



## Earth Processes: The Basis for Life

**Driving Question:**  
How can we use clues to solve a geological mystery?

**Context:** The materials of the Earth's crust are continually being transformed by natural forces from one rock type to another. Physical properties and appearance of the rock give clues to its geological history. Relative position of rocks in strata provides clues which help us infer the age and sequence of events. Surface processes change landscapes and alter the distribution of plant and animal communities. How are rocks and landscapes formed? How does the physical earth support ecosystems? How can we use clues to solve a geological mystery?

**Project:** Students create a cake that tells a geologic story. They experiment with different ingredients and cooking processes to represent igneous, sedimentary and metamorphic rocks and processes that shape the surface of the Earth. Finally they hold a geology bakeoff and they describe the story behind each other's cakes and critique each other's interpretations.

**Approach:** The geological consulting company, Terramax, is having a party to celebrate a successful year. The geologists there enjoy solving geological mysteries by looking at evidence in the rocks. Students are challenged to create a specialty cake for the event. To prepare for their project students explore each rock type and become familiar with patterns of their appearance. They research how each type is formed in the Earth and how that leads to the appearance of rocks and landscapes. They pick baking materials and techniques which model geological processes. They write a story of geological changes and leave clues in their cake. At the end, students playing the role of geologists slice into the cakes and write their interpretation of the geological story that is being told.

**Expert Involvement:** Classrooms using experts engage geologists respond to student-generated questions about geology. This begins a dialogue between experts and students that lasts throughout the unit. Experts review students' approach to their geological cake and provide feedback. Students revise their plan based on the expert feedback.

### Primary Standards: Next Generation Science Standards- Performance Expectations

**HS-ESS2-1** Develop a model to illustrate how Earth's internal and surface processes operate at different spatial and temporal scales to form continental and ocean-floor features.

**HS-ESS2-2** Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth's systems.

**HS-ESS2-3** Develop a model based on evidence of Earth's interior to describe the cycling of matter by thermal convection.

**HS-ESS2-5** Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes.