

Lesson Plan 6-28-2021

Lesson Title: Sedimentary Rocks Day 1

Grade level: 3-5

Estimated lesson length: 55 min

Description:

Students will connect with each other and their teachers by playing a get to know you game. Students will also gain a basic understanding of Earth's major natural disasters: earthquakes, volcanoes, floods. They will make their own sedimentary rock and leave it to dry for a few days.

Essential Question:

How do humans use experiments to simulate what happens in the real world?

Grades 3-5 Standard(s):

5.3.1.2.2 Explain how slow processes, such as water erosion, and rapid processes, such as landslides and volcanic eruptions, form features of the Earth's surface.

Learning Objective(s):

Content:

- Students will gain an understanding of Earth's natural disasters: earthquakes, volcanoes, floods.
- Students will learn that sedimentary rocks are made up of deposits of other rocks and living organisms from the earth and form together with minerals.
- Students will make a sedimentary rock using sand, gravel, water, and sugar.

Language:

- Students will collaborate through discussion to come up with a set of class rules and expectations.
- Students will listen to directions in order to make their sedimentary rocks.
- Students will draw and label the Earth's features to show their understanding.

Academic Language:

- Crust - "Crust" describes the outermost shell of our planet.
- Earth has three layers: the crust, the mantle, and the core
- Tectonic plates - Plate tectonics is the theory that Earth's outer shell is divided into large slabs of solid rock, called "plates," that glide over Earth's mantle, the rocky inner layer above Earth's core.
- Fault lines - Tectonic plate boundaries
 - Strike-slip faults indicate rocks are sliding past each other horizontally, with little to no vertical movement.
 - Normal faults create space. Two blocks of crust pull apart, stretching the crust into a valley.
 - Reverse faults slide one block of crust on top of another. Tectonic plates push up mountain ranges.
 - Ring of Fire: area around rim of Pacific Ocean where volcanic eruptions and earthquakes occur.

- Earthquakes - A sudden and violent shaking of the ground, sometimes causing great destruction, as a result of movements within the earth's crust or volcanic action.
- Volcanoes - A mountain or hill, typically conical, having a crater or vent through which lava, rock fragments, hot vapor, and gas are being or have erupted from the earth's crust.
- Floods - An overflowing of a large amount of water beyond its normal boundaries, especially over what is normally dry land.
- Sedimentary rocks - Sedimentary rocks are formed from pre-existing rocks or pieces of once-living organisms. They form from deposits that accumulate on the Earth's surface.

Assessment(s):

- Teacher will informally assess the class' KWL chart and use it to guide instruction further in the week.
- Teacher will informally assess students' science journals and use their drawings of Earth's features to guide instruction and correct any misconceptions later in the week.

UDL, Accommodations, & Modifications:

- Students who have sensory difficulties can use non-latex gloves to mix and pour sugar and water mixture.
- Multiple modes of learning are given: video, discussion, observation, drawing. This allows all students to learn using their preferred learning style and take in information several different ways.
- Teacher will provide specific guiding questions to facilitate learning and connect to prior knowledge.
- A word bank will be provided during independent practice for students who do not have a domain specific academic vocabulary or those who have difficulty spelling.

Materials:

- Smartboard
- Science journals
- Pencils
- Sand
- Gravel
- Water
- Sugar
- Cups
- Spoons
- Wax paper

Procedure:

Core:

Estimated time: 50 minutes

Slides:

https://docs.google.com/presentation/d/1Fhn1mkcWp8Kuf-exfcvHSxrqEzbF7kvfkqJ8b0LHOgU/edit#slide=id.gdf36a80993_0_838

We do:

1. Intro game
 - a. Name game - Students sit in a circle and say their name along with an adjective that starts with the same letter as their name. As students go around the circle they will try and say the names introduced before them!
 - b. Beach ball question game - Toss the beach ball around and have students answer the question their right thumb lands on!
2. Safety expectations
 - a. Write expectations on a whiteboard/chalkboard where students will be able to see for the duration of camp
 - b. Tell the students that because we will be working with so many fun materials we have to come up with some expectations for how we are going to treat the materials and others. Ask students for what they think good rules would be for this camp.
3. KWL
 - a. What do students already know about how the earth was formed?
 - b. What do the students wonder?
 - c. Fill these slides out on your smartboard so that all students can see their input to class discussion displayed
4. Watch one video about how the earth was formed → pick one
 - a. https://www.youtube.com/watch?v=fJ0J4mbj0_o (5 min)
 - b. https://www.youtube.com/watch?v=55oDyazPdTU&ab_channel=GoogolplexGoogolplex (9 min)

