

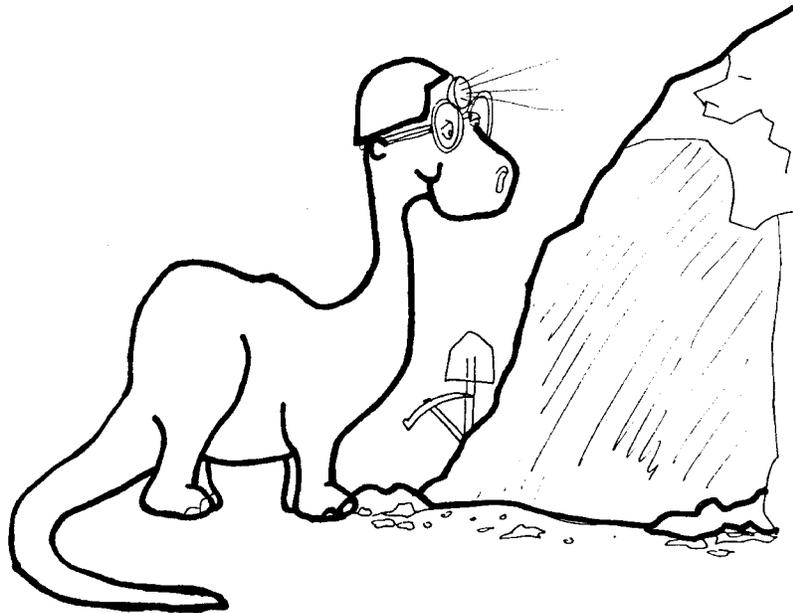


# Rock Cycle

Understanding the Earth's Crust



## KINDERGARTEN CHEMISTRY



1 WEEK  
LESSON PLANS AND  
ACTIVITIES

## ROCK CYCLE OVERVIEW OF KINDERGARTEN

### CHEMISTRY

#### WEEK 1.

PRE: *Distinguishing the four types of matter.*

LAB: *Classifying heavy and light rocks.*

POST: *Exploring elements.*

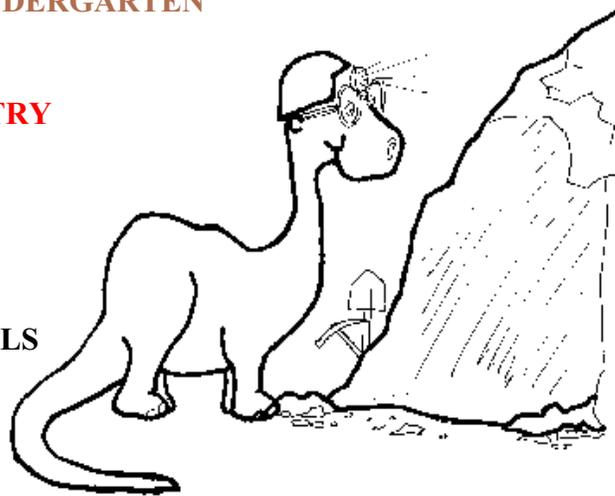
### MINERALS

#### WEEK 2.

PRE: *Discovering how minerals grow.*

LAB: *Distinguishing different colors of minerals.*

POST: *Exploring the various colors of quartz.*



### ROCKS

#### WEEK 3.

PRE: *Exploring rocks derived from volcanoes.*

LAB: *Discovering two different types of igneous rocks.*

POST: *Exploring myths about rocks.*

#### WEEK 4.

PRE: *Exploring rocks created in or near water.*

LAB: *Discovering that sand can form different types of rocks.*

POST: *Observing and describing sand.*

### PAST LIFE

#### WEEK 5.

PRE: *Defining "dinosaur."*

LAB: *Classifying extinct and living animals.*

POST: *Contrasting dinosaurs, prehistoric and living animals.*

#### WEEK 6.

PRE: *Comparing extinct and living animals.*

LAB: *Distinguishing dinosaurs that eat meat.*

POST: *Dramatizing life during the age of dinosaurs.*

## ROCK CYCLE - CHEMISTRY (K)

### PRE LAB

Students identify different states of matter in the classroom.

