

MODELING METAMORPHIC ROCKS

Ages:
11–18 years

Duration:
30 minutes

Materials:

Per group of students

- ½ container of playdough
- ¼ cup of either miniature penne pasta or large almond slivers
- Plastic knives

OVERVIEW —

The students will model metamorphic processes and create a “rock” with aligned “crystals.”

OBJECTIVE —

The students will:

- Demonstrate that pressure can align certain structures within a matrix.
- Model the formation of a metamorphic rock

ACTIVITY —

Invite the students to create a metamorphic rock.

Hand out materials as needed.

1. Each group of students should soften their playdough by squeezing it.
2. Have the students add their elongated “crystals” (either pasta or almond slivers) and fold and pull the combined materials apart and together until the “crystals” are mixed thoroughly and randomly oriented.
3. Ask the students to place their rock on a surface and apply pressure to the top. Invite them to discuss what is happening to the “crystals”.
Pressure from one dimension will compress the rock and align the crystals in one dimension, forming layers.
4. Have the students pick up their “rock” and apply pressure from a different direction, squeezing the playdough into a tube. Continue applying pressure from the alternating sides; as the tube grows long, pull it into two tubes and join them, and repeat.
5. After sufficient pressure has been applied from two dimensions, cut the tube lengthwise with a plastic knife and examine the “crystals.” Discuss their orientation.
When would a rock experience pressure from two dimensions? [when mountains are forming; there will be pressure from rocks above and from the sides]

Further Discussion:

What rock does this model? [metamorphic foliated rock, such as schist]

In what ways does this model succeed? In what ways does it fail?

TIES TO STANDARDS —

Texas Science TEKS: Scientific Investigation and Reasoning

(3) Scientific investigation and reasoning. The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions and knows the contributions of relevant scientists. The student is expected to:

- (B) use models to represent aspects of the natural world such as a model of Earth's layers;
- (C) identify advantages and limitations of models such as size, scale, properties, and materials

Sixth Grade Scientific Concept TEKS

(10) Earth and space. The student understands the structure of Earth, the rock cycle, and plate tectonics. The student is expected to: (B) classify rocks as metamorphic, igneous, or sedimentary by the processes of their formation

Eighth Grade Scientific Concept TEKS

(9) Earth and space. The student knows that natural events can impact Earth systems. The student is expected to: (B) relate plate tectonics to the formation of crustal features