You do together:

5. KWL
 - a. What did the students learn about how the Earth was formed now that they have watched the video?
 - b. Fill out this slide on the smartboard

I do:

6. Go over new vocabulary/content
 - a. Show earth's structures on slides and have students make observations/turn & talks before describing new vocab... go through these images fast!!
 - b. Crust - "Crust" describes the outermost shell of our planet.
 - c. Tectonic plates - Plate tectonics is the theory that Earth's outer shell is divided into large slabs of solid rock, called "plates," that glide over Earth's mantle, the rocky inner layer above Earth's core.
 - d. Fault lines - Tectonic plate boundaries
 - e. Earthquakes - A sudden and violent shaking of the ground, sometimes causing great destruction, as a result of movements within the earth's crust or volcanic action.
 - f. Volcanoes - A mountain or hill, typically conical, having a crater or vent through which lava, rock fragments, hot vapor, and gas are being or have erupted from the earth's crust.
 - g. Floods - An overflowing of a large amount of water beyond its normal boundaries, especially over what is normally dry land.

- h. Sedimentary rocks - Sedimentary rocks are formed from pre-existing rocks or pieces of once-living organisms. They form from deposits that accumulate on the Earth's surface.
- 7. Model activity - sedimentary rocks
 - a. Show the students an example rock (make beforehand)
 - b. Remind students of the rules we made about materials at the beginning of class
 - c. Directions - <https://www.education.com/science-fair/article/making-a-rock-in-a-cup/>

We do:

- 8. Activity - sedimentary rocks
 - a. Hand out 2 cups, 1 spoon, and 1 square of wax paper to each student
 - b. Go through activity step by step so students are following along
 - c. Make sure students do NOT pour in all of their sugar water mixture!!! Only enough to make the sand/gravel wet!!!

Closure:

Estimated Time: 5 min

You do alone:

- 9. Have students illustrate the Earth and features in their science journals
 - a. Have students label their illustrations
 - b. Project Earth's feature vocabulary words on the smartboard for students to reference

Lesson Plan 6-29-2021

Lesson Title: Earthquakes Day 2

Grade level: 3-5

Estimated lesson length: 55 min

Description:

Students will learn about earthquakes and what makes a good structure. They will receive parameters and criteria in order to build their own structures to survive an earthquake.

Essential Question:

How do humans use experiments to simulate what happens in the real world?

Grades 3-5 Standard(s):

3.1.1.2.3 Maintain a record of observations, procedures and explanations, being careful to distinguish between actual observations and ideas about what was observed. For example: Make a chart comparing observations about the structures of plants and animals.

4.1.2.2.2 Generate ideas and possible constraints for solving a problem through engineering design. For example: Design and build an electromagnet to sort steel and aluminum materials for recycling

4.1.2.2.3 Test and evaluate solutions, considering advantages and disadvantages for the engineering solution, and communicate the results effectively.

5.3.1.2.2 Explain how slow processes, such as water erosion, and rapid processes, such as landslides and volcanic eruptions, form features of the Earth's surface.

Learning Objective(s):

Content:

- Students will learn about earthquakes, how they happen, why they happen, and the damage they can cause.
- Students will build a structure to withstand an earthquake with a partner.

Language:

- Students will work as a team to design, discuss, and construct their earthquake-proof structure.
- Students will speak to each other about what they already know about earthquakes and write down their knowledge in their science journal.

Academic Language:

- Fault lines - Tectonic plate boundaries
 - Strike-slip faults indicate rocks are sliding past each other horizontally, with little to no vertical movement.
 - Normal faults create space. Two blocks of crust pull apart, stretching the crust into a valley.

- Reverse faults slide one block of crust on top of another. Tectonic plates push up mountain ranges.
- Ring of Fire: area around rim of Pacific Ocean where volcanic eruptions and earthquakes occur.
- Earthquakes - A sudden and violent shaking of the ground, sometimes causing great destruction, as a result of movements within the earth's crust or volcanic action.
- Structure

Assessment(s):

- Teacher will informally assess students' science journals at the end of the day, looking for what they already knew about earthquakes before the lesson and any questions they had. The teacher will also look at students' structure sketches and observations.
- Teacher will look for student teams working together to plan and design their structure, materials being used appropriately, and calm bodies. The teacher will listen for students discussing ways to build a structure, using academic language, and being good teammates.
- Teacher will informally assess students' structures when they are tested out on the earthquake simulator.