### OBJECTIVES:

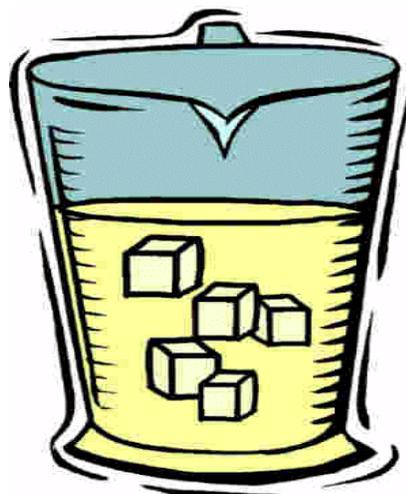
1. Classifying matter into five groups.
2. Distinguishing four different types of matter.

### VOCABULARY:

gas  
liquid  
plasma  
solid

### MATERIALS:

plasma ball  
glass of water  
balloons



Water can be seen as 3 states of matter: gas, liquid, and solid.

### BACKGROUND:

Chemistry is an underlying component of most branches of the sciences. All substances can be described by their chemical behaviors and chemical compositions. All “things” are classified as matter. Everything on Earth can be easily described in terms of one of four forms of matter: solid, liquid, gas, and plasma. Students are familiar with the three common forms of matter: solids, liquids, and gases. A solid is an object that has a form. Its form will not change if the solid is picked up, put in a container, or touched. A liquid is a substance which flows, spreads out, or will fall from your hand if you try to hold it. Liquids take the shape of the containers in which they are placed. A gas is a substance that moves around and fills the container that encloses it. Gases will continue to try and fill up an area even if that area is the size of a room. Outside, gases will expand indefinitely. Plasma is a fully ionized gas containing roughly equal numbers of positively and negatively charged atoms. Plasma is actually the most common form of matter in the Universe, but most children are not familiar with it. The best way to describe plasma for a kindergarten student is to demonstrate plasma by showing the students a “plasma” ball, which generates a plasma. Remember not to confuse blood plasma with this plasma. Blood plasma and plasma the state of matter are two very different things.

There is also a fifth state of matter called the Bose-Einstein Condensate. This form of matter only is observed under extremely cold conditions not found naturally on Earth. Scientists are currently learning more and more about how matter can be described in

other conditions that are not normal on the Earth's surface. The Bose-Einstein Condensate is difficult to explain at this time. We suggest that you may mention that other states of matter exist, and that the students will learn more about them in higher grades.

## PROCEDURE:

1. Explain to the students that there are four states of matter; solid, liquid, gas, and plasma. Tell them that a fifth state of matter, Bose-Einstein Condensate, also exists, but that they will not study it in kindergarten.

2. Ask your students to find some objects in the class that are solids. Hopefully they will pick up a book or pencil. Ask them why these objects are solids. The objects are solids because their shapes do not change when touched. Point out other solids in the room.

3. Make sure you have a glass of water on your desk when you ask students to find a liquid. If the students are having a difficult time finding a liquid, hold the glass of water and either swirl the water so the students can see that it flows or pour some on your hand to show some properties of liquids. Discuss other examples of liquids like milk or honey.

4. Next, have the children place their hands in front of their faces and blow onto their hands so that they feel air. Ask them if this is matter. They may not fully realize that air is matter, because it is a gas that takes up space. Air is a mixture of many types of gases and although air cannot be seen (unless it is very cold), it is everywhere on the Earth's surface. Discuss other examples of gasses like helium in a balloon, steam from a tea kettle, or any other familiar examples.

5. Explain that plasma is not easy to see, but it is all around us. Tell them that you have a special device called a plasma ball, which you will use to demonstrate plasma.

Turn on the ball and invite the children to look at the plasma discharging on the sides of the glass. Lightning is a form of plasma. Touch the glass and ask the students to tell you what they see. They will probably say "a lightening bolt". Explain that the plasma is attracted to your finger. It is best not to allow the students to all touch the plasma ball as this can lead to small shocks.

