

SECOND GRADE CHEMISTRY



1 WEEK LESSON PLANS AND ACTIVITIES

ROCK CYCLE OVERVIEW OF SECOND GRADE

CHEMISTRY

WEEK 1.

PRE: Comparing the states of matter. LAB: Observing the elements on the periodic table. POST: *Exploring the states of matter of the elements*.



WEEK 2.

PRE: Observing "things" logically. LAB: Comparing different minerals. POST: Discovering rocks and minerals near school.

WEEK 3.

PRE: Observing the structure of crystals. LAB: Exploring how minerals can grow. POST: Designing a "mineral person."

ROCKS

WEEK 4.

PRE: Recognizing the three types of rocks. LAB: Observing the three types of rocks. POST: Writing a paragraph on rocks.

PAST LIFE

WEEK 5.

PRE: Comparing present day and fossil organisms. LAB: Exploring how dinosaur footprints are formed. POST: Dramatizing how different dinosaurs lived.

WEEK 6.

PRE: Exploring the environment of the Mesozoic. LAB: Learning how fossils are made. POST: Comparing how fossils appear in the literature.

ROCK CYCLE - CHEMISTRY (2)

PRE LAB

Students discover the different types of elements on the Periodic Table.

OBJECTIVE:

- 1. Comparing the states of matter.
- 2. Analyzing the periodic table of the elements.

VOCABULARY:

element gas liquid matter periodic table plasma solid



MATERIALS:

Periodic Table Placemats plasma ball (optional)

BACKGROUND:

All "things" in the Universe can easily be classified as either solids, liquids, gases, or plasma. A solid is a state of matter with a boundary to its volume and shape. A liquid's shape and volume is defined by the container it is in. A gas can take on the shape and volume of the container that encloses it and can expand indefinitely. A plasma refers to matter that is composed of electrically charged particles. Plasma is very abundant in the Universe. The best way to illustrate these states of matter is to use examples. A book is solid, water is a liquid, air is composed of gases, and the "light" in a fluorescent lamp is plasma.

A fifth state of matter has recently been confirmed. This new state of matter is called the Bose-Einstein condensate. This state of matter is only observed under extreme cold temperature. It seems that under these temperatures the different elements and compounds act very strange, some even seem to levitate! Scientists do not know all there is about this state of matter, but it is a good example of how our understanding of science changes with new information.

PROCEDURE:

1. Go around the room and have students identify substances as being solid, liquid, gas or plasma. Make a list on the board. A solid could be a table or pencil; a liquid could be water or blood; gas could be air or helium; and plasma could be a fluorescent bulb or the plasma ball. You will not be able to find any examples of Bose-Einstein condensate.

2. Tell your students that matter is made of elements. Some elements are natural (90), others elements are man-made (19). Most substances that your students are familiar with are made of these elements. The elements can be solids, liquids, or gases. None of the natural elements are in a state of plasma on Earth.

3. Give students a Periodic Table Placemat and have them look at the symbols. The Periodic Table is a "handy dandy" guide to all the elements. Remember, the Periodic Table was developed to be looked at as reference material, not something that was meant to be memorized. Once you learn how to use the table, it can tell you many things about the elements. You might want to point out the following elements that the students may be familiar with:

H = hydrogen, a gas
He = helium, a gas
Ca = calcium, a solid
Si = silicon, a solid
Au = gold, a solid
U = uranium, a solid
Ag = silver, a solid
Hg = mercury, a liquid

4. Students love to find elements on the Periodic Table. You can make a racing game out of finding the elements by asking students to raise their hands when they find a certain elements. They should have to be able to tell you the element's atomic number when you call on them.

ROCK CYCLE - CHEMISTRY (2)

LAB

Students evaluate different elements that can be found naturally or synthetically.

OBJECTIVE:

- 1. Comparing characteristics of different elements.
- 2. Observing the elements on the periodic table.

VOCABULARY:

compound elements periodic table

MATERIALS:

worksheet Periodic Table Placemats Rock Cycle - Chemistry (2)



Sulfur forming along the rim of this volcano

BACKGROUND:

In our everyday world, we are see and use "elements" in many ways. Advertisements talk about, "Iron is needed for our blood" or "Silicon Valley." Unfortunately, not all references to elements are scientifically accurate. For instance, lead in a pencil is not the element lead, but the mineral graphite which is composed of the element carbon. A five cent nickel only has a small percentage of the metal nickel in it. The calcium in milk is not the element calcium, just a small percentage of calcium is



contained in the chemical composition. Elemental calcium is a silver white metal and is very reactive.

The elements are grouped into units that have similar properties. For example elements 2,10,18,36,54, and 86 are classified as "rare or inert gases." Notice also that the colors on the periodic table refer to groups of elements that have similar characteristics. If an element is found naturally not in combination with other elements it is called a native element or native mineral.

