6th Grade Processes that Shape the Surface of the Earth Unit
Earthquake & Volcanoes Section

Benchmarks

Chapter 1: The Nature of Science

The Scientific World View

1A(6-8)#1: When similar investigations give different results, the scientific challenge is to judge whether the differences are trivial or significant, and it often takes further studies to decide. Even with similar results, scientists may wait until an investigation has been repeated many times before accepting the results as correct.

Scientific Inquiry

1B(6-8)#2: If more than one variable changes at the same time in an experiment, the outcome of the experiment may not be clearly attributable to any one of the variables. It may not always be possible to prevent outside variables from influencing the outcome of an investigation (or even to identify all of the variables), but collaboration among investigators can often lead to research designs that are able to deal with such situations.

Chapter 3: The Nature of Technology

Technology and Science

3A(6-8)#3: Engineers, architects, and others who engage in design and technology use scientific knowledge to solve practical problems. But they usually have to take human values and limitations into account as well.

Chapter 4: The Physical Setting

Processes that Shape the Earth

4C(6-8)#1: The interior of the earth is hot. Heat flow and movement of material within the earth cause earthquakes and volcanic eruptions and create mountains and ocean basins. Gas and dust from large volcanoes can change the atmosphere.

4C(6-8)#2: Some changes in the earth's surface are abrupt (such as earthquakes and volcanic eruptions) while other changes happen very slowly (such as uplift and wearing down of mountains). The earth's surface is shaped in part by the motion of water and wind over very long times, which act to level mountain ranges.

Chapter titles and headers correlate with *Benchmarks for Science Literacy* by Project 2061. To fully understand the context and intent of the benchmarks, essays within each chapter and section of *Benchmarks* must reviewed.

4C(6-8)#4: Sedimentary rock buried deep enough may be reformed by pressure and heat, perhaps melting and recrystallizing into different kinds of rock. These re-formed rock layers may be forced up again to become land surface and even mountains. Subsequently, this new rock too will erode. Rock bears evidence of the minerals, temperatures, and forces that created it.

4C(9-12)#5: Earthquakes often occur along the boundaries between colliding plates, and molten rock from below creates pressure that is released by volcanic eruptions, helping to build up mountains. Under the ocean basins, molten rock may well up between separating plates to create new ocean floor. Volcanic activity along the ocean floor may form undersea mountains, which can thrust above the ocean's surface to become islands.

Energy Transformations

4E(6-8)#3: Heat can be transferred through materials by the collisions of atoms or across space by radiation. If the material is fluid, currents will be set up in it that aid the transfer of heat.

Motion

4F(6-8)#4: Vibrations in materials set up wavelike disturbances that spread away from the source. Sound and earthquake waves are examples. These and other waves move at different speeds in different materials.

Chapter 11: Common Themes

Models

11B(6-8)#3: Different models can be used to represent the same thing. What kind of a model to use and how complex it should be depends on its purpose. The usefulness of a model may be limited if it is too simple or if it is needlessly complicated. Choosing a useful model is one of the instances in which intuition and creativity come into play in science, mathematics, and engineering.

Chapter 12: Habits of Mind

Values and Attitudes

12A(6-8)#2: Know that hypotheses are valuable, even if they turn out not to be true, if they lead to fruitful investigations.

Communication Skills

12D(6-8)#1: Organize information in simple tables and graphs and identify relationships they reveal.

12D(6-8)#2: Read simple tables and graphs produced by others and describe in words what they show.

State Goals

State Goal 11A, Stage G, #5: Report and display the process and findings of inquiry investigation.

State Goal 12E, Stage F, #1: Apply scientific inquiries or technological designs to examine the large-scale dynamic forces, events and process that affect Earth's land and populations, demonstrating tectonic movements related to earthquakes, tsunamis and volcanoes.