

# Lesson 2 Soils

## Overview

Lesson Two furthers the understanding of soils and explains some of their observations from the first soil activity, such as why sands feel gritty and clays are slippery when wet. The Rock Cycle demonstrates the importance of weathering to form different soils. The Sedimentation Observation Activity allows the students to observe the particles again and how the soil particles interact with water. The Rock Cycle Worksheet provides an opportunity for the students to review the Rock Cycle.

## Objective

1. Describe three additional ways that soils are classified:
  - a. Size of particles
  - b. Amount of organic material in the soil
  - c. The minerals that make up the soil
2. Identify the source of minerals in the soil as the rocks it came from via weathering.
3. Define organic as anything living today or in the past.
4. Identify specific organic matter in the soil such as twigs, dead animals and waste.
5. List agents of weathering such as water, wind and plant roots.
6. Recognize that natural cycles such as the water cycle and the rock cycle, are run with energy, use the atoms over repeatedly, but differ in the time it takes to complete the cycle.
7. Draw conclusions about the size of the particles and the rate at which they settle in water.
8. Observe and record less dense organic matter floating in the water.
9. Recognize that rocks have a cycle just as water has a cycle

## TEKS for 6<sup>th</sup> grade

### (b) [Knowledge and Skills](#)

(10) Earth and space. (B)

## TEKS for 7<sup>th</sup> grade

### (b) [Knowledge and Skills](#)

(8) Earth and space. (B)

## Recommended Procedure

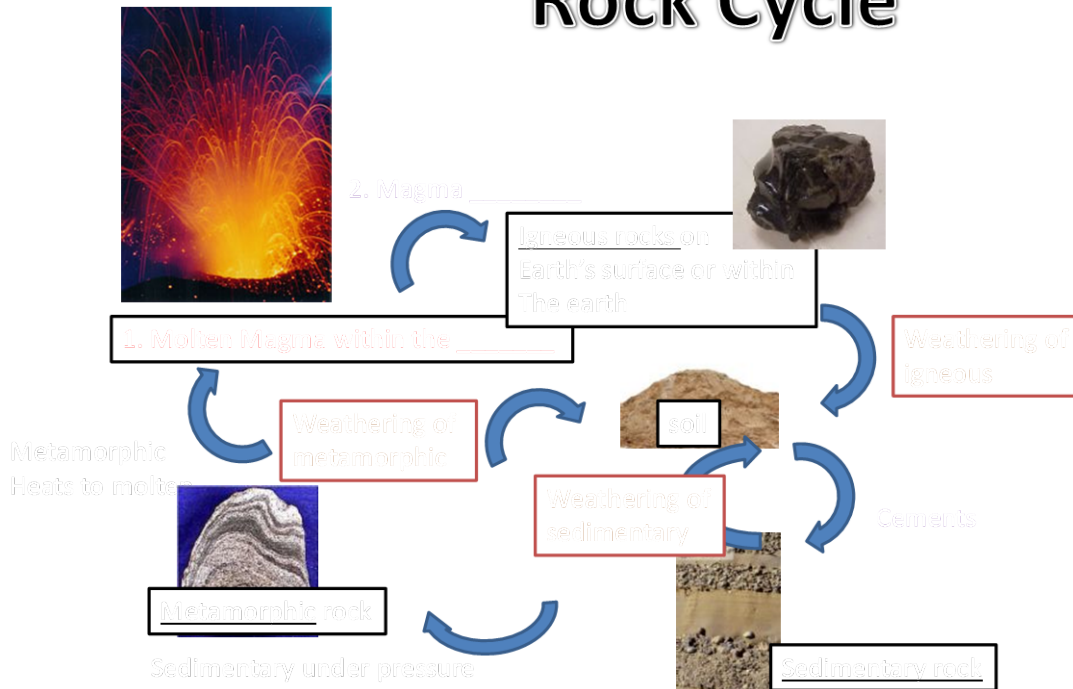
1. Show the Power Point for Lesson Two or the overhead for lesson two.  
Have the students take notes.
2. Do the Sedimentation Observation Activity and have the students turn this sheet in before they leave class.
3. When the students finish the activity have them start on their homework of Rock Cycle Worksheet

