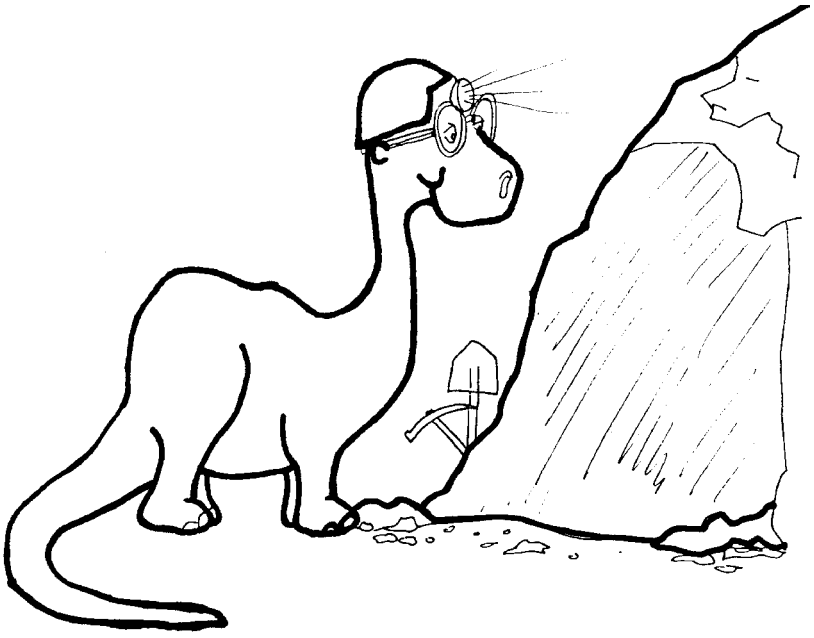
Rock Cycle

Understanding the Earth's Crust

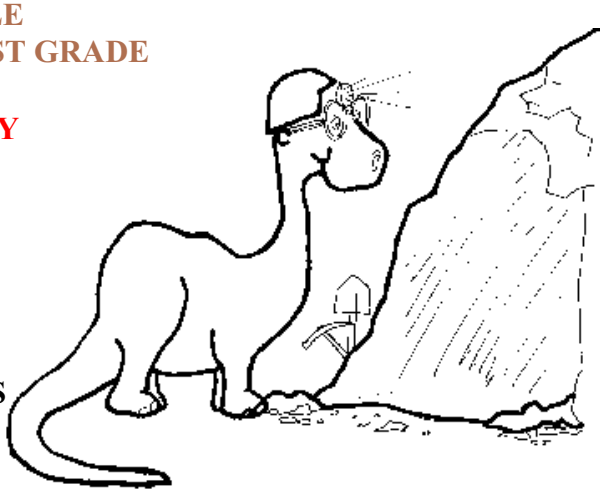
FIRST GRADE

CHEMISTRY



1 WEEK
LESSON PLANS AND
ACTIVITIES

ROCK CYCLE
OVERVIEW OF FIRST GRADE



CHEMISTRY

WEEK 1.
PRE: *Comparing solids, gases, liquids, and plasma.*
LAB: *Exploring how states of matter can change.*
POST: *Introducing the periodic table.*

MINERALS

WEEK 2.
PRE: *Discovering the components of quartz.*
LAB: *Exploring which elements make up minerals.*
POST: *Comparing characteristics of minerals.*

ROCKS

WEEK 3.
PRE: *Comparing how minerals are different than rocks.*
LAB: *Distinguishing minerals from rocks.*
POST: *Discovering where rocks are formed.*

WEEK 4.
PRE: *Describing characteristics of rocks.*
LAB: *Recognizing rock characteristics.*
POST: *Contrasting the three types of rocks.*

PAST LIFE

WEEK 5.
PRE: *Comparing dinosaurs and dragons.*
LAB: *Distinguishing characteristics of dinosaur models.*
POST: *Exploring dinosaurs in books.*

WEEK 6.
PRE: *Analyzing footprints.*
LAB: *Modeling dinosaur tracks.*
POST: *Comparing how dinosaurs moved.*

ROCK CYCLE - CHEMISTRY (1)

PRE LAB

Students observe different states of matter.

OBJECTIVES:

1. Exploring the properties of matter.
2. Comparing solids, gases, liquids, and plasma.

VOCABULARY:

gas
liquid
matter
plasma
solid

MATERIALS:

plasma ball
examples of the states of matter (i.e. water)

BACKGROUND:

Matter exists in 4 states that can be commonly observed including solid, liquid, gas, and plasma. There is a fifth state of matter that occurs at extremely cold temperatures called the Bose-Einstein condensate. However, the Bose-Einstein condensate is difficult to show because it occurs only at extremely low temperatures that are nonexistent on the Earth's surface. We suggest that you tell students that they will see only four states of matter and observing Bose-Einstein condensate requires special equipment.

