



Mountains: *Discussion Guide*

Overview

Towering mountains result from chaotic and violent processes that occur deep beneath the Earth's surface. Some mountains arise when the Earth's plates move against one another, thrusting up layers of rock. Others develop when material in the Earth's mantle melts, rises through the crust, and erupts onto the surface. Yet others form when rocks become so hot that they simply expand. Often, these hidden processes are as fascinating as the giant peaks they create.

Help your students explore the exciting process of mountain formation and learn about how mountains affect the lives of the plants, animals, and humans around them—with this discussion guide and related videos and activities.

Classroom Activities

1. Show the “Part Two: Mountains, Volcanoes, and Earthquakes” segment from the *Basics of Geology: Formations of Continents and Mountains* video.
 - **Accessing Prior Knowledge:** Before showing the video segment, ask students what they know about the following questions: How do mountains, volcanoes, and earthquakes relate to one another? How do all three connect to the movement of the Earth's plates, or plate tectonics? What roles do heat and pressure play in the formation of these natural features?
 - **Math Challenge:** The Earth's plates travel at the very slow rate of one to four inches each year. Ask students to calculate how many miles a plate would travel in one million years at a rate of one inch per year. (Hint: The plate would move 1,000,000 million inches. Divide 1,000,000 by 12, which is the number of inches per foot, and then divide that by 5,280, which is the number of feet per mile.) (Answer: about 16 miles)
 - **Geology Glossary:** Have students create a glossary of terms related to the formation of mountains, volcanoes, and earthquakes. They might start with the following terms, which are addressed in the video segment: *lithosphere, asthenosphere, magma, mantle, lava, shield volcano, cinder cone, composite cone, sea floor spreading, subduction, folding, and faulting.*

- **Biography of a Mountain:** Have students visit <http://www.peakware.com/> to explore an interactive map of the world's mountains. Students can click on a continent, click on a mountain range on that continent, and then choose a specific mountain within that range. The site provides images of and facts about the mountain. Ask students to choose one mountain and present information about it in the form of a brief biography: facts about its early life (formation), notable events in its history, and qualities that make it interesting or unique.
2. Show the “The Himalayan Mountains: Many Biomes in One Place” segment from the *World of Nature: Mountain of Life* video. (Access to unitedstreaming is required.)
- **Brainstorming:** Explain that a biome is an area defined by its plant life and prevailing climate, such as a desert or a rainforest. Point out that mountains often have different biomes at different elevations because of changes in temperature, soil, and atmosphere. Have students brainstorm a list of the living things they might find in a mountain's highest biome, where the conditions include thin, cold air; strong winds; and steep, rocky ground.
 - **Illustrated Wall Map:** Have students choose a tree, plant, or flower they learned about in the video segment. Ask them to draw a picture of it, labeling its various parts. Then, below the picture, have them write a paragraph describing its most interesting characteristics. Hang the finished products on the wall in the shape of a mountain, placing each plant, tree, or flower in the biome where it would actually be found.
 - **My Own Biome:** Ask students to learn more about the flora and fauna in their own biome. Have them work in small groups to conduct research and create a list of plants and animals native to the area where they live. Then, have them choose one plant and one animal and learn about the local environmental conditions (temperature, soil, sunlight, food sources, etc.) that help them to thrive. Groups can share their information with the class orally.
3. Show the “Land Areas of the Mountain States” segment from the *American Geography Close-Ups: The Mountain States Volume I* video. (Access to unitedstreaming is required.)
- **Pre-Viewing Discussion:** What do students know about the Mountain States? Which ones can they name? Can they point them out on a map? Have any of the students visited the Mountain States?
 - **Post-Viewing Discussion:** Were students surprised to hear that a series of large seas once covered much of North America? Did they know that dinosaur fossils can be found in the Colorado Plateau? What else did they learn that was unexpected?

- **Graphic Organizer:** The Mountain States comprise 5 major land areas: the Rocky Mountains, the Great Plains, the Great Basin, the Columbia Plateau, and the Colorado Plateau. As students watch the video segment, have them fill in a chart that compares the terrain, elevation, and other geographical features of these five areas.
 - **Model Building:** The video segment explains that the Rocky Mountains formed when two plates collided and thrust up huge masses of rock, causing mountains to rise from the sea floor. These are called fold mountains, or fold-and-thrust mountains. The other main types of mountains are fault-block, dome, volcanic, and plateau mountains. Ask pairs of students to research one type of mountain at the Web sites below. Then, using clay, cardboard, paper, or other materials, have each pair build a small model that shows how their type of mountain forms.
 - <http://www.britannica.com/ebi/article-204984>
 - http://encarta.msn.com/encyclopedia_761577470_2/Mountain.html
 - http://ia.essortment.com/mountainmountai_rmky.htm
4. Show the “Inhabitants of the Himalayan Mountains” segment from the *Mountains of the Maya* video. (Access to unitedstreaming is required.)
- **Pre-viewing Research:** Before showing the video segment, have students research basic facts about the Maya and their descendants using the following Web sites:
 - <http://www.kidskonnnect.com/AncientMayan/AncientMayanHome.html>
 - <http://www.smm.org/sln/ma/index.html>

In addition to obtaining basic information, such as where and when the Mayas lived, ask each student to find one interesting fact about Mayan art, writing, math, calendars, or architecture. Have students share their findings during a class discussion.
 - **Home in the Mountains:** In the video, students meet members of the Mayan culture who live in the Himalayan Mountains. Many other peoples, both Indo-European and Tibeto-Burman, inhabit these mountains, as well. In fact, the word *Himalaya* comes from the Sanskrit *hima*, meaning “snow,” and *alaya*, meaning “abode.” Ask students to conduct research on a group of people who make their home in the Himalayan Mountains. Have them write a paragraph explaining how the mountains affect the group’s culture and way of life.
 - **Medical Investigation:** How do the high altitude and cold temperatures found in the Himalayas affect the human body? What can travelers do to avoid the problems caused by these conditions? Have students visit the Web sites below and then present their findings in the form of a health manual for people who plan to travel to the Himalayas.
 - <http://www.mayoclinic.com/>
 - <http://www.webmd.com/>

Academic Standards

National Academy of Sciences

The National Academy of Sciences provides guidelines for teaching science in grades K–12 to promote scientific literacy. To view the standards, visit this Web site:

<http://books.nap.edu/html/nses/html/overview.html#content>.

This discussion guide addresses the following national standards:

- Earth and Space Science: Energy in the Earth system, Structure of the Earth system, Earth’s history
- Science in Personal and Social Perspectives: Personal and community health; Natural resources; Environmental quality; Populations, resources and environments

National Council for the Social Studies

The National Council for the Social Studies (NCSS) has developed national standards to provide guidelines for teaching social studies. To view the standards online, go to

<http://www.socialstudies.org/standards/strands/>.

This lesson plan addresses the following thematic standards:

- Culture
- People, Places, and Environments

Mid-continent Research for Education and Learning (McREL)

McREL’s Content Knowledge: A Compendium of Standards and Benchmarks for K-12 Education addresses 14 content areas. To view the standards and benchmarks, visit

<http://www.mcrel.org/compendium/browse.asp>.

This lesson plan addresses the following national standards:

- Science
 - Life Sciences: Understands relationships among organisms and their physical environment
- Geography
 - The World in Spatial Terms: Understands the characteristics and uses of maps, globes, and other geographic tools and technologies
 - Physical Systems: Knows the physical processes that shape patterns on Earth’s surface
- Health
 - Knows environmental and external factors that affect individual and community health
- Language Arts
 - Writing: Uses the general skills and strategies of the writing process; Gathers and uses information for research purposes

- Reading: Uses reading skills and strategies to understand and interpret a variety of informational texts
- Viewing: Uses viewing skills and strategies to understand and interpret visual media
- Listening and Speaking: Uses listening and speaking strategies for different purposes
- Mathematics
 - Uses a variety of strategies in the problem-solving process