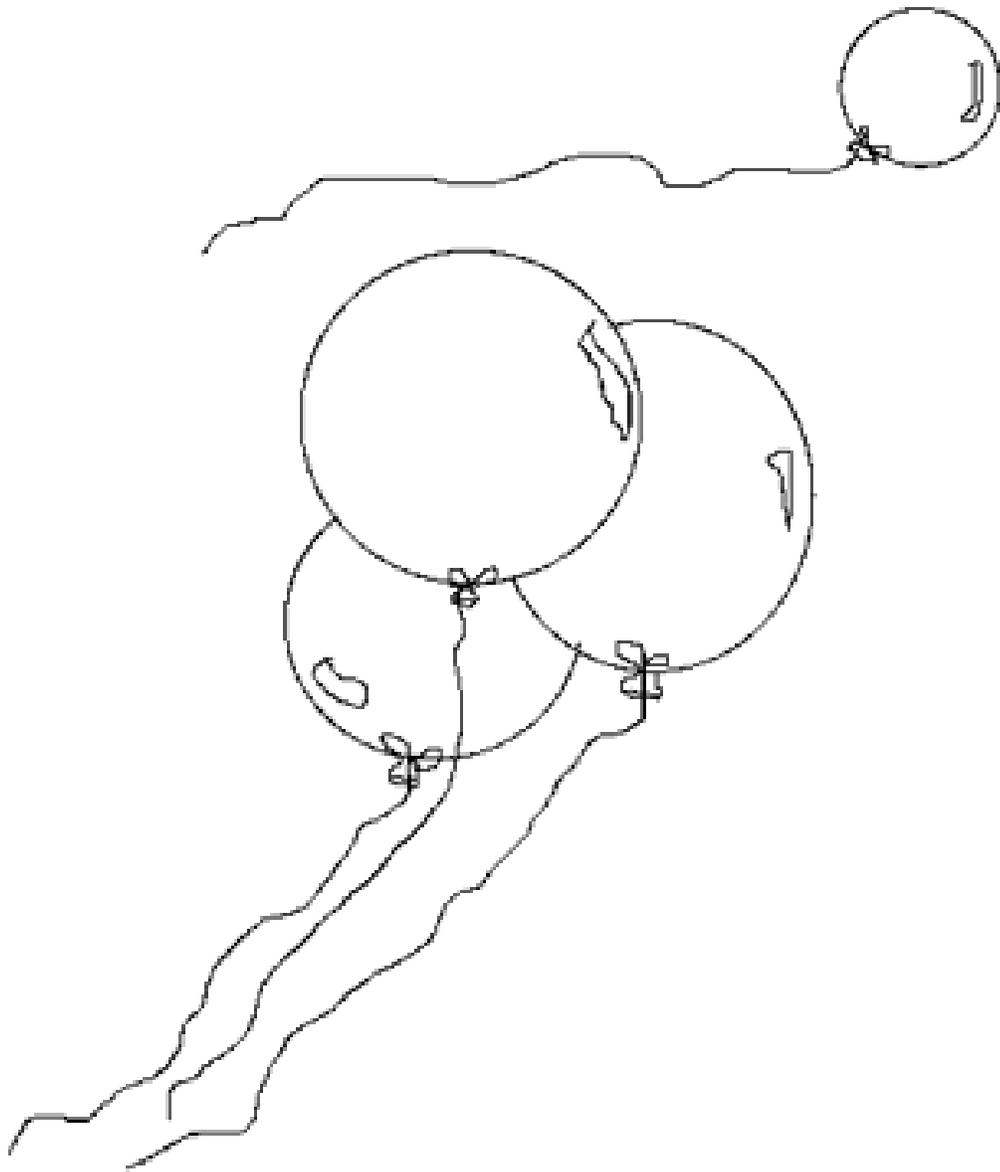
If you don't have a plasma ball, show students a flourescent bulb. The light it generates is actually a glowing plasma.



6. Give each child a balloon and ask them to think of different types of substances that can be used to fill up the balloon. If you have a helium balloon, you may want to bring it in to show the children that there are different types of gases, some lighter than others. You can also put water into a balloon, which would be the liquid state of matter. You may want the student to blow up the balloon several times, so that water will form at the tip of the balloon.

7. Have the students color the balloon picture in the workbook. Have them determine how many states of matter are in the picture. The balloons in this coloring exercise illustrate two of the four states of matter (solid and gas). The actual balloon is a solid and the air inside is a gas. Some students may say plasma is also present even though we can't see it.

# ROCK CYCLE - CHEMISTRY (K) PRE LAB



## ROCK CYCLE - CHEMISTRY (K)

### LAB

Students experiment with objects to determine if they are dense or not dense.