Each state has its own special characteristics.

SOLID STATE:

Characterized by: (1) definite shape, (2) definite volume, (3) higher density than liquids, and (4) very slight contraction and expansion.

LIQUID STATE:

Characterized by: (1) lack of a definite shape, (2) definite volume, (3) high density, and (4) slight expansion and contraction. (Children may notice that a liquid takes the shape of the container holding it, as does a gas.)

GASEOUS STATE:

Characterized by (1) lack of definite shape and volume, (2) low density (airy), and (3) easy contraction and expansion. (Children may describe gases as being light, colorless, invisible, or floating.)

PLASMA STATE:

Characterized by (1) lack of shape and (2) not able to classify it as a gas, liquid or solid.

PROCEDURE:

1. Before class, make sure you have 4 states of matter available.

2. Go over the four common states of matter. Ask the students for examples of each state in the classroom. Write their examples of the different states of matter on the board in a chart form; see the example below. They may not be familiar with plasma, so tell them plasma is very common. Demonstrate a plasma to the class using the plasma ball. Explain that lightening bolts are discharges of plasma. Plasma is also found in fluorescent bulbs.

LIQUIDS	SOLIDS	GASES	PLASMA
water blood	book eraser desk	air	plasma ball

3. It may be difficult to come up with many examples of gases, plasma, and liquids in the classroom. Ask children to describe the states of matter in a kitchen. There are more liquids in the kitchen than in the classroom.

LIQUIDS	SOLIDS	GASES	PLASMA
water milk coffee	knife stove floor	air propane steam	fluorescent bulbs

4. Have your students give you examples of the four states of matter from different settings. You might suggest a birthday party with helium balloons. They will learn that all four states of matter are all around us.

ROCK CYCLE - CHEMISTRY (1)

LAB

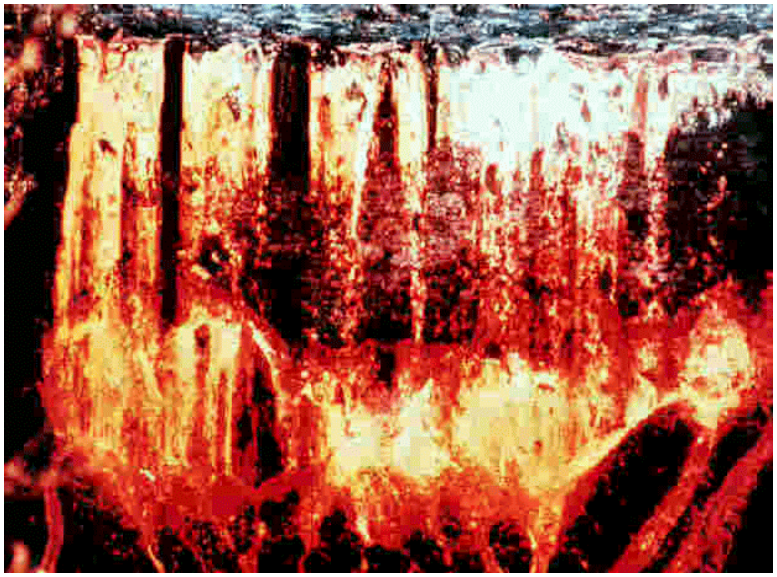
Students create a chemical change using vinegar and baking soda.

OBJECTIVE:

1. Exploring how states of matter can change.
2. Experimenting with a chemical change.

VOCABULARY:

chemical change
gas
liquid
matter
solid



Lava is a liquid, that cools into rock, which is a solid.

MATERIALS:

baking soda
vinegar
red food color
clay

BACKGROUND:

Lava is molten rock (a liquid) that flows on the earth's surface. Lava is formed inside the crust of the Earth by extreme heat; it erupts to form a volcano. During an eruption, many changes occur to the lava. First, as it cools, the lava changes state, from liquid to solid. Another change is the escape of gasses such as carbon dioxide, hydrogen sulfide, and water vapor, from the lava into the atmosphere.

In this lab, the students will model a volcanic eruption in order to simulate the chemical changes that occur in an erupting volcano. The children will see a solid (baking soda) and liquid (vinegar) mixing to form a gas (carbon dioxide) and a liquid.

STATES OF MATTER IN AN ERUPTING VOLCANO		
LIQUIDS	**SOLIDS**	**GASES**
lava	rocks	carbon dioxide, hydrogen sulfide, steam

PROCEDURE:

1. Before lab, assemble the vinegar, baking soda, clay, and red food coloring. If you do not have clay available, you can conduct the experiment in a plastic cup, flask, or test tube. If you are unfamiliar with the vinegar-baking soda reaction, you may wish to try it a few times, until you get a feel for the quantities of reactants necessary. Shape the clay into a "volcano" as a model for your students. Make sure you leave room at the top to place about a spoonful of baking soda.

