LET'S DO IT!

ISBN 978-1-847004-15-4

Teacher Edition

Science Is A Verb!

Part 1

Teacher Edition

Contents

Introduction to the lab manual:

This lab manual provides structure for teachers who wish to engage students in hands-on interactive learning but also provides support for teachers who are more comfortable with enquiry based learning. If you are a teacher who is taking his or her first "dive" into hands-on Science, the background material is designed to provide enough structure to help support the organisation of the lab and its materials. Most of the materials are commonly found in local supermarkets and department stores at a nominal cost. A few materials, like scales and hand microscopes can be found on-line. The lab sheets can be given to students so they follow step-by-step, or they can be told a general structure to follow.

The critical portion of any lab is to have a thorough discussion of the results and their thinking after the experiment is completed. It is suggested that you take as much time as the experiment to have this discussion with students. The real learning occurs not from the hands-on experiment, but from a deep discussion of the experiment, while making connections to the concept they are learning. For this reason, it is suggested that the students do the experiment FIRST and then have the students learn the concepts. They will have a better understanding of the concept if they first conduct an experiment, gain the experience and then discuss a new concept.

Even without a strong Science background, get into the habit of asking questions. The process of asking questions and being inquisitive will generate more excitement for students and will engage them in a deeper way of learning Science. "I don't know" is as important to learning as having all the answers. Together you can learn Science and discover the major ideas that Scientists' research.

If you are an experienced teacher, the Teacher Guided Questions to Enquiry are designed to provide prompts for students. These questions are not intended to be assessment questions, but ones that will engage students in the general direction of the benchmark. The teacher may select one or two, but not all of them, to have students start on an open enquiry approach to learning. The students will engage in their own experiment, create their own procedures and make conclusions from their data. For this reason, there are no answers to those questions. They are open ended and can be used to formulate interesting experiments for advanced students. The slight variation in some of the questions in each of the labs is designed to provide a sufficient number of prompts at various levels of Bloom's Taxonomy to engage students.

Throughout the year, encourage questioning, student dialogue and the scientific process. There is no one exact scientific method as is often suggested. The process of learning about the world and universe, drawing conclusions from facts and building these facts into strong scientific theories is the work of Science. Science is always growing, stretching and expanding its knowledge base. It is about challenging well-supported ideas to discover weakness. This is exactly what students should be encouraged to do! And in the end, Science is not something to study, it is something to do!

Science is a VERB!

Note:
Many students may not be able to read or write in this grade. If this is the situation in your class then read the words to the students; they can answer and you can write the words onto the classroom board.

Science is a Verb

PHYSICAL SCIENCES

Is it a Solid, Liquid or Gas?

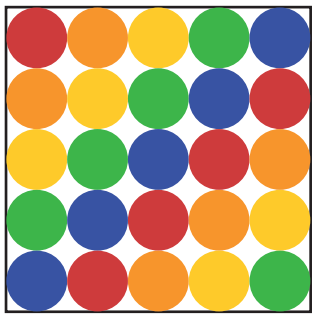
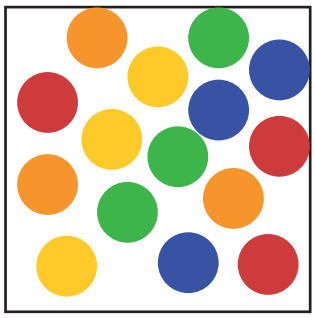
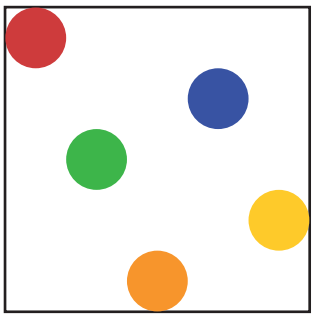
Description: Students will identify several objects as a solid, liquid or a gas.

Student Materials (per group):

- Balloon
- Helium balloon
- Empty Ziploc bag
- Cup of water
- Cup of ice
- Cup of sand
- Cup of juice
- Cup of fizzy drink
- Cup of marbles
- Cup of fizzy drink with raisins

Background and Misconceptions:

Solids, liquids and gases are the three states a matter. A fourth state of matter exists called plasma. Fire is an example of plasma. The three states of matter differ in their molecular motion, the shape they take and the volume they occupy.

