

Lesson ID: 20231023	Fun Science Saturdays
Title	Exploring Sedimentary Rock
Subject	Geology
Topic	Sedimentary Rock
Activities	Soil content testing, extracting clay from dirt, making sedimentary rock
LESSON (20-30 minutes)	
Earth's Structure	
<p>Inner Core: Ball of hot solid/plasma metal, mostly iron Diameter = 1,516 miles, 2,440 km Temperature = 5,200 C, 9,392 F Pressure = 3.6 million atmospheres, 52,905,240 PSI ⁽¹⁾</p> <p>Outer Core: Spinning liquid iron & nickel Thickness = 1,367 miles, 2,200 km Temperature = 4,500 to 5,500 C, 8,132 to 9,932 F Creates the Earth's magnetic field ⁽¹⁾</p> <p>Mantle: Mostly solid material like soft rock that can move which causes Earthquakes and minerals Thickness = 1,802 miles, 2,900 km Temperature = 1,832 (near crust) to 6,692 (near core)⁽²⁾</p> <p>CRUST: The part of the earth's structure we are going to look at today is the crust. The crust is the part that we are standing on right now. It is approximately 2 miles (oceans) to 43 miles (land mountains) thick, which is not that thick when compared to the size of the planet. Two miles is 8 times the length of my driveway and 43 miles is from here to the north side of Lake Norman. ⁽³⁾</p> <p>What is the crust made of? Minerals, rocks, melted rock called lava, water, and life like you and me, the trees, plants and animals.</p> <p>Today the activities are focusing on sedimentary rocks but you need to know the other rock types too.</p>	

Rock Types

Igneous: Created by the cooling of lava (liquefied rock)

Examples: Basalt, obsidian, granite, pumice, peridotite⁽⁴⁾

Metamorphic: These are rocks that used to be a different type of rock. They were heated, and compressed by the earth and mixed with other minerals. After all the mashing and squishing a new rock is created

Examples: Marble, schist, slate, quartzite used to be quartz, most quartz (also sedimentary), anthracite coal⁽⁵⁾

Hands on Illustration of Metamorphic Rock: Layer different colors of playdough with layers of salt, and sand on top of plastic wrap then wrap it up and smash it with hands to mix it for 30 seconds.

Are all the layers of sedimentary rock look the same? Color, texture, shape

Sedimentary: Types of rock that are formed by the accumulation or deposition of mineral or organic particles at Earth's surface, followed by cementation. Sedimentation is the collective name for processes that cause these particles to settle in place.

Examples: Quartz (also igneous), shale, sandstone, travertine, flint, clay, gypsum (drywall)

ACTIVITIES (2 hours)

Soil Testing (20 minutes)

Supplies:

Each person needs one of the following; clear container min. 6" tall with lid, plastic cup to fill container with dirt, water and a marker to mark the different stratifications of dirt, litmus paper

Instructions:

1. Fill clear container halfway then fill the rest of the container with water
2. Close container
3. Shake container vigorously for 30 seconds
4. Set container down and do not move until the top of the container is water and the dirt has settled into layers on the bottom
5. With a marker draw a line at each level you see in the dirt
6. Using litmus paper check the PH of the soil by dipping it in the water after the dirt settles

Conclusion:

The layers you see in the container tells you what type of dirt you have. You should see a thick layer with different size sediment below it.

* If there are mostly larger particles then the soil is a rocky type

* If there is mostly clay (very fine particles) on top then the soil has a clay type

* If the layer in between the clay and the rock is the largest the soil is sandy.

Testing the PH of the soil tells you what kind of plants will be able to grow in the soil. Tomatoes and blueberries like acidic soil. If your soil is not acidic they will not grow very well.

Making Sedimentary Rock (45 minutes)

Supplies:

1 wood frame per student, compacting sticks large size and small size, container, plastic wrap to make removal from frame easier

Directions:

1. Place wooden frame on a flat hard surface
2. Place a piece of clear plastic wrap in the frame
3. Put a thin 1/4 inch layer of dirt in the frame
4. Make the dirt level
5. Using the larger compacting tool tap down on the dirt until it is flat
6. Using the smaller compacting tool tap down the dirt again using a good amount of force
7. Repeat steps 2 - 5 until the frame is full
8. Keep the dirt in the frame for 24 hours or until dry
9. To remove your sedimentary rock from the frame lift it out by the plastic wrap

Clay Extraction (1 hour)

Supplies:

Several large buckets for settle the clay out of solution, cotton rags/pillow cases, container to store refined clay.