Copper

Most of the "elements" that we are exposed to in advertising are really combinations of elements (compounds). In this exercise the students will learn the characteristics of certain elements. Please note that some of the items may not be 100% pure, but they still exhibit to students the characteristics of that element in its pure state.



PROCEDURE:

1. Tell the students that today they will be Lead is used in weights.

looking at some of the elements found on the Periodic Table. These elements are either found in nature or manufactured (silicon). As they look at the samples tell them that they will need to use words to describe them.

2. Practice words that describe something (color, texture, etc.).

3. Pass out the student lab sheets. As students look at the samples and try to find both the atomic symbol and the atomic number of the element using the periodic table. They will learn in later grades that the atomic numbers refer to the number of protons the element possesses. Ask them to record this information in the appropriate boxes on the lab sheet.

4. After they complete this, ask them to describe the minerals in descriptive words. Record these in the box on their lab sheet.

5. As they finish up, orally read the conclusion question. Tell them that the work 'characteristics' in this case means how it looks and feels. Elicit responses as to what the students think might be the answer. Then ask them to write down their response.



Aluminum

6. Go over some of the properties of each of the elements found in the lab. You may want to help the students develop a descriptive vocabulary before they begin the lab. Below are some accurate descriptions of the lab specimens.

COPPER - copper color, used to make pipes, teapots, etc (native mineral)
NICKEL - gray color, used to make nickels and metal, naturally magnetic
LEAD - gray color, used to make metals, flexible, heavy
SILICON - white or gray color, used in computer industry to make computer chips
CARBON - gray color, used in making pencils, rubs off easily
SULFUR - yellow color, used in making medicine, (native mineral)
ALUMINUM - gray color, used to make aluminum foil and other metals

IRON - gray color, used in the steel industry, and has other uses as a metal

ZINC - gray color, used as metal

TIN - gray color, shiny, bends, used as a metal

ROCK CYCLE CHEMISTRY (2)

PROBLEM: How can you tell the difference between elements?

PREDICTION:_____

ELEMENT	ATOMIC SYMBOL NUMBER		DESCRIBE
COPPER			
NICKEL			
ZINC			
SILICON			
CARBON			
SULFUR			
IRON			
ALUMINUM			
LEAD			
TIN			

CONCLUSIONS: Can you tell what the element might be used for by looking at it's characteristics?

ROCK CYCLE - CHEMISTRY (2)

POST LAB

Students discover the state of matter of individual elements.

OBJECTIVE:

- 1. Counting the number of elements that are solids, liquids, and gases.
- 2. Exploring the states of matter of elements.

VOCABULARY:

element gas liquid periodic table solid

MATERIALS:

worksheet Periodic Table Placemats

BACKGROUND:

When elements combine to make molecules they sometimes loose the state of matter they were in when they were an element. For instance, hydrogen and oxygen are gases, but when you combine them the normal condition would be liquid (water). Silicon is a solid, and oxygen is a gas; when you combine them they sometimes become quartz, which is a solid. Carbon is a solid and oxygen is a gas; when they combine they become a gas.

States of matter can change even within normal conditions on Earth. If water (hydrogen + oxygen) is frozen, it is ice; when heated, it is a gas. Water is actually one of the few molecules that can change from the three states of matter easily on Earth. Most other elements and compounds cannot do that.

PROCEDURE:

1. Pass out the Periodic Table placemats and the student worksheets. Ask them to count all the gaseous elements. Record this number on the worksheet. Next ask them to count all the liquids. Again, record this number on the worksheet. Finally, have them count all the solids.

On the Periodic Table Placemat, the elements that are solids, liquids, and gases



are differentiated by color. This refers to the state of matter that they are in on the Earth's surface, under normal conditions. Note that plasma is not a form of matter that elements take. There are 11 gases, 4 liquids, and 94 solids on this periodic table.

2. Tell students that not all elements can be found in a pure state, meaning that the element naturally occurs in combination with other elements rather than by itself. There are 18 elements that are synthetically made. These are created by scientists. We really do not know what their natural form would be since they are unstable in the natural environment of Earth's surface. These synthetic elements have the atomic numbers 61, 93-109. Have the students write the symbol of these elements on their worksheets. Say the name of each of the elements and have the students repeat the name.

3. Explain to the students that when an element combines with other elements it forms a compound, which can be a different state of matter then its component elements. For example, hydrogen and oxygen are gases, but when combined they become water, a liquid.

ROCK CYCLE - CHEMISTRY (2)	PERIODIC TABLE
NUMBER OF GASES	
NUMBER OF LIQUIDS	
NUMBER OF SOLIDS	

WRITE THE SYMBOLS OF THE SYNTHETIC ELEMENTS, 61,93-109.

61	101
93	102
94	103
95	104
96	105
97	106
98	107
99	108
100	109