Solids	Liquids	Gases
Are a fixed shape and volume. The molecules only slightly vibrate. The molecules are in a locked position.	The volume is constant, but the shape changes based on the container. The molecules can move past each other.	There is no set shape or volume. The gas takes the shape of the container. The molecules move very fast and are not in contact with each other like in a liquid.
		

Science is a Verb
Physical Sciences:

Prepare the following materials in advance:

- Ziploc bag – inflate bag and close tightly. Use tape if necessary.
- Balloon – inflate balloon.
- Helium balloon – purchase a mylar balloon or use a portable helium tank.
- Fizzy drink with raisins – pour the fizzy drink just before students do experiment. The raisins will rise and sink with the bubbles of gas.
- Fizzy drink – pour just prior to start of experiment so bubbles are evident.

The fizzy drink contains dissolved carbon dioxide gas that is released as bubbles. The raisins in the fizzy drink rise because the bubbles stick to the raisins and rise to the surface. Once there, the bubbles pop and the raisins fall.

Teacher Guided Questions to Enquiry:

Use these questions to get the students started on their own enquiry!

1. What is the difference between a solid, liquid and a gas?
2. What are the names of some objects that are solids, liquids or gases.

Additional Hints:

- Set up each of the items as a station.
- Tell students that some stations have more than one state of matter included.

Is it a Solid, Liquid or Gas?

TEACHER ANSWER KEY

Description: Solids, liquids and gases are the three states of matter. In this experiment, you are going to identify which of the items are a solid, liquid or gas.

Materials:

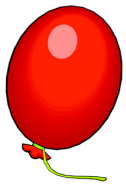
- Balloon
- Empty Ziploc bag
- Cup of ice
- Cup of juice
- Cup of marbles
- Cup of fizzy drink with raisins
- Helium balloon
- Cup of water
- Cup of sand
- Cup of fizzy drink

Procedures:

1. Look at each item your teacher has prepared. Tell your teacher which is a solid, liquid or gas and get help completing the table. Some may be one or more!

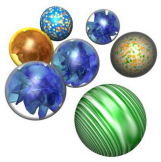
Science is a Verb
Physical Sciences:

Is it a Solid, Liquid or Gas?

Item	Is it a SOLID?	Is it a LIQUID?	Is it a GAS?
 Ice	X	X (if melted slightly)	
 Fizzy drink		X	X
 Inside of Box			X
 Balloon			X
 Juice		X	
 Sand	X		

Science is a Verb
Physical Sciences:

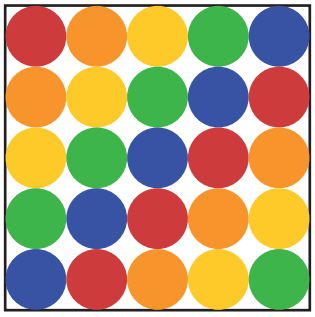
Is it a Solid, Liquid or Gas?

Item	Is it a SOLID?	Is it a LIQUID?	Is it a GAS?
 Helium Balloon			X
 Marbles	X		
 Fizzy drink with raisins	X	X	X

Is it a Solid, Liquid or Gas?

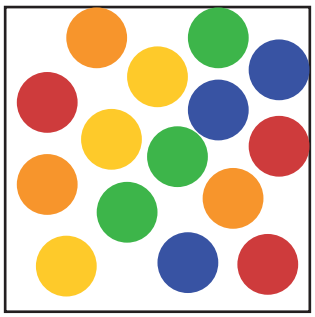
Questions:

1. Draw a picture of a solid. How is a solid different from liquids and gases?

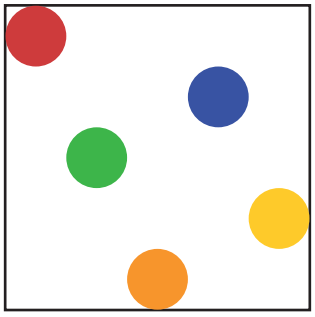


They have a definite shape.

2. Draw a picture of a liquid.



3. Draw a picture of a gas. How are liquids and gases similar to each other, but different from solids?



They both take the shape of their container.