



EXPLOSIVE ATTITUDES: VOLCANOES

Subject Matter: Earth Science

Grade Level: 9

Time Allotment: One 50-minute class session

Master Teacher: Susan Daugherty

Overview

Volcanoes vary in their personalities much like people do. Some volcanoes are quiet and serene, while others erupt violently and destructively. This lesson will examine three types of volcanoes and the reasons that they erupt so differently.

Learning Objectives

Students will be able to:

- Compare and contrast three types of volcanoes.
- Use volcano location to determine the volcano's type.
- Diagram a cross-sectional view of each type of volcano.

Oregon Standards Available at:

<http://www.ode.state.or.us/cifs>

Subject – Earth Science

Understand physical properties of the Earth, how those properties change and the Earth's relationship to other celestial bodies.

The Dynamic Earth

- Understand changes occurring within the lithosphere, hydrosphere and atmosphere of the Earth.
- Analyze evidence of ongoing evolution of the Earth system.

Media Components

Video

Check the link at <http://www.opb.org/edmedia/trs/> to find access to the video(s) from unitedstreaming™ referenced in this lesson plan.

- “Earth Science: Volcanoes” (20:00)
 - **Clip:** “Types of Volcanoes” (03:26)



Web

- **Using Clues About Volcanoes to Find Out Where They Are Located**
Interactive Web site that gives case studies of four different volcanoes. Descriptive information of the four volcanoes is coupled with a map of several unnamed volcanoes. Students read the description of the volcano and try to select it from the choices on the map.
<http://www.learner.org/exhibits/volcanoes/activty2/act2main.html>
- **Cascades Volcano Observatory - Cascade Range**
A map of the Cascade Range Volcanoes in Washington, Oregon and California. This map is public domain and may be printed with credit given to the USGS.
http://vulcan.wr.usgs.gov/Volcanoes/Cascades/Maps/map_cascades_locationmap.html
- **Active Volcano, Plate Tectonics and the Ring of Fire**
A map of volcano locations, tectonic plate boundaries and hot spots.
http://vulcan.wr.usgs.gov/Glossary/PlateTectonics/Maps/map_plate_tectonics_world.html
- **Volcano**
Brief descriptions and schematic diagrams of composite, shield and cinder cones. Includes an animation of a cinder cone.
<http://whitethornhouse.com/volcano.htm>

Materials

Per Class and/or Group:

- Map of major Cascade Range Volcanoes without names
- Paper, colored pencils or chalk

Prep for Teachers

When using media, provide students with a **Focus for Media Interaction**, a specific task to complete and/or information to identify during or after viewing of video, Web sites or other multimedia elements.

Prior to teaching this lesson, bookmark the Web sites used in the lesson on each computer or provide a list of the URLs that students can type into the address bar. Make sure that each Web site is still available for use before bookmarking. Be sure each Web site displays appropriately by using appropriate plug-ins and media players.

Download the video clips onto the computer that will be used for the classroom presentation. Be sure each video clip displays appropriately by using appropriate plug-ins and media players. Make sure the screensaver is turned off or is on a long delay.

Print map of major Cascade Range Volcanoes in grayscale. The map is available from this Web site: http://vulcan.wr.usgs.gov/Volcanoes/Cascades/Maps/map_cascades_locationmap.html. Remove the names of the volcanoes so students can use the volcano map for the Introductory Activity.

Introductory Activity

Step 1: Provide students with the map of major Cascade Range Volcanoes. Have students work with partners to correctly name as many of the volcanoes as they can. You should not need to provide too much time for this.

Step 2: As a class, ask students to name the volcanoes starting from the top of the map and proceeding to the bottom of the map. If a student is incorrect, ask another student for the correct name.

Step 3: Explain to students that they are going to be shown a world map of volcanoes (available from http://vulcan.wr.usgs.gov/Glossary/PlateTectonics/Maps/map_plate_tectonics_world.html). Provide students with a **Focus for Media Interaction** by asking them if they notice anything about the location of volcanoes. *Students should respond that volcanoes are located at plate boundaries or that clusters of volcanoes are located within tectonic plates.*

Step 4: Using the Cascade Range Volcano map and the world map of volcanoes, ask students if they know anything about how any of the volcanoes erupted. *Student responses may include violent eruptions that killed lots of people and lava flows that buried cities.*

Learning Activities

Step 1: Explain to students that they are now going to watch a short video clip on different types of volcanoes, their characteristics and how their location helps determine volcano type. Provide students with a **Focus for Media Interaction** by asking them to record the names of the three types of volcanoes, their characteristics and their locations.

Step 2: **Play** the video clip, “Types of Volcanoes” (03:26), from the video, “Earth Science: Volcanoes” (20:00).

Step 3: At the end of the video, have students continue to work with their partners for about 10 minutes to create a chart from the information they recorded. The chart should list the three types of volcanoes, their characteristics and their possible location. (A sample chart is available at the end of this lesson plan.)

Step 4: At the end of 10 minutes, have students draw schematics of each of the three volcanoes. Give students about five minutes to complete their drawings. Students should label their diagrams as completely as possible.

Step 5: Provide students with a **Focus for Media Interaction** by explaining to them they are going to view a Web site that has schematic diagrams of the three volcanoes. Students will need to use the information from the Web site to correct or add information to their drawings.

Step 6: Connect to <http://whitethornhouse.com/volcano.htm>. View the Web site as a class and give students about 10 minutes to check and make corrections to their drawings.

Step 7: At the end of 10 minutes, have students continue to work with their partners and use their schematic diagram and chart to contrast each of the volcanoes. Give students about five minutes to complete this activity.

Step 8: Summarize as a class how the volcano types are different from each other. *Student responses should include: the cinder cone is the smallest, erupts violently and is cone-shaped; the composite is explosive, the most dangerous and is a tall cone; the shield volcano is the quietest and a wide, flat volcano.*

Culminating Activity

Connect to <http://www.learner.org/exhibits/volcanoes/activity2/act2main.html>. Provide students with a **Focus for Media Interaction** by explaining they are going to work as a class to identify the location of the four case-study volcanoes. Students will need to use their charts and the clues that are given by the case-study descriptions to try and identify each volcano.

Cross-Curricular Extensions

Social Studies

- Select an active volcano and research the impact that the volcano has on the lives of the people that live within its eruption zone.

Agriculture

- Research volcanic islands and the types of agricultural products that are grown in the volcanic soils.

Community Connections

- Contact the local United States Geological Survey office or State Geology Office and ask a geologist to speak about current volcanic activity and how it might affect your area.
- Research the earthquake preparedness plan that your school or community has developed.

Types of Volcanoes

<u>Types of Volcanoes</u>	<u>Characteristics</u>	<u>Location</u>
Composite Volcano	<ul style="list-style-type: none"> -Most violent -Large cone shape -Magma explodes from volcano because of hot gases and boiled water -Excessive heat in magma -Alternating layers of ash, cinders and lava 	Subduction zones
Shield Volcano	<ul style="list-style-type: none"> -Pool of magma breaks through Earth's crust -Lava oozes out in layers -Forms new land -Wide, flat shape 	Hot spots
Cinder Cone Volcano	<ul style="list-style-type: none"> -Violent explosions -Bursts forth with ash, cinder and lava fountains -Rapidly built volcano -Not as high as composite or shield volcano -Shaped determined by size of ejected material 	None given in video