2. The students should be familiar with images of erupting volcanoes. You may want to show students pictures from the unit on Volcanoes from the Plate Tectonic Cycle.

3. Explain to the students that during the eruption of a volcano, all the states of matter are present. Rocks are solids. Liquid is represented by the lava. Many gasses are emitted by the lava during an eruption. Plasma may even be present, in the form of electrical discharges in the sky above the erupting volcano.

4. Tell the students that today they will make a play volcano and observe three states of matter: solid, liquid, and gas.

5. Instruct the students to build a small volcano with clay, leaving a small crater-like opening on the top. The students will be able to clean the clay volcano, so the clay can be reused.

6. Students should first place about 2-5 ml teaspoons of baking soda in the crater at the top of the volcano. Next, mix 100 ml of vinegar with a few drops of red food coloring (to make it look like a real volcano). Ask the students to pour the vinegar slowly on the baking soda. The resulting mixture will fizz as the vinegar reacts with the baking soda. Make sure they realize that the fizz is the release of a gas (carbon dioxide).

7. Discuss with the students that what they have demonstrated is a chemical change. When vinegar (a liquid) is poured on baking soda (a solid), it produces a change to carbon dioxide (a gas).

8. Explain that the gas escapes into the atmosphere, but some liquid and solid remain in the "volcano".

ROCK CYCLE - CHEMISTRY (1)

POST LAB

Students use the Periodic Table of the elements.

OBJECTIVE:

1. Learning that matter is made of elements.
2. Introduction of the periodic table.

Yellow sulfur (an element) is forming on the surface of this lake,

VOCABULARY:

element
matter
periodic table

MATERIALS:

Periodic Table Placemats
worksheet

BACKGROUND:

Students may start to ask what matter is made of. Matter is everywhere. All matter is composed of either single elements or combinations of elements (compound). An element is a substance that cannot be broken down into simpler materials by normal chemical methods. It is the smallest unit into which matter can be divided and still retain its fundamental characteristics.

The purpose of this exercise is to reinforce the idea that common substances are made of elements or combinations of elements.

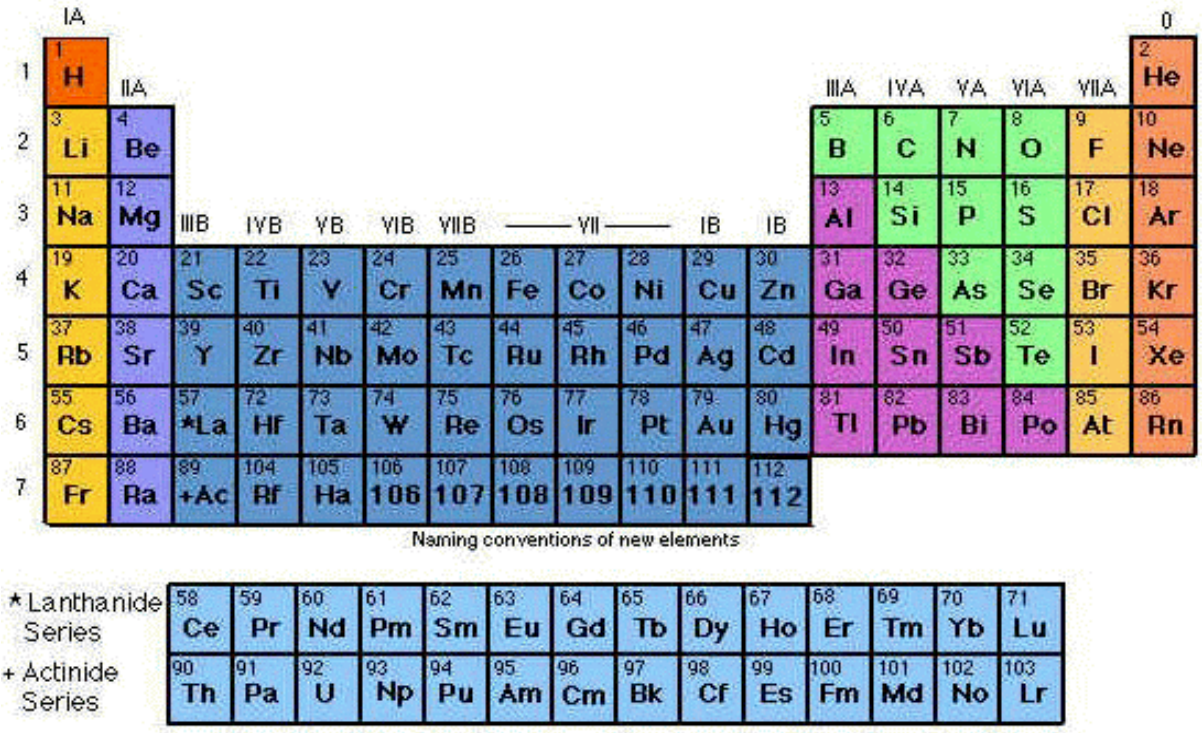
PROCEDURE:

1. Pass out the Periodic Table Placemats. Display the periodic table image in the presentation, or use a poster of the periodic table if you have one. The students will see that there are 109 elements at the present time. The students should have already heard of some of them. Elements such as iron in your blood, calcium for strong bones, and fluorine (fluoride) in your toothpaste are frequently used on television and radio commercials.

