

Reducing Sedimentation-A Nonpoint Source of Pollution

SOILS

1. Based on your activity with soils, tell me how can we distinguish one soil type from another?
Hint—look at your table you filled out during the soil activity. *Let the students tell you before you reveal the following list.*
 - a. Color/appearance
 - b. smell
 - c. The feel of soil between wet fingers
 - d. Which pile loses height with water first/ which pile absorbs water best/ which breaks down into muddy sediment
 - e. size of particles and composition (fill in later) Now we will fill this part in

2. Soils are mainly classified by

- a. Size of the soil particles
- b. How much organic matter is in the soil?
- c. The Minerals that make up the soil

Be certain to get these in your notes as they are very important. We will cover each in detail.

3. Size of the soil particles Average sand particles are as big as a



barrel compared to average clay



playing cards

Stress that we are talking about average sand particles and average clay particles

4. This explains why Sand particles felt _____ (*gritty, or similar word*)
And clay particles felt ____ (*slick or slippery*) Clay particles are small and flat so they can slide over one another.

5. How much organic matter is in the soil? *You might want to stress that we talked about size of particles and now we go on to the second issue of organic matter.*

What does it mean to be **ORGANIC**? *Let the students try to answer this question before giving the answer*

6. **Organic** means living, either now or in the past.

7. What organic things might you find in the soil? *Again encourage student answers*
Twigs, parts of leaves, flower parts, animal parts (bones, feathers, skin) live small animals, fungus, dung, to name a few.

8. Organic matter in the soil makes it dark in color (carbon is black)

Gives soil an “earthy” smell

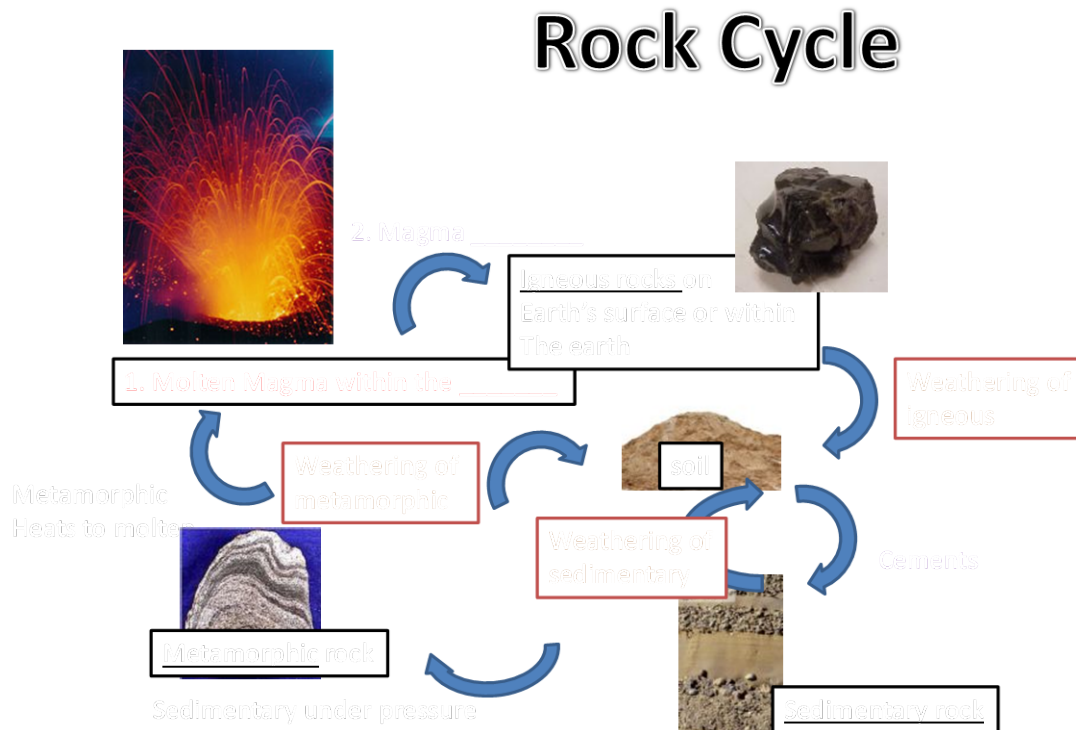
Soil with lots of organic matter is often less dense than water so it floats

9. Which soil do you think had most organic matter? Clay, sand or loam?

The answer depends on your source of soils, but loam is usually darker and with more organic material.

10. Where does soil come from? *Allow students to answer first, then reveal the answer*
Just as water has a cycle, Soil is part of the ROCK CYCLE.

11. All cycles can begin at any point so let's begin when rocks are so hot that they melt.
Where can liquid rocks be found?



Go through the cycle putting the word “earth” for #1 and #2 has Magma “cools” or “solidifies”

All the major rock types going to soil have this word: **WEATHERING**

12. What is weathering? Take a guess See if the students can guess from the word “weathering” that it is agents associated with the weather such as wind, rain, cold and heat that break down rocks into smaller pieces and eventually soil.

13. Agents of weathering:

a. Water

Acidic Rainwater can dissolve some rocks like limestone and marble DEMO

Put a drop of vinegar on some limestone or marble and see little bubbles

Rapid water flow can physically bang up and break rocks

Freezing water EX _ _ _ _ and can crack rocks EXPANDS

b. Wind: can be like sandblasting of rocks

c. Plants: roots grow into crevices and can split open a rock, breaking it down eventually into soil.

14. We have been looking at cycles:

- The Water cycles on the earth and The Rocks cycle on the earth
- They both are continuous processes that use ENERGY to run the cycle
- The atoms that make up the water and the rocks are used over and over—billions of years old

You could point out that the atoms that make up your body are the SAME age as the atoms of their body—the atoms are used over and over again and are the age of the earth. HOWEVER the rock cycle takes a much longer time to complete than the water cycle

15. MATTER AND ENERGY INTERACT IN THE ROCK CYCLE AND THE WATER CYCLE

- The ENERGY that runs the rock cycle and the water cycle provides the force to
- The ATOMS in both cycles
- Atoms are matter (matter is anything that has mass and occupies space), but energy is NOT Matter. *One of the 6th grade TEKS relates to students understanding that matter and energy interact in the water cycle as well as other cycles, such as the rock cycle. This is a good point to bring up while we are looking at cycles.*

16. So how are the water cycle and the rock cycles alike? *The atoms are used over and over again; both are continuous processes that are run by energy.*

17. How are the times for the two cycles different? *The Rock Cycle takes much longer than the water cycle to complete.*

18. Back to the main point of the lesson:

Soils are mainly classified by

- a. Size of the soil particles
- b. How much organic matter is in the soil?
- c. The Minerals that make up the soil

Igneous rock

Metamorphic Rock

Sedimentary Rock

Can make soil

can make soil

can make soil

BUT EACH TYPE OF ROCK IS MADE OF DIFFERENT MINERALS AND SO THE SOIL IS DIFFERENT.

Quartz for example breaks down to make sand like particles and

Feldspar breaks down to make very small particles of a type of clay

Reassure the students that they do not have to memorize these examples, but they do need to understand that different kinds of rocks break down to make different kinds of soil. The minerals that make up the soil are different because of the rocks they come from.

18. MAIN POINTS OF THE LESSON:

Soils are mainly classified by

Size of the soil particles

How much organic matter is in the soil?

The Minerals that make up the soil

Rocks in the rock cycle can all break down to make soil through **weathering**
Organic is anything that is living or has lived