

Rock Rubble Review

Living with a **VOLCANO** in Your Backyard
MOUNT RAINIER



Grade Level: 3–9

Learner Objectives:

Students will:

- Identify correctly the meaning of volcano terms
- Review the implication of volcano terms used in Chapter 2

Setting: *Geocharades* in classroom;
Volcano on the Run in field or gym;
Volcano Anatomy Crossword

Timeframe:

Geocharades—30 minutes
Volcano on the Run—40 minutes
Volcano Anatomy Crossword—30 minutes

Materials:

Geocharades

- Index cards
- Pens or pencils

Volcano on the Run

- “*Volcano on the Run*” teacher page
- Boundary markers (i.e., flagging, bandanas or construction cones)



**Living with a Volcano in Your Backyard-
An Educator's Guide with Emphasis on
Mount Rainier**

Prepared in collaboration with the National Park Service

U.S. Department of the Interior
U.S. Geological Survey

General Information Product 19

Overview

Students use charades to review volcanic processes in “*Geocharades*,” engage in a physically active review of volcano processes in “*Volcano on the Run*,” and review volcano terms in “*Volcano Anatