



Sedimentation

Lesson two: Soils





Time to observe and learn

- You will examine three types of soil:
 - Clay
 - Sand
 - Loam
- You will need to read and follow the instructions carefully




After examining the soil types:

- What are some ways we can classify soils?
- How can we distinguish one soil type from another?




From your soil investigation

- Color/appearance
- Smell
- The feel of soil between wet fingers
- Which pile loses height with water first/ which pile absorbs water best/ which pile breaks down into muddy sediment?
- Size of particles and composition



Soils are mainly classified by:



- Size of the soil particles
- How much organic matter is in the soil
- What minerals make up the soil




Size of the soil particles

Sand

Clay





This explains why:

- The sand particles felt:
- The clay particles felt:

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Size

- The clay particles are very small and relatively flat so they slide over one another easily. This is why it feels slippery to you.
- The sand particles are larger and more coarse so they feel grittier.



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Classifying soils

- Soils are classified by size, but also by:
- How much organic matter is in the soil
- What minerals make up the soil



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What does it mean to be *organic*?



Organic

- The word organic means living, either now or in the past
- Because all living things (plants and animals) have carbon in them, we say that organic chemistry is the chemistry of carbon
- What organic things might you find in soil?



Organic matter in soils

- Twigs
- Leaves or parts of leaves
- Flower parts
- Animal parts (bones, feathers, skin)
- Live small animals (worms, insects, etc)
- Fungus
- Feces



Organic matter in soils:

- Organic matter makes the soil darker in color (carbon is black)
- It also gives the soil an “earthy” smell
- Organic soil is often less dense than water so it floats in water

Which soil that you looked at had the most organic matter? The clay, sand or loam?



Soil

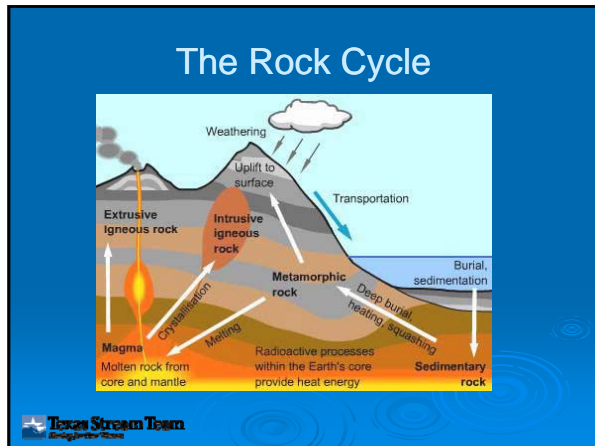
Can anyone tell me where soil comes from?



Cycles

- Just as water has a cycle, SOIL is part of the ROCK CYCLE
- All cycles can begin at any point. Let's begin when rocks are so hot that they melt. Where can liquid rocks be found?





➤ All major rock types that turn into soil will undergo this process:

Weathering

➤ What is weathering?

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Agents of weathering

➤ Water

- Acidic rain can dissolve some rocks like limestone and marble
- Rapid water flow can physically bang up and break rocks
- Freezing water can crack rocks

➤ Wind- can be like sandblasting rocks

➤ Plants- roots grow into crevices and can split open rock, breaking it down into soil

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We have been looking at cycles

- The WATER cycle
- The ROCK cycle
- Both are continuous processes that use energy to run the cycle
- The atoms that make up water and rocks are used over and over- the atoms are billions of years old
- The rock cycle takes a MUCH longer time to complete than the water cycle



Matter and Energy Interact

- The energy in the rock and water cycle provides the force for the atoms in both cycles to move
- Atoms are matter (anything that has mass and occupies space), but energy is NOT matter



Weathering

- Igneous, Metamorphic and Sedimentary rocks all can break down to form soil



Minerals

- Remember, soils can be classified by the minerals that make up the soil
- Igneous, metamorphic and sedimentary rock are made up of different minerals and when they break down, the soil looks different
- Example: Quartz breaks down to make a larger, sand like particle. Feldspar breaks down to make a very small, clay like particle



Important terms and concepts:

- 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 means anything that is living or has lived



Time to learn and observe

- You will examine the interaction of three types of soil with lots of water
- You will need to read and follow the instructions carefully