## Materials needed for this lesson

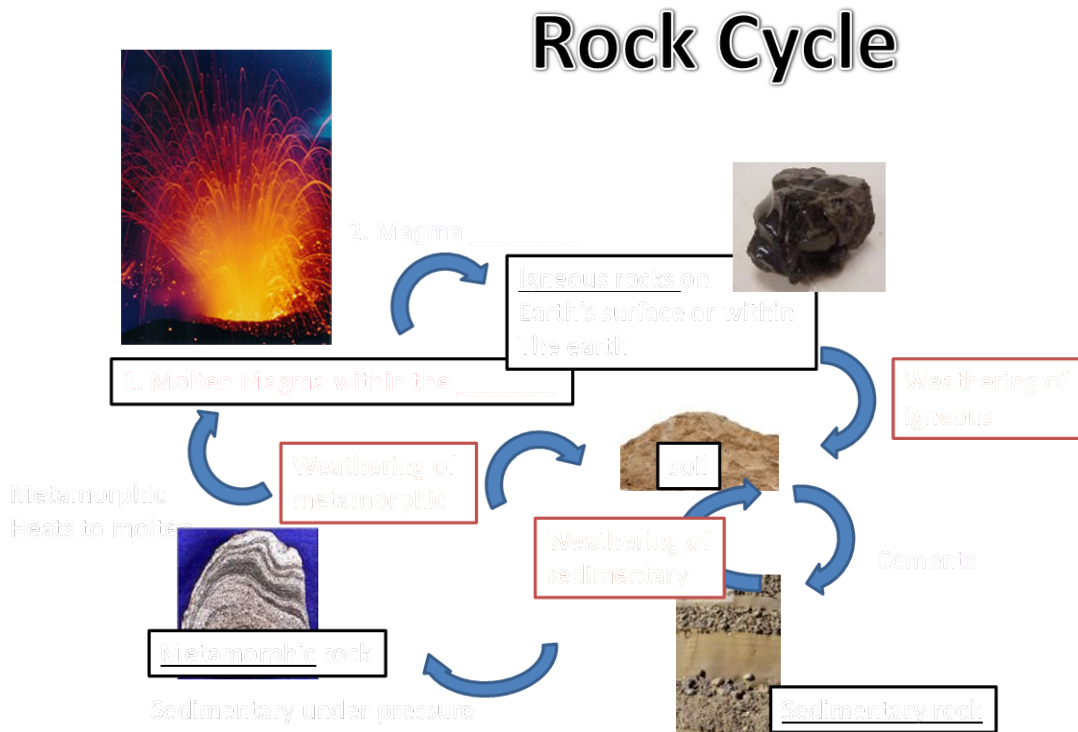
The overhead and the Power Point presentation need a dropper bottle with vinegar and a piece of limestone or marble for the demonstration of acidic liquids (acid rain) as a weathering agent. The Sedimentation Observation Activity needs: Course sand, loam (potting soil will do), and clay soil used in previous soil observation activity, a clear container (plastic best, but glass will work with care) with a leak proof lid, water in the clear container, community old towels and a plastic bucket to avoid spills.



# Rock Cycle



1. Fill in word above
2. Fill in word above
3. What is the process called by which all rocks break down and form soil? \_\_\_\_\_
4. What do we call hot liquid (molten) rock? \_\_\_\_\_
5. When soil cements together over time, which kind of rock is formed? \_\_\_\_\_
6. When the magma cools, what kind of rock is formed either on the surface of the earth or within the earth? \_\_\_\_\_
7. When sedimentary rocks (or igneous rocks) are put under great heat and pressure (but not enough to melt), what kind of rock is formed? \_\_\_\_\_
8. Circle one: True/False ALL rocks can break down and form soil.
9. What do we call this cycle? \_\_\_\_\_
10. How is the rock cycle DIFFERENT from the water cycle?



- Fill in word above *Earth*
- Fill in word above *solidifies, or becomes solid, or cools and forms a rock*
- What is the process called by which all rocks break down and form soil? weathering
- What do we call hot liquid (molten) rock? magma
- When soil cements together over time, which kind of rock is formed? sedimentary rock
- When the magma cools, what kind of rock is formed either on the surface of the earth or within the earth? igneous rock
- When sedimentary rocks (or igneous rocks) are put under great heat and pressure (but not enough to melt), what kind of rock is formed? metamorphic rock
- Circle one: True/False ALL rocks can break down and form soil.
- What do we call this cycle? Rock Cycle
- How is the rock cycle DIFFERENT from the water cycle? *The Rock Cycle takes a lot more time to complete than the water cycle. They might also add that the rock cycle does not involve water molecules.*

Name \_\_\_\_\_

### Sedimentation Observation Activity

**Goal:** the student will be able to observe sediment as it settles in water and communicate trends based on their observations.

