

What Volcano?

Original lesson by Marcella Welch

Focus on Inquiry

The student will create a model of one of the three types of volcanoes based on research data collected from the text book and the Internet.

Lesson Overview

A team will research the three basic types of volcanoes while other team members will create the volcanoes using the materials at hand. They will then evaluate their researched information and compare it to their created volcanoes. Each team will then identify each type volcano based on its characteristics.

Duration 30-40 minutes	Setting Classroom	Grouping groups of 4 students: 2 each for research and to make models	PTI Inquiry Subskills 3.3, 5.3, 5.4, 5.8, 5.9, 7.1, 7.2, 7.3
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Lesson Components	Estimated Time	Inquiry Subskills Used	Technology Used	Level of Student Engagement	Brief Description
Engage	10 min	3.3	Internet (images)	1	Students examine pictures of various volcanoes and temporarily classifies them according to similarities.
Explore	20 min	5.8	Internet (research)	3	Students divide up into research and model-building teams to construct their volcanoes.
Explain	10 min	5.9, 7.2	None	3	Students report on the characteristics of the type of volcano model they built.
Expand	10 min	5.3, 5.4	None	2	Students relate the three types of volcanoes to plate tectonics and eruptions.
Evaluate	varies	7.1, 7.3	None	n/a	Teacher developed rubric for presentations.

Level of Student Engagement

1	Low	Listen to lecture, observe the teacher, individual reading, teacher demonstration, teacher-centered instruction
2	Moderate	Raise questions, lecture with discussion, record data, make predictions, technology interaction with assistance
3	High	Hands-on activity or inquiry; critique others, draw conclusions, make connections, problem-solve, student-centered

National Science Education Standards – Inquiry

Use appropriate tools and techniques to gather, analyze, and interpret data.
 Develop descriptions, explanations, predictions, and models using evidence.
 Communicate scientific procedures and explanations.



National Science Education Standards – Earth Science

Landforms are the result of a combination of constructive and destructive forces. Constructive forces include... volcanic eruptions....

Louisiana Grade Level Expectations – Inquiry

- Gr. 8, Inquiry GLE#14 - Develop models to illustrate or explain conclusions reached through investigation (SI-M-A5)
- Gr. 8, Inquiry GLE#15 - Identify and explain the limitations of models used to represent the natural world (SI-M-A5)
- Gr. 8, Inquiry GLE#16 - Use evidence to make inferences and predict trends (SI-M-A5)
- Gr. 8, Inquiry GLE#19 - Communicate ideas in a variety of ways (e.g., symbols, illustrations, graphs, charts, spreadsheets, concept maps, oral and written reports, equations) (SI-M-A7)
- Gr. 8, Inquiry GLE#20 - Write clear, step-by-step instructions that others can follow to carry out procedures or conduct investigations (SI-M-A7)
- Gr. 8, Inquiry GLE#22 - Use evidence and observations to explain and communicate the results of investigations (SI-M-A7)



Louisiana Grade Level Expectations Earth Science

Gr. 8, GLE#35 – Describe how processes seen today are similar to those in the past. (ESS-M-B3)

Materials List (per group)

- trays or cookie sheet tray
- one 20 oz. container of play ground sand
- computer with Internet access
- text books and books on volcanoes

FOR WHOLE CLASS:

- pictures of the three types of volcanoes
- paraffin (3 blocks)
- crock pot for paraffin
- aluminum foil for lining the trays

Advance Preparation

1. Use a crock pot to melt the paraffin.
2. Line each of the trays with aluminum foil.
3. Obtain pictures of the three types of volcanoes.
4. Make copies of Blackline Masters.

Other Information

Prior Knowledge Needed by the Students

Students should have covered plate tectonics and discussed volcano formation as a result of this action.

Procedure

Engage

1. Show the students pictures of various shaped volcanoes from around the world. As each volcano is shown discuss its primary features. As you go through the pictures, have students temporarily classify pictures of volcanoes according to their similarities into the three basic types of volcanoes.
2. Bring books into the class and have each team look up one particular volcano. The teams will then describe how they think it formed that particular shape. If necessary, have students make changes to the pictures they originally classified.

Explore

1. Divide the class into teams of 4.
2. Allow each team to decide who is going to go research volcanoes.
Research Teams (Blackline Master 3) will research:
 - a. the three types of volcanoes
 - b. they will write an description on the type of magma that formed each particular volcano shape
 - c. they will provide example and location for each type of volcano.
 Volcano Teams (Blackline Master 2) will begin creating models based on the research:
 - a. each team will have access to the materials to create the three types of volcanoes
 - b. a set of instructions will be provided for each team
 *Alternatively, each team can pick one type of volcano, conduct research on this volcano type, and build a model of it.

