/dp/0736826173>



**CRS**

**COMMUNITY RESOURCES FOR SCIENCE**  
*practical support for great science teaching*

1611 San Pablo Avenue, Suite 10 B  
Berkeley, CA 94702

(510) 527-5212 | [www.crs-science.org](http://www.crs-science.org)