2. Discuss how elements are common in our lives. On the board record the following elements, which students may have heard of , or any other ones you think they might recognize. Ask the students to find the elements on the placemats as you are mentioning them.

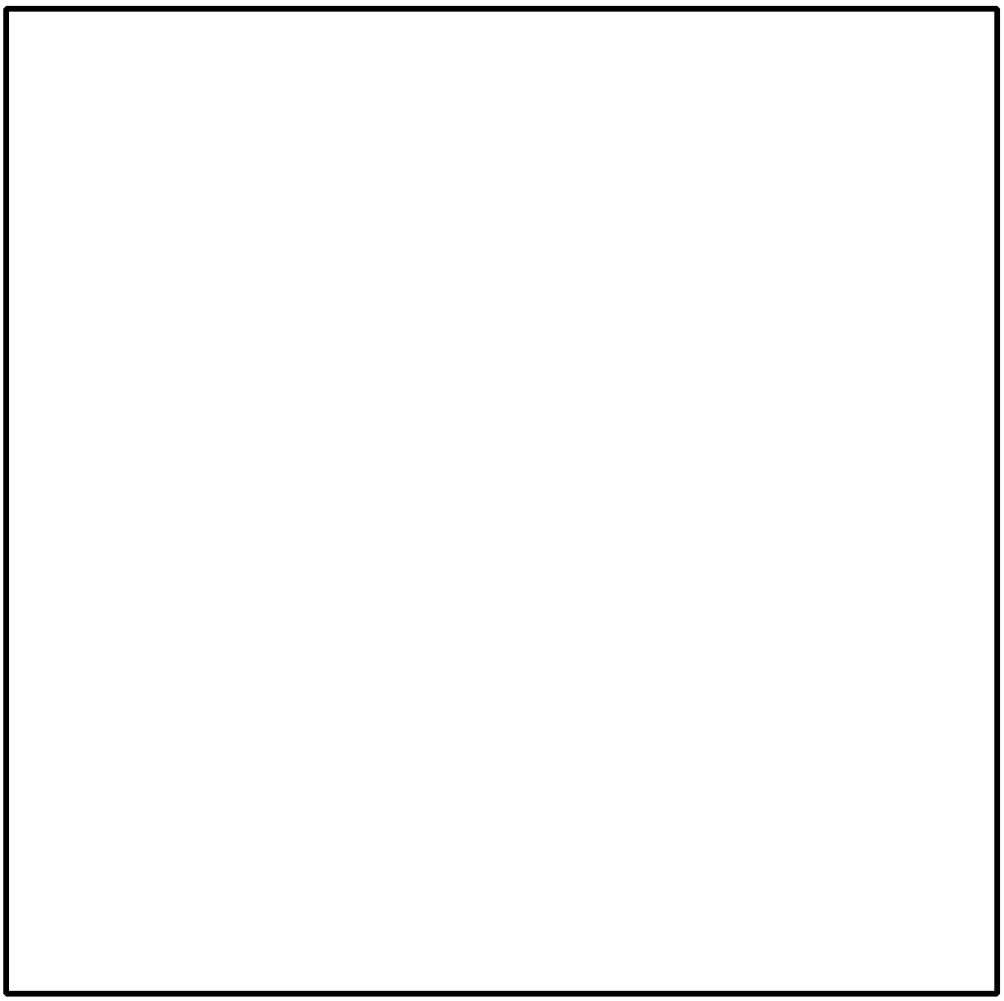
O = *oxygen* (what we breathe)
Au = *gold* (jewelry)
Ag = *silver* (jewelry)
Al = *aluminum* (foil)
Ca = *calcium* (for strong bones)
Cu = *copper* (pipes)
Fe = *iron* (pots and pans)
Na = *sodium* (salt)
Cl = *chlorine* (household cleaners)
He = *helium* (balloons)
F= *fluorine* (toothpaste)

3. Allow the children time to illustrate their favorite element on the worksheet provided. Ask them to write their special element's atomic symbol.



ROCK CYCLE - CHEMISTRY (1)

Draw your favorite element. Write its symbol.



Symbol _____