SWEET ROCK CYCLE

INSTRUCTIONS
Grade 7

Science Concept:

Rocks undergo change.

Objectives:

The student will:

- describe how a rock can change from sediments to igneous rocks;
- make generalizations about rock type from an observation; and
- write a report using new vocabulary to describe the rock cycle.

GLEs Addressed:

Science

[7] SD1.1 The student demonstrates an understanding of geochemical cycles by describing the rock cycle and its relationship to igneous, metamorphic, and sedimentary rocks.

[7] SA1.1 The student demonstrates an understanding of the processes of science by asking questions, predicting, observing, describing, measuring, classifying, making generalizations, inferring, and communicating.

Writing

[7] W3.2.2 The student writes for a variety of purposes and audiences by writing in a variety of nonfiction forms (e.g., letter, report, biography, and/or autobiography) to inform or describe

Vocabulary:

cementing – a chemically precipitated substance that binds particles of clastic rocks

compaction - the consolidation of sediments resulting from the weight of overlying deposits

erosion - the process by which the surface of the earth is worn away by the transporting action of water, glaciers, winds, waves, etc.

heat - a nonmechanical energy transfer with reference to a temperature difference between a system and its surroundings or between two parts of the same system

igneous rock - rocks formed by the cooling and solidifying of molten materials. Igneous rocks can form beneath the Earth's surface as magma or at its surface, as lava.

lava - molten rock that reaches Earth's surface through a volcano or fissure

magma - molten material beneath or within the earth's crust, from which igneous rock is formed

metamorphic rock - rock that was once one form of rock but has changed to another under the influence of heat, pressure, or percolating fluids without passing through a liquid phase

pressure - the exertion of force upon a surface by an object, fluid, etc., in contact with it: the pressure of earth against a wall

rock cycle - the process in which rocks continuously change from one type to another

sedimentary rock - rock that has formed through the deposition and lithificaiton of sediment, especially sediment transported by water (rivers, lakes, and oceans), ice (glaciers), and wind. Sedimentary rocks are often deposited in layers, and frequently contain fossils.

sediments – transported particles of rock or minerals or chemically precipitated material

weathering - the various mechanical and chemical processes that cause exposed rock to decompose

Materials:

- Cups (one per student)
- Sugar cubes (one per student)
- Assorted hard candies (2 large bags)
- Heat and pressure source (e.g., George Foreman® grill or hot plate and two pans)
- Hand lenses (several to be shared among students)
- Safety goggles (one pair per student)
- Spoon or other instrument for crushing sugar cube (1 or 2 to be shared)
- Water
- Science journal

Activity Procedure:

Please refer to the assessment task and scoring rubric located at the end of these instructions. Discuss the assessment descriptors with the class before teaching this lesson.

Gear up

Process Skills: observing, describing, and communicating

1. Ask students to each bring one rock to school or take a class field trip to collect rocks.
2. Ask students to make observations and write about their rocks in their science journal. Next they should compare their rock observations with a partner and write down how the rocks are different from each other.
3. Ask students how rocks change. Write student responses on the board, with student's initials next to their response. Make sure each student provides a response.

Explore

Process Skills: observing, describing, and communicating

4. Explain students will use sugar to explore how rocks change. Show students the assorted candies and sugar cubes and ask them how they could change the candy/cube. Write responses (i.e., break, crush, dissolve, melt) on the board.
5. Explain that the candy/cube will represent a rock. Show students the materials they will use to change their "rock:" heat and pressure source, spoon, and water. Discuss safety issues. Distribute cups, sugar cubes, hard candies, and safety goggles.
6. Ask students to use the tools to change their "rock" and record their observations in their science journal.

Generalize

Process Skills: describing, and communicating

7. Ask students to share their observations about candy/cubes exploration.
   a. How did the candy/cubes change?
   b. How many times were you able to change the same piece of candy/cube?
   c. How do rocks change?
8. Show students a diagram of the rock cycle and ask them to make comparisons between what they explored with candy/sugar cubes and the type of rocks in the rock cycle.

Apply

Process Skills: generalizing, describing, and communicating

9. As a class, go outside. Ask students to find evidence of rocks that have been changed. Students should record their observations in their science journals. Add new ideas as they are expressed.

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RUBRIC

Assessment Task:

Write a report that describes how a rock can change from sedimentary rock to igneous rocks. The report must include at least two generalizations about the type of rock at each stage of the rock cycle. Use at least five introduced vocabulary words in the report.

Rubric

Objective	GLE	Below Proficient	Proficient	Above Proficient
The student describes how a rock can change from sedimentary rock to igneous rocks.	[7] SD1.1	The student's description does not explain how a rock can change from sedimentary rock to igneous rocks or has two or less changes in rock type.	The student's description explains how a rock can change from sedimentary rock to igneous rocks and includes three changes in rock type.	The student's description explains how a rock can change from sedimentary rock to igneous rocks and includes more than three changes in rock type.
The student makes generalizations about the rock cycle.	[7] SA1.1	The student does not make, or makes one generalization about the type of rock represented at each stage of the rock cycle.	The student makes two generalizations about the type of rock represented at each stage of the rock cycle.	The student makes three or more generalizations about the type of rock represented at each stage of the rock cycle.
The student writes a report to describe the rock cycle.	[7] W3.2.2	The student does not describe, or describes the rock cycle using less than five introduced vocabulary words in the report.	The student describes the rock cycle using five introduced vocabulary words in the report.	The student describes the rock cycle using more than five introduced vocabulary words in the report.