**Materials:** Course sand, loam (potting soil will do), and clay soil used in previous soil observation activity, a clear container (plastic best, but glass will work with care) with a leak proof lid, water in the clear container, community old towels and a plastic bucket to avoid spills.

**Instructions:**

1. Put all three types of soils from the previous soil observation exercise in the jar with water in it. Put the lid on the container.
2. OVER THE BUCKET invert your clear container with water and soil about 10 times.
3. Set the container down so you can see it well. You must start observations IMMEDIATELY.
4. How would you describe the particles that fell to the bottom FIRST (compared to the particles that fell later)?
5. Did ALL the particles fall to the bottom? Yes/no (circle one)  
The ones that floated are less dense than water. Describe the particles that floated. Include how they compare to the particles that sank--other than less dense.
6. Describe the particles that fell more SLOWLY compared to the ones that fell rapidly.
7. What do we call this process of particles slowly being deposited on the bottom?  
\_\_\_\_\_ (hint, look back at class notes)
8. How does the water look AFTER five minutes, compared to the first minute?
9. Is soil getting into the water generally considered a Point Source of Pollution/ or a Nonpoint Source of Pollution? (Circle one)
10. Make an educated guess: Do you think the water will ever appear completely clear?

In Science we call the educated guess a hypothesis. Scientists design experiments to test the hypothesis, to see if the educated guess is correct and can be supported by observations in the form of data.

Extra credit: How would you test the hypothesis you made in question 10 above. Your answer must be written in complete sentences to receive credit.

Name \_\_\_\_\_

### Sedimentation Observation Activity

**Goal:** the student will be able to observe sediment as it settles in water and communicate trends based on their observations.

**Materials:** Course sand, loam (potting soil will do), and clay soil used in previous soil observation activity, a clear container (plastic best, but glass will work with care) with a leak proof lid, water in the clear container, community old towels and a plastic bucket to avoid spills.

#### Instructions:

1. Put all three types of soils from the previous soil observation exercise in the jar with water in it. Put the lid on the container.

2. OVER THE BUCKET invert your clear container with water and soil about 10 times. *You may have to demonstrate inverting the container. I found students did not know what "invert" meant.*

3. Set the container down so you can see it well. You must start observations IMMEDIATELY.

4. How would you describe the particles that fell to the bottom FIRST (compared to the particles that fell later)? *The particles that fall to the bottom first are larger (they might also note that the particles are more dense.)*

5. Did ALL the particles fall to the bottom? Yes/no (circle one) circle *no*

The ones that floated are less dense than water. Describe the particles that floated. Include how they compare to the particles that sank--other than less dense. *If the soil they used had organic matter in it, it will float on the top. The students should see that it is dark and the particles look rough like tiny bits of wood.*

6. Describe the particles that fell more SLOWLY compared to the ones that fell rapidly. *The particles that fell more slowly were smaller than the ones that fell rapidly.*

7. What do we call this process of particles slowly being deposited on the bottom?

*Sedimentation* (hint, look back at class notes)

8. How does the water look AFTER five minutes, compared to the first minute? *You will probably need to remind the students that they cannot answer this question until five minutes have passed since they inverted the container. They should note that the water looks clearer after five minutes compared to the cloudy appearance of the water during the first minute after the container is inverted.*

9. Is soil getting into the water generally considered a Point Source of Pollution/ or a Nonpoint Source of Pollution?\_ (Circle one)

10. Make an educated guess: Do you think the water will ever appear completely clear? *Only take off if the student does not answer the question. Since it is a guess they may guess it will never clear up or they may guess that it does become clear.*

In Science we call the educated guess a hypothesis.

Scientists design experiments to test the hypothesis, to see if the educated guess is correct and can be supported by observations in the form of data.

Extra credit: How would you test the hypothesis you made in question 10 above. Your answer must be written in complete sentences to receive credit.

*In order to test my hypothesis we would have to leave the container alone for a very long time. By tomorrow we might be able to determine if the water has begun to get clearer. We would test the hypothesis by leaving the container alone overnight.*