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Mars and Earth: A Study in Topography

Purpose

The purpose of this activity is to study and compare the topography of both Mars and Earth. Students will become more familiar with the mountainous nature of both planets through discussion and hands-on activities. A lesson on Pangea and/or plate tectonics should also be integrated.

Students will be able to

1. Define and understand terms relating to topography.
2. Read and understand a topographic map.
3. Design a topographic map.

Important Vocabulary (key terms in bold)

Mars	**Earth**	**topography**	**mountain**
altitude	valley	terrain	volcano
slope	contour lines	map	geology

Mountains on Mars

Discuss mountains and volcanoes. Are they the same thing? What are their differences? Are there both mountains and volcanoes on Mars, or is this only a feature of the Earth? What other questions do your students have?

Use the following activity, adapted slightly from one on the Discovery School website (http://school.discovery.com/curriculumcenter/solarsystem/projectideas.html), to open and close your class.

MOUNT CHOCOLATE

Gather Hershey Kisses™ or other chocolate candies. To represent Mars, freeze a few of then on a plate. For Earth, leave another batch at room temperature. Show them to the students at the start of your class. At the end of class, put the mini-mountains to the test by posing these four questions to your students: Are they all the same "altitude?" Have any changed shape? What other differences do you see? What happens when you tilt the plates?

*(** See below for printable activity sheet.)*

Mapping Mountains

Discuss topography and its importance in studying mountains on Earth and Mars. Students will make topographical maps using modeling clay. Use either of the following resources, which include directions for making a map.

http://www.sciencespot.net/Media/playdhmtn.pdf
http://spaceplace.jpl.nasa.gov/en/kids/srtm_makemap.shtml

Other Resources

Here are a few resources that will be valuable in your discussion.

1. Carr, Michael H., et al, The Geology of Terrestrial Planets. Washington, D.C.: NASA SP-469, 1984.
2. Surkov, Yuri. Exploration of Terrestrial Planets from Spacecraft: Information, Investigation, Interpretation. West Chester, England: Ellis Horwood Limited, 1990.
3. This Dynamic Earth: the Story of Plate Tectonics (http://pubs.usgs.gov/publications/text/dynamic.html)
4. Martian Volcanoes (http://www.solarviews.com/eng/marsvolc.htm)
5. Topography and the Earth © 2002 by Visual Learning Company (video)
6. Mapping © 2002 by Visual Learning Company (video)
7. Volcanoes and Earthquakes © 2003 by Visual Learning Company (video)
8. Plate Tectonics © 2003 by Visual Learning Company (video)

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MOUNT CHOCOLATE!

Here's a sweet way to learn more about the mountains on Mars, as compared to those on Earth. Take note of the mini-mountains created from the chocolate candies. Answer the following questions. Remember: the frozen candies represent Mars, and the room temperature ones represent Earth.

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1. Are the mini-mountains all the same "altitude?"

2. Have any changed shape?

3. What other differences do you see?

4. Does anything happen when you tilt the plates?