### OBJECTIVES:

1. Discovering that rocks are solids.
2. Classifying dense and light rocks.

### VOCABULARY:

dense  
gas  
heavy  
light  
liquid  
matter  
solid



### MATERIALS:

Rock Cycle - Chemistry (K) or different objects

### BACKGROUND:

Students will learn in this exercise that all solids have specific descriptive characteristics. This exercise will focus on one characteristic, "density," by having the students compare a variety of heavy (more dense) and light (less dense) rocks.

In rocks of high density, the matter is packed together more tightly than in rocks of low density. Higher density rocks will therefore feel heavier than similar-sized rocks of lower density.

### PROCEDURE:

1. Before lab, prepare sets of objects with differing densities, one for each student group. The chart below is designed for eight rocks from the Rock Cycle - Chemistry (K) kit. If you do not have the kit, you may use any rocks or objects that the students can hold in their hands.

2. Review the characteristics of the three states of matter common on Earth. Ask the students what state of matter they believe rocks belong to. Discuss that solids have a form that does not change easily.

You may want to discuss with your students that matter can be changed into

different forms. For example, rocks (solid) can be melted into lava (liquid); ice (solid) can be melted to form water (liquid), and water can be turned into steam (gas).

3 Pick two students to come forward. Give one student two rocks. Place one rock in each of the student's hands. Ask the question, "Which one is heavier?" After the student responds give both rocks to the other student and ask the same question. If they agree move on to C. If they do not agree, try to break the tie with another student and then move on.

4. Inform the students that one characteristic of matter is density or how heavy something is. Be sure to reinforce that in this instance "light" refers to density and not color. Tell them that they will be looking at rocks and trying to separate them into two groups, dense and less dense (or heavy and light). Explain that they will be working with partners just as the two children did in the front of the classroom.

5. Each group will be given a pile of rocks. They are to divide the rocks into heavy and light piles. If they can't tell, or the weights feel the same, tell them that they must make a decision. The students should check all the rocks and help each other. This is the First Trial.

6. After they have separated them into light and heavy piles, they should separate the heavy pile rocks into lighter and heaviest. Repeat this for the light pile. This is the Second Trial.

7. If time permits and the students are interested, have them separate the piles once more, for a Third Trial. You will inevitably see the students arguing over their decisions - just like real scientists!

The final sorting of the rocks is highly subjective. The goal of the exercise is not the "correctness" of the sorting but rather the development of the decision making ability of the students. Note pyrite is not a rock, but a mineral.

This chart demonstrates the divisions the children will make in each trial.

FIRST TRIAL:	LIGHT				HEAVY			
SECOND TRIAL:	LIGHT		HEAVY		LIGHT		HEAVY	
THIRD TRIAL:	L	H	L	H	L	H	L	H

## ROCK CYCLE - CHEMISTRY (K)

### POST LAB

Students discover elements using the periodic table of the elements.

### OBJECTIVES:

1. Observing the periodic table of elements.
2. Exploring elements.

### VOCABULARY:

chemistry  
element  
matter  
periodic table

### MATERIALS:

Periodic table placemats



Helium filled balloons

### BACKGROUND:

The fear of chemistry experienced by many young adults usually stems from lack of exposure to the table early in their education. This exercise introduces the periodic table, the basic organizational chart of the elements, and begins developing a new vocabulary that centers around the elements. An element is a substance that cannot be broken down into simpler materials by normal chemical methods. Every day, students hear words like calcium, lead, iron, magnesium, carbon, and oxygen in advertisements. These words are used to sell a product; the aim is not to educate but to make people believe that because of this "magic" ingredient they should buy the product. However, if the students can realize that these are not magic ingredients, but naturally occurring ingredients, they would be better equipped to evaluate the advertiser's claims.

For instance, many commercials insist that "calcium makes your bones grow stronger." Children (and adults) get the idea that you can buy calcium in its pure elemental form. However, in its pure state calcium is a highly reactive whitish metal. The "calcium" as purchased from stores actually occurs in combination with other elements (a compound).

### PROCEDURE:

1. Pass out the Periodic Table Placemats. As the students look at the periodic table, begin to discuss what is on the table. State that this table has all the ingredients of every substance that they see in the world. These ingredients are called elements. Even