UDL, Accommodations, & Modifications:

- Multiple modes of learning are given: video, discussion, observation, drawing. This allows all students to learn using their preferred learning style and take in information several different ways.
- Materials and criteria are listed on the board for students to reference as they work.
- A time is also displayed on the board for students to reference as they work.
- Students are given the option to write down what they already know OR they can draw a picture of what they already know.

Materials:

- Smartboard
- Science journals
- Pencils
- Playdough
- Coffee stirrers
- Popsicle sticks
- Masking tape
- Duct tape
- Cardstock
- Earthquake simulator (desk)

Procedure:

Core:

Estimated time: 45 minutes

Slides:

https://docs.google.com/presentation/d/1Fhn1mkeWp8Kuf-exfcvHSxrqEzbF7kvfkqJ8b0LHOgU/edit#slide=id.gdf36a80993_0_838

We do:

1. Connect to prior knowledge
 - a. Ask students to turn and talk to their table and discuss what they already know about earthquakes
 - b. Students will go to the earthquake KWL in their science journals and write down what they already know AND/OR they can draw a picture of what they already know
 - c. Finally, have students write down any questions/wonders they have about earthquakes

I do:

2. Content
 - a. Show video about earthquakes - [What Is An Earthquake? | The Dr. Binocs Show | Educational Videos For Kids - YouTube](#)
 - b. Go over vocab and show images
 - i. Earthquakes, fault lines, tectonic plates, seismometer
 - ii. Hand out tectonic plate models to students to move and touch (these can get loud while you are teaching)

You do together & alone:

3. Challenge
 - a. Tell students, “Your challenge is to design a structure that will be ‘earthquake-proof’, the taller the better but make sure your structure will still be able to stand!”
 - b. Students will work in teams to roughly sketch in their science journal a structure that could withstand earthquakes
 - c. Explain what students can use (15 popsicle sticks, 10 toothpicks, 20 coffee stirring sticks, 3 ft. tape) and have students place/build their structure on cardstock paper!!
 - d. Pair students up! Groups of 2 work best
4. Earthquake simulator
 - a. Pairs of students will start to design their own structure before putting it in an earthquake simulator, students will get about 15-20 minutes to build
 - b. Once time is up, students will test out their structures in an “earthquake simulator” (we shook a desk) and then make at least 3-4 observations/sentences of how their structure did or what they would change about their room next time
5. Time permitting...
 - a. Talk about triangles/best structures for earthquakes [How We Design Buildings To Survive Earthquakes - YouTube](#)
 - b. Students can rebuild rooms and test out their room again
 - c. Student make more observations in their journal, how was my second structure better than the first

Closure:

Estimated Time: 10 min

6. Clean up

- a. Disassemble structures and return materials to bins
- b. Hand in science journals and pencils

Lesson Plan 6-30-2021

Lesson Title: Volcanoes Day 3
Grade level: 3-5
Estimated lesson length: 55 min

Description:

Students will learn about volcanoes and how they function. Students will make their own volcanoes out of clay & PVC pipe and mix vinegar & baking soda.

Essential Question:

How do humans use experiments to simulate what happens in the real world?

Grades 3-5 Standard(s):

5.3.1.2.2 Explain how slow processes, such as water erosion, and rapid processes, such as landslides and volcanic eruptions, form features of the Earth's surface.

Learning Objective(s):

Content:

- Students will learn about volcanoes, where they are located, why they erupt, and the advantages and disadvantages of their destruction.
- Students will gain a basic understanding of the parts of a volcano and be able to name their elements.

Language:

- Students will share what they already know about volcanoes with the class and then discuss what they learned after watching a short video.
- Students will write down or draw what they already know about volcanoes and wonders they may have.

Academic Language:

- Volcanoes - A mountain or hill, typically conical, having a crater or vent through which lava, rock fragments, hot vapor, and gas are being or have erupted from the earth's crust.
- Fault lines - Tectonic plate boundaries
 - Strike-slip faults indicate rocks are sliding past each other horizontally, with little to no vertical movement.
 - Normal faults create space. Two blocks of crust pull apart, stretching the crust into a valley.
 - Reverse faults slide one block of crust on top of another. Tectonic plates push up mountain ranges.
 - Ring of Fire: area around rim of Pacific Ocean where volcanic eruptions and earthquakes occur.
- Eruption - A sudden outbreak of something, typically something unwelcome or noisy. The sudden occurrence of a violent discharge of steam and volcanic material.

- Magma - Hot fluid or semifluid material below or within the earth's crust from which lava and other igneous rock is formed on cooling.