Explain

1. Once the volcanoes are built and the research has been completed, the teams must describe:
 - a. How the volcano was constructed.
 - b. What types of material helped shape each type of volcano.
 - c. Teams will write an explanation on how the magma shaped each type of volcano.
 - d. Students are to include examples and locations of each type of volcano.
 - e. Reports should include how these volcanoes affected the people in the area.
 - f. What are the limitations of the model you built?

2. Students report their findings to the class and show their models.

Expand**Questions to be answered by the class:**

1. How could you use the theory of plate tectonics to explain how a volcano works?
2. Explain how heat is produced in the Earth. What types of heat transfer moves this energy to the mantle and lithosphere?
3. Hawaiian volcanoes produce two forms of lava. Name these two forms and explain what causes the same lava to have different appearances.
4. Explain how the amount of gas concentrations in magma could signal a volcanic eruption.
5. What is the danger in an eruption like Mt. Pinatubo and Mt. St. Helens?

Evaluate

1. Each group can be graded according to their presentations, written report and team work.

Blackline Masters

1. What Volcano? Task Sheet
2. Volcano Model-Building Teams Directions
3. Volcano Research Teams Directions



Name _____ Date _____ Block _____

What Volcano?

Objectives:

1. Students will research the three types of volcanoes.
2. Students will discover that each volcano forms in a different way due to the magma.
3. Students will observe that each volcano has a distinctive shape because the magma.

Materials: Paraffin, crock pot or hot plate/double boiler, cookie tray lined with aluminum foil, refrigerator, sand, large paper cup, newspapers, rulers

- I Teams will decide who will research the volcanoes and who will create the volcano models.
- II The volcano team will be given materials and directions for creating the volcanoes.
- III Research teams will have access their text book and a computer.
 - a. They will research a description for each of the 3 basic types of volcanoes.
 - b. The team will write an explanation of the type of magma that formed each volcano.
 - c. Each team will include examples and locations of each type of volcano.
- IV Once the volcanoes are built and research is completed, each team will describe what type of volcano they created. Each student will write a paper explaining how their volcano was constructed, a physical description of the volcano and how it forms, how this volcano effects people in the area.. The research team will provide the information.

Questions to be discussed.

1. How can you use the theory of plate tectonics to explain how a volcano works?
2. Explain how heat is produced in the Earth. What type of heat transfer moves this energy to the mantle and lithosphere.
3. Hawaiian volcanoes produce two forms of lava. Name these two forms. Explain what causes the same lava to have different appearances?
4. Explain how the amount of gas concentrations in magma could signal volcanic eruption.
5. What is the danger in an eruption like Mt. Pinatubo or Mt. St. Helens?

Name _____ Date _____ Team _____ Block _____

Volcano Model-Building Teams

Type 1 Volcano:

1. Have 2 cups of melted paraffin available.
2. Stop pouring when the pool of melted paraffin is 5 inches in diameter.
3. Allow the paraffin to cool. (Fanning it may help speed this process.)
4. Repeat the process several more times by allowing the paraffin to cool in between the layers.

Type 2 Volcano:

1. Pour sand from a large paper cup onto some newspaper.
2. Continue pouring until your “volcano” is 8 inches high.

Type 3 Volcano:

1. Have 2 cups of melted paraffin AND sand available.
2. Pour some melted paraffin into the pan. Stop pouring when the pool of melted paraffin is 5 inches in diameter.
3. Allow the paraffin to cool. (Fan it)
4. Pour a generous layer of sand over the hardened paraffin.
5. Repeat the process from Steps 2, 3, and 4.
6. Repeat Step 5 at least six to seven more times.

Name _____ Date _____ Team _____ Block _____

Volcano Research Team

Use the following web sites for information on volcanoes.
Remember you have the following information to collect.

1. Research the 3 basic types of volcanoes. Describe each type.
2. What type of magma formed each type of volcano?
3. How did each volcano form?
4. Find some examples (and locations) for each of the three types of volcanoes.
5. How did the eruptions affect the people/wildlife/etc.?
6. Name and describe the two types of lava in Hawaii.
What is the difference between the two types?
7. How is geothermal energy and hot springs related to volcanoes?
8. What made Mt. Pinatubo and Mt. St. Helens so dangerous?

Web Sources: Go to the following web sites for information.

1. <http://www.educ.uvic.ca/faculty/mroth/438/VOLCANO/TYPES.html>
...volcano types
2. <http://volcano.und.nodak.edu/volcanoes.html>
...volcano parks, examples of volcanoes around the world
3. <http://www.learner.org/exhibits/volcanoes/>
..predicting volcano eruptions
4. <http://library.thinkquest.org/17457/english.html>
..types of volcanoes, types of eruptions, geysers/hot springs, hazards
5. <http://library.thinkquest.org/17457/english.html>
...types of volcanoes
6. http://www.geology.sdsu.edu/how_volcanoes_work/
...Types of volcanoes
7. <http://hsv.com/scitech/earthsci/quake.htm..recent>
...volcanic eruptions