Directions:

1. Fill the bucket with dirt about less than halfway
2. Fill the rest of the bucket to about 3/4 full with water
3. Mix the dirt and water together really well (get dirty and use your hands or a stir stick)
4. Let the bucket sit for about 15 - 20 minutes to let the dirt settle in to layers
5. Pour the water and clay in to a pillow case or t-shirt and let the water drain
6. What is left in the cloth should be all clay depending on how well you poured it from the bucket.
7. Hang the cloth with the clay in it and let it dry
8. Once the clay dries (not all the way until it is form) place it in a plastic bag to keep it from drying out

NOTE: If the clay dries out just mix in a little water to soften it up.

REFERENCES	
Ref #	Reference
1	https://education.nationalgeographic.org/resource/core/
2	https://education.nationalgeographic.org/resource/mantle/
3	https://education.nationalgeographic.org/resource/crust/
4	https://www.usgs.gov/faqs/what-are-igneous-rocks#:~:text=Igneous%20rocks%20(from%20the%20Latin,then%20rises%20toward%20the%20surface.
5	https://www.usgs.gov/faqs/what-are-metamorphic-rocks#:~:text=Metamorphic%20rocks%20started%20out%20as,some%20combination%20of%20these%20factors.
6	https://www.usgs.gov/faqs/what-are-sedimentary-rocks#:~:text=Common%20sedimentary%20rocks%20include%20sandstone,Tuffaceous%20sandstones%20contain%20volcanic%20ash.
Internet Resources	
How to fire natural clay at home	https://thepotterywheel.com/how-to-fire-clay-at-home/#:~:text=So%2C%20even%20if%20they%20feel,an%20hour%20at%20this%20heat.
US Geological Survey	https://www.usgs.gov/educational-resources
National Geographic	https://education.nationalgeographic.org/resource/rock-cycle/

YouTube Videos About Geology

Elementary	<p>Title: Where does sand come from? Length: 5:59 Creator: SciShow Kids Level: Easy Worldview: Neutral https://www.youtube.com/watch?v=d0o19GJB_kg</p> <p>Title: How to make edible rocks...rock candy Length: 4:46 Creator: SciShow Kids Level: Easy Worldview: Neutral https://www.youtube.com/watch?v=jyYrHQvvyq8</p> <p>Title: Studying Rocks Length: 8:48 Creator: Learn Bright Level: Intermediate Worldview: Neutral https://www.youtube.com/watch?v=xsHPA2GNF9Q</p> <p>Title: Geology for Kids playlist Length: 35 videos Creator: Bill Nye Level: Mixed Worldview: Evolutionary https://www.youtube.com/playlist?list=PL_WS7MHPzIhK2-RYggIJ19C6MtFM-Qk8b</p> <p>Title: Rocks and Minerals for kids Length: 4:09 Creator: Smile and Learn – English Level: Easy Worldview: Neutral https://www.youtube.com/watch?v=XvVvfPnrhd0</p> <p>Title: Be a Rock Detective Length: 4:22 Creator: SciShow Kids Level: Easy Worldview: Neutral https://www.youtube.com/watch?v=tNs1gqkYerg</p>
Middle & High School	<p>Title: Introduction to Geology Length: 40:28 Level: advanced Worldview: Neutral Creator: Earth & Spaces Sciences https://www.youtube.com/watch?v=qNiOXc6pSBQ</p> <p>Title: The Rock Cycle Length: 6:39 Level: Beginner Creator: Mr. Bradley Worldview: Evolutionary https://www.youtube.com/watch?v=Vp_S3BDiR-I</p> <p>Title: What are rocks and how do they form? Length: 10:56 Level: Beginner Worldview: Neutral Creator: CrashCourse https://www.youtube.com/watch?v=7Bxw4kkeHJ8</p> <p>Title: Creation Geology for Beginners Playlist Creator: Creation Unfolding Length: 13 videos Level: Beginner Worldview: Creation https://www.youtube.com/playlist?list=PL9_FWXmcBjZNfEA8A-J70pYnIcNoiUvhC</p> <p>Title: The Most Convincing Evidence for a Young Earth Length: 01:03:49 Creator: Answers in Genesis Level: Intermediate Worldview: Creation https://www.youtube.com/watch?v=kuRFueoiu78</p>