Assessment(s):

- Teacher will listen to students as they discuss what they already know about volcanoes and the wonders they have. The teacher will also listen as students share what they learned about volcanoes they didn't know before watching a video.
- Teacher will ask students about the different parts of a volcano and informally assess class knowledge of volcanic elements.
- Teacher will look at the knowledge check in students' science journals and see if they can answer the two questions: what causes volcanoes to erupt & what damage they can cause. The teacher will use this to guide instruction.

UDL, Accommodations, & Modifications:

- Multiple modes of learning are given: video, discussion, observation, drawing, photos. This allows all students to learn using their preferred learning style and take in information several different ways.
- Gloves will be provided for those who do not want to touch the clay or the vinegar mixture.
- Students will get a choice to build their own volcano or work with a partner in order to give choice and promote ownership of learning.

Materials:

- Smartboard
- Science journals
- Pencils
- Clay
- Wax paper
- Centrifuge tubes
- Baking soda
- Vinegar
- Red food dye
- Liter of Coke
- Mentos
- Paper towels!
- Latex free rubber gloves

Procedure:

Core:

Estimated time: 50 minutes

Slides:

https://docs.google.com/presentation/d/1Fhn1mkeWp8Kuf-exfcvHSxrqEzbF7kvfkqJ8b0LHOgU/edit#slide=id.gdf36a80993_0_838

We do:

1. Connect to prior knowledge

- a. Students will share what they know about volcanoes with their table groups and if they have seen one/know of any active ones. Students will write or draw these ideas in their science journals.
- b. Students will talk to their table group about any questions they have about volcanoes and write them in the science journals.

I do:

2. Content

- a. Go over vocab: volcano, fault line, eruption, magma (they should have heard about most of these before). Make sure to point out the ring of fire in the picture of fault lines and describe it. Then point to North America, specifically Minnesota, and ask students if we are close to any of the fault lines... No, that is why Minnesota does not have to worry about volcanoes.
- b. Ask students if they can name any volcanoes that are in the United States...ex. Mt. St. Helen in Washington state, Yellowstone, Hawaii, etc.
- c. Students will watch the video on how volcanoes are formed and what they look like when they erupt:
https://www.youtube.com/watch?v=VNGUdObDoLk&ab_channel=NationalGeographicNationalGeographic
- d. Have a short discussion about what students learned from the video that they didn't know before.

3. Model how to build clay volcano

- a. Show students an image of what they will be building
- b. They will get the choice of working by themselves or working with a partner
- c. Give directions before handing out materials:
 - i. Each person/partnership will get a square of wax paper to build on
 - ii. Each person/partnership will get some clay to mold into a volcano (if there is time have students get a few minutes to play with the clay before starting)
 - iii. Once groups are ready, the teacher will pass out a centrifuge tube to act as the vent of the volcano, the opening of the tube should be facing upward
- d. Give students about 5-10 minutes to construct

4. Coke and mentos volcano (outside)

- a. Walk students outside with their model volcanoes; bring coke bottle, mentos, baking soda, vinegar, funnels, food dye, cups, trash bin
- b. Once everyone is settled outside, have all students watch as you erupt your own volcano
- c. Before putting the mentos in, ask students how they think this model is like a real volcano... possible answers could include the coke is like the magma, the opening on top is the vent, the bottle is the Earth's crust/volcano
- d. Erupt your volcano!

You do together:

5. Erupt model volcanoes

- a. <https://happybrownhouse.com/simple-science-how-to-make-a-volcano-with-kids/>
- b. Have students put a little baking soda in the opening of their volcano
- c. Each student gets a cup of vinegar and red food dye to look like lava (wear gloves while putting dye into the vinegar!)
- d. On the count of three students will pour in their vinegar and watch their volcanoes erupt!

6. Clean

- a. Have students dump the rest of the vinegar in the grass and throw away the clay, cups, and wax paper
- b. Save the centrifuge tubes! Students will have to pull the class off of them and bring them inside

Independent work:

7. Knowledge check

- a. Students will write in their journals what causes volcanoes to erupt and the effects they have on people and the environment

Closure:

Estimated Time: 5 min

8. CLEAN UP!!!!

- a. If there is time, have students bring their centrifuge tubes to the sink and wash off the excess clay and then place them in a bin to dry

Lesson Plan 7-1-2021

Lesson Title: Floods Day 4

Grade level: 3-5

Estimated lesson length: 55 min

Description:

Students will learn about slow processes such as erosion and weathering and how it affects the earth. Then, the students will make their own sandcastles and flood their bin and watch as the sand falls away from the buildings.

Essential Question:

How do humans use experiments to simulate what happens in the real world?

Grades 3-5 Standard(s):

5.3.1.2.2 Explain how slow processes, such as water erosion, and rapid processes, such as landslides and volcanic eruptions, form features of the Earth's surface.

Learning Objective(s):

Content:

- Students will gain a basic understanding of floods, weathering, erosion, and floodplains.
- Students will determine what the dangers of floods are.
- Students will build a house of sand and make observations as it floods.

Language:

- Students will discuss with their classmates what they already know about floods and what they learned from guided instruction.
- Students will speak with a partner about what they are going to build and how they are going to build their sandcastle.
- Students will write predictions about what will happen when their sandcastle floods in their science notebooks.
- Students will write down what they learned from STEM camp.

Academic Language:

- Flood - An overflowing of a large amount of water beyond its normal boundaries, especially over what is normally dry land.
- Floodplain - flat area by a river that becomes covered in water when a flood happens. It is a fertile area: good for agriculture/farm land.
- Flash flood - a local flood that happens suddenly. It is caused by heavy rainfall.
- Weathering - causes rocks to break down
- Erosion - the transport of sediment to another place, can be cause by water

Assessment(s):

- Teacher will listen as students discuss what they already know and then what they learned from direct instruction. The teacher will use this to guide instruction.
- Teacher will informally assess students' predictions about flooding. The teacher will look for academic vocabulary and the ideas of weathering and erosion present in predictions.
- Teacher will informally assess students' knowledge checks at the end of the unit to see what they learned overall and use it to guide instruction for the next time the unit will be taught.

UDL, Accommodations, & Modifications:

- Multiple modes of learning are given: video, discussion, observation, drawing, photos. This allows all students to learn using their preferred learning style and take in information several different ways.
- Students are given the option to write OR draw what they know about floods, which allows students to demonstrate their knowledge in different ways.

Materials:

- Smartboard
- Science journals
- Pencils
- 5 medium sized bins
- Lots and lots of water!
- Treats (optional)

Procedure:

Core:

Estimated time: 50 minutes

Slides:

https://docs.google.com/presentation/d/1Fhn1mkeWp8Kuf-exfcvHSxrqEzbF7kvfkqJ8b0LHOgU/edit#slide=id.gdf36a80993_0_838

We do:

1. Connect to prior knowledge
 - a. Talk about what we know about floods... allow a few minutes for discussion
 - b. "Do you know of anywhere that has been affected by flooding? Or has been flooded recently?"
 - c. Students will write or draw their knowledge in their science journals, including an wonders/questions they might have
 - d. "Do you know what happens when we get a lot of rain? The lake fills up like a bucket and sometimes overflows! When rivers flood, the land around them goes underwater... have you ever seen a beach or a sand bank? That is where the water rises to!"

I do:

2. Content
 - a. Show video of floods

- i. https://www.youtube.com/watch?v=9hQZCiZ21fk&ab_channel=NationalGeographicNationalGeographicVerified (entire video)
 - ii. <https://www.youtube.com/watch?v=4PXj7bOD7IY> (pick a small part)
 - iii. https://www.youtube.com/watch?v=_rnb6u6gPw&ab_channel=TopFives (pick a small part)
- b. Discuss why floods are damaging - slides
 - i. Talk about flash floods, electrical dangers, drowning, blackwater, etc. <https://www.rotorooter.com/blog/flooding/dangers-of-flooding-water/>
 - c. Go over new vocab: weathering, erosion, flash flood, floodplain
 - i. If time, show video of a flash flood: <https://www.nationalgeographic.org/encyclopedia/flood-plain/>
 - d. Real life case study (if time allows): <http://floodlist.com/america/canada-floods-british-columbia-june-2021> read the article to the students and have them make observations

You do together & alone:

3. Flood simulation
 - a. Explain that students have about 10 minutes to build a town/sandcastle in their flood bin before we flood it
 - b. Pair students up into 5 teams, one for each flood bin
 - c. **Before** flooding, have students write in their science journal at least 2 predictions of what will happen when their town gets flooded. “What will happen to the buildings? What damage will flooding have on the sand?”
 - d. Let students build for about 10 minutes
 - e. Test out their flood simulator! Dump water into their bin and have students make observations. Ask students what process this flood is simulating... Weathering and erosion!
 - f. If time: have students try again!

Closure:

Estimated Time: 5 min

4. Dismissal
 - a. Students will fill out an exit ticket, explaining 3 things they learned, one for each natural disaster!
 - b. Treat?!

Resources:

<https://www.weather.gov/phi/FlashFloodingDefinition>