**5E Lesson 4 Play-Doh Rock Cycle- Science**

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| **Name: Jeanette Fehr** | **Date: July 18, 2011** |
| **Content Area: Earth Sci.** | **Grade Level(s): 9+** | **Topic(s): Rock Cycle** |

**Standards (SOL)**

Earth Science SOL Standards

ES.1a,c,f

ES.5a,b,c

**Objectives (UKD’s)**

Students should be able to:

1. Understand the processes by which rocks are formed define the three major groups of rocks
2. Sedimentary rocks may be formed rock fragments
3. Metamorphic rocks form when and rock is changed by the effects of heat and pressure
4. Comprehend the main components of the rock cycle
5. Demonstrate the rock cycle through the use of Play-Doh

**Materials & Resources**

4 card board box squares (~10”X10”)—this adds support to the activity

32 pieces of Wax paper (~5”X5”)—this is a protective barrier between the Play-Doh and the student desk

1 Dental Floss package (will need 4 pieces (~8”-10” long)

1 or 2 cases of the 24-pack of Play-Doh (there will be enough for each students to feel he/she has a selection choice)

* Hold out the brown/beige containers

Play-Doh PowerPoint

Copies of the Word Document Play-Doh Rock Cycle

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Mini Chocolate candy bars—if doing the extension with the candy

Copies of the Word Document Candy Rock Cycle Script

\*If seen this demonstration done before, but haven’t a clue where or when.

<http://www.bing.com/images/search?q=PLKAY+DOH+24+PACK&view=detail&id=99DEBEC1861EA82AE07D7204D39861C23AD3DA0E&first=31&FORM=IDFRIR>

 *Retrieved July 18, 2011*

<http://s1.babyearth.com/images/images_big/10-2038-01.jpg> *Retrieved July 18, 2011*

**Safety Considerations**

Students with food allergies or sensitivities to wheat or ingredients listed on the package Play-Doh—Student(s) may wear latex gloves if he/feels comfortable, or may be given a supervisory assignment to make sure students are following directions. (I had modeling clay & called the company inquiring about the ingredients—it’s clay, but is processed in the factory lines as the Play-Doh; they would not confirm that cross-contamination did not occur.)

The wax paper is used to protect the desks from spotting.

\*Prior to assigning the extension activity, determine if students have allergies to peanuts or chocolate and severity of allergy. This activity is not recommended for students with severe allergies. Sometimes other layered candy can be substituted. (Parents may have an idea for substitutions).

**Engage – Time Estimate 5-10 minutes**

1. As the students walk into the classroom, have each select a canister of Play-Doh, **but don’t open it**.
2. The Play-Doh PowerPoint can be used to intrigue students’ curiosity
3. Think-Pair-Share: Ask the students to brainstorm about how the class could use Play-Doh to demonstrate the processes, or most of the processes of the rock cycle.
4. Lead a class discussion; put brainstorming ideas on the board and label them as to which part of the rock cycle the idea represents

