

Community in the Classroom Presentation Plan

Lesson Name Exploring States of Matter!

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Grade Level 1st **Standards Connection(s)** States of Matter and Categorizing

Abstract:

Your opportunity to tell teachers and kids what's going to be fun and interesting about your visit!

Vocabulary/Definitions:

Matter- the stuff everything around you is made of

State of Matter- separable types of matter

Solid- a phase that is difficult to change the shape of; has structure

Liquid- a phase that takes the shape its container, and won't escape from the container

Gas- a phase that completely fills its container, needs a lid to hold it in!

Materials:

We will bring:

Hot plate

Ice

Beaker

Tank

Pumice

Chopsticks

Plastic silverware

Cotton

Coins

Notebooks, printout folded in half

Blue water

Oil

Yellow rubbing alcohol

Beakers

Plexiglas

Pipettes

Pipette bulbs

Con syrup

Honey

Baby oil

Paper towel

Balloons

Argon balloon

Helium balloon

Analytical balance

Liquid nitrogen

Filter flask

Aerosol

Sand

Foam (shaving cream)

Jello

We will need:
Water

Classroom Set-up:

We will be flexible with student seating; we will talk to the teacher in advance to learn about their classroom setup and get tips from the teacher about the best way to divide the class into three groups for the stations segment of the lesson.

Access to power and water would be helpful. If water is not available we can bring our own.

Classroom Visit

1. Introduction

Personal Introduction:

2 Minutes

We are graduate students from UC Berkeley studying organic chemistry! We are originally from all over the country but the one thing we share is a passion for science.

Topic Introduction:

8 Minutes

Introduce vocabulary, starting by asking the students "what is matter?" Discuss what matter is and move on to phase using solid, liquid and gas as examples of different phases. To demonstrate the three phases we will use H₂O.

Demo: First ask, who knows what water is? Ice? What happens when ice is left out? What happens when water evaporates? These are predictions that scientists make. We will demonstrate these changes in matter. A beaker of liquid H₂O will be placed on a hot plate, as the water is heated and begins to boil the bubbles are H₂O as a gas. Next, a watchglass with ice will be held over the steaming beaker. The ice is a solid but will quickly melt into liquid water. This exercise is to demonstrate that one type of matter (H₂O) can exist in three phases: solid, liquid and gas.

2. Learning Experience(s):

25 Minutes

For the bulk of the lesson, the students will be divided up into three groups to visit stations (~8 minutes/station). The students will be armed with a notebook to record their observations, just like real scientists!

Solid Station:

Introduction to solids- What makes something a solid? Some solids are hard, others are soft and squishy; some are heavy, others are light.

Activity- Float or Sink? Students will have the opportunity to touch several different solids and describe their properties. One specific property that will be explored is density. Students will predict whether an object will float or sink, then place the object in a tank of water to test their hypothesis. Objects will include but are not limited to: pumice, wood (chopsticks), plastic (plastic silverware), cotton, metal (coin). The students will be encouraged to record their findings in their notebook in the solids section.

Liquid Station:

Introduction to liquids- Definition- takes the shape of its container, but the liquid will stay in the container on its own, without a lid.

Demonstration- Exploring the mixing of liquids. Some liquids will mix with each other and others will not. To demonstrate this property of liquids (a) water colored blue will be poured into a beaker containing oil, the students will observe two layers because water and oil will not mix and (b) water colored blue will be poured into a beaker containing rubbing alcohol colored yellow, the two liquids will mix to make a green solution!

Activity- To explore another property of liquids, how thick they are, students will have liquid races. Students will pipette a drop of liquid onto Plexiglas on an incline. Potential liquids include: baby oil, water, honey, corn syrup, etc. Students will be able to observe the different speeds of the different liquids.

Gas Station:

Introduction to gases- Definition- gases expand to fill their container and have mass

Demonstrations-

Gas has mass! Two balloons, one containing He and the other Ar, will be demonstrated. The Ar balloon will sink and He will float. They weight different amounts. The Ar balloon weighs more. Gas takes up space! Liquid nitrogen will be poured into a filter flask that has a balloon over the side arm. When the flask is capped, the balloon will quickly begin filling with nitrogen gas demonstrating that gas takes up space.

What is that smell? To demonstrate that gases expand to fill the container they are in, an aerosol will be sprayed at one side of the room. Students will be asked to raise their hands when they can smell it, soon everyone will be able to smell the diffused aerosol.

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

We will bring everyone back to one group to review the exciting things learned that day.

Students will be asked what types of properties each state of matter has.

We will review vocab

Students will be given challenging items and asked to classify them, such as:

Sand

Foam

Jello

Questions?

4. Close:

2 Minutes

TOTAL 42

Minutes

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.

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