Rock Cycle Demonstration

Developed by Wendy Van Norden
Harvard-Westlake School

NGSS standard

**MS-ESS2-1. Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.** [Clarification Statement: Emphasis is on the processes of melting, crystallization, weathering, deformation, and sedimentation, which act together to form minerals and rocks through the cycling of Earth's materials.] [Assessment Boundary: Assessment does not include the identification and naming of minerals.]

Materials:

- Hand sample, or larger of each of the following
  - Granite, obsidian, sandstone (arkose is best), conglomerate, slate, gneiss
- Clear container with sand
- Lava lamp
- Pieces of paper
- Large marker pen “Magic Marker”

Procedure

Gather students in a circle.

1. Place a lava lamp in circle. Lava lamps are a wonderful way to teach about convection cells, but for this demonstration, it is just a stand-in for lava or magma.

2. Place a piece of granite near the lava lamp

Question “What happened to make the lava turn into this rock?”

3. Have a student write “cooled” with an arrow on a piece of paper, and place the paper between the lava lamp and the granite

4. Question “to what group of rocks does this piece of granite belong?”

5. Have a student write “igneous” and place it next to the granite

6. Place a beaker full of sand near the granite. Question “What happened to the rock to produce this sediment?”

7. Have a student write “weathered” and an arrow on a piece of paper and place it between the granite and the sand
8. Place a piece of sandstone near the sand. Question “What is this rock made of?”, and “To what group of rocks does this rock belong?” and “What happened to the sand to turn it into sandstone?”

9. Have a student write an arrow and the word “lithification” (or cementation) and place it in the appropriate place, as well as a paper with “sedimentary”

10. Do the same with the piece of slate, the word “metamorphic”, and the arrow with “heat and pressure”

11. Finish the first part of the cycle with an arrow from the slate to the lava lamp with the word “melt”

12. Questions: “can an igneous rock turn into a metamorphic rock?” Place an arrow with “heat and pressure” leading from igneous to metamorphic. “can a metamorphic rock turn into a sedimentary rock? Place an arrow with weather between the slate and the sand. “Can a sedimentary rock become an igneous rock?” Place an arrow between the granite and the lava lamp.

13. At this point, the cycle should be complete and look like this
14. Question "Can a sedimentary rock become another sedimentary rock?" Place a piece of conglomerate next to the sandstone and have arrows between the two.

15. "Can a metamorphic rock become another metamorphic rock?" Place a piece of gneiss next to the slate and have an arrow with heat and pressure going from the slate to the gneiss. Note: the gneiss cannot turn into slate unless it goes through the rock cycle first.

16. Question "Can an igneous rock become another igneous rock?" Place a piece of obsidian next to the granite with the words melt and cool and arrows between them.

The final cycle should look like this

When done, encourage the students to take pictures with their cell phones.
Final questions: “What can be said of all igneous rocks?” They are the result of melting and cooling of other rocks.

“What can be said of all sedimentary rocks?” They are the result of weathering and lithification of other rocks.

“What can be said of all metamorphic rocks?” They are the result of heat and pressure applied to other rocks.

Final observation: If you understand the definitions of the three rock groups, then you don’t have to memorize the rock cycle, it simply makes sense.