**Explore – Time Estimate 10+ minutes**

1. The activity is like organized caos, but it’s fun; it seems to work best moving left-to right or right to left in the classroom.
2. Have a student pass out a piece of wax paper to everyone in the class
3. Start at the teacher’s right side; pass back a cardboard square to each student
4. Students open the Play-Doh canister chosen upon entering classroom
5. Pinch-off a piece ~1.5” diameter (about the size of a large marble); teacher may model. Keep the rest of the Play-Doh inside the canister and recap“What would that piece broken-off from the original represent if it were part of the rock cycle?” Sediment “What is the term for rocks breaking? “ Weathering
6. Roll the sediment into a round sphere in your hands or on wax paper. “Sediments may become spherical in nature—where would we find this taking place?” Streams/rivers “Look around the room at all different colors of sediment”—Everyone should hold theirs up.” “Each colored piece comes from the original parent rock”.
7. Take your sediment sphere and ‘deposit’ it on the wax paper; gently press it to flatten the sphere. “Where in nature would the sediment be deposited or dropped? “ Bays/ocean/Gulf
8. Starting from the teacher’s right side, the student on the end places the wax paper with the 1st layer of deposited sediment onto the cardboard square. Pass the cardboard to your right, add the 2nd layer of the flattened sediment to the top (not the wax paper—Play-Doh touches Play-Doh). Continue doing the same to the right until the end of the row. “Depositing sedimentary layers…” Remember to add & pass it along. [it won’t matter if there are different number of students in each row].
9. Starting this time from teacher’s left, press down gently on the top of the new layers of sediment then pass the cardboard with the layered sediment to your left—to the end of row. “What is the vocabulary term we could use to describe the process for the layers being pressed together?” Compaction & cementation “What rock type would the Play-Doh represent?” Sedimentary Rock
10. Now starting again from teacher’s right, fold the ‘rock’ once and pass it to the right—to the end of the row. “What rock cycle process is being represented by folding the rock?” Pressure/heat (If students inquire about heat—heat from their hands is molding the Play-Doh rock.) “What rock type would have folded layers in it?” Metamorphic \*If student’s can’t figure it out, do the next step, then repeat the question.
11. Now our ‘metamorphic rock’ is at the far left of the room. Each student on the left holding the cardboard with the folded Play-Doh rock should get a piece of dental floss. Hold the dental floss tightly with both hands and use it to slice the ‘rock’ in half. [It doesn’t matter which way they chose to slice it as long as it is in half.]
12. Starting again from teacher’s right, the student who sliced the rock should pass both halves to the left. (Everyone in the row will have a chance to see the newly created metamorphic rock.)
13. “What major part of the rock cycle did we miss?” Igneous Rock & Magma/Lava “What can be done with the Play-Doh rock to simulate the magma.” Continue to fold and blend all the colors of that ‘rock’ into one color. It would simulate dissolved minerals.
14. Since each rock will look a little different, place the halves from each in two different spots in the classroom for students to observe.

**Explain -- Time Estimate 10+ minutes**

Use the Word Document Play-Doh Rock Cycle to have the students should use complete sentences to write a short paragraph explaining how this activity with the play-Doh represented some of the basic processes in the Rock Cycle. (example: spheres, pancaked layers, flattening, folding…)

The book can be a great resource for the vocabulary terminology.

**Extend -- Time Estimate 10-15 minutes**

Students may work in pairs using their knowledge and experience of working with the Play-doh to design a script, or set of directions using a piece of chocolate candy to explain to another classmate processes of the rock cycle. (The activity can be done using no candy and using their imagination of a Milky Way candy bar, or the mini’s can be distributed.)

**Evaluate -- Time Estimate 10-15 minutes**

Teachers can evaluate the student paragraphs summarizing the rock cycle process with Play-Doh to asses proper use of vocabulary and understanding of the rock cycle process.

 If the extension activity is used, the students would be using a higher to create the script or directions to explain the rock cycle.

**Plans for Diversity**

Students who have a stronger understanding of the rock cycle may be paired with those students with a weaker understanding, students who are easily frustrated, or who may have an attention deficiency. The stronger students should encourage their partner to explain “how would you show me…sediments…with the candy bar?”

Students stronger with scientific terminology and vocabulary usage may be pair with students with lower reading skills or ELL students.

Some students may still need a ‘re-teaching’. Use the Word document Candy-rock activity or Candy-rock activity2. (One activity has a selection of 1 piece of candy, the other two pieces)

**Connections**

This activity ties into changing earth unit especially supporting the chapters on rock, weathering & erosion, and deposition. Our scope & sequence was altered this year. We’ll be teaching rocks and weathering during 1st quarter in erosion during 2nd quarter. The activity works a scaffolding for concepts about plate tectonics, geologic history, Virginia resources, and oceanography.





Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Class Period \_\_\_\_\_

 Rock Cycle Script Using Candy

**Objective:**

1. Comprehend the main components of the rock cycle
2. Demonstrate knowledge of the rock cycle by producing a script or set of directions using candy to explain the rock cycle and the processes.

Directions: Students may work in pairs using their knowledge and experience of working with the Play-doh to design a script, or set of directions using a piece of chocolate candy to explain to another classmate process of the rock cycle. One of these items below may be used in your work, but it is not limited to just those listed below.

Milky Way Milky Way Midnight Snickers 3 Musketeers Sugar Wafer

Baby Ruth Butterfinger Almond Joy Reese’s Cups Twix

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Candy – Rock Activity

1. Circle the name of the candy that you chose:

Milky Way Milky Way Midnight Twix Snickers 3 Musketeers Sugar Wafer

1. Describe the *Physical Characteristics* of your candy: (color, smell, texture, etc.)
	* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Take your plastic knife and cut your candy in half.

 Then draw a *cross-section* of your candy: (Draw a side view)

 Example Your candy ‘rock’

1. What type of “rock” would this represent?

 A. Igneous Rock B. Metamorphic Rock C. Sedimentary Rock

1. Take half of your candy and press down on it with your thumb or finger.

 (You are exerting *heat and pressure*)

 Draw another *cross-section* of what you see now.

 Your candy ‘rock’

1. What type of “layered rock” would your first sketches represent?

 A. Igneous Rocks B. Metamorphic Rocks C. Sedimentary Rocks

5. What do the tiny candy/cookie crumbs & broken chocolate on the paper plate represent?

 A. Igneous Rocks B. Metamorphic Rocks C. Sedimentary Rocks D. Sediment

1. Take half of the candy and slowly press down on it with your thumb or finger onto your paper plate. (You are exerting ***heat and pressure***)

 Draw another *cross-section* of what you see now that the pieces are smashed.

 1st candy “rock” (Draw a side view)

1. What type of “rock” formed when *heat and pressure* from your finger changed it:

 A. Igneous Rock B. Metamorphic Rock C. Sedimentary Rock

1. The ‘liquefied’ chocolate on your finger would represent which stage in the rock cycle?

 A. Melting B. Metamorphic Rock C. Sedimentary Rock

 In a short paragraph, write an explanation of how this activity with the candy

represents some of the processes in the Rock Cycle.

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Candy – Rock Activity 2

1. Chose 2 different candies: Circle the names of the candies that you chose:

Milky Way Milky Way Midnight Snickers 3 Musketeers Sugar Wafer

Baby Ruth Butterfinger Almond Joy Reese’s Cups Twix

1. Describe the *Physical Characteristics* of your candy: (color, smell, texture, etc.)

 1st candy- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 2nd candy- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. Take the shared plastic knife and gently cut your candy in half.

 Then draw a *cross-section* of your candy: (Draw a side view of the layers that you see)

 Example 1st candy “Rock” 2nd candy “Rock”

1. What type of “layered rock” would your first sketches represent?

 A. Igneous Rocks B. Metamorphic Rocks C. Sedimentary Rocks

5. What do the tiny candy/cookie crumbs & broken chocolate on the paper plate represent?

 A. Igneous Rocks B. Metamorphic Rocks C. Sedimentary Rocks D. Sediment

1. Take half of the 1st candy and slowly press down on it with your thumb or finger onto your paper plate. Then repeat with the 2nd candy. (You are exerting ***heat and pressure***)

 Draw another *cross-section* of what you see now that the pieces are smashed.

 1st candy “rock” (Draw a side view) 2nd candy “rock” (Draw a side view)

1. What type of “rock” formed when *heat and pressure* from your finger changed it:

 A. Igneous Rock B. Metamorphic Rock C. Sedimentary Rock

1. The ‘liquefied’ chocolate on your finger would represent which stage in the rock cycle?

 A. Melting B. Metamorphic Rock C. Sedimentary Rock

 In a short paragraph, write an explanation of how this activity with the candy

represents some of the processes in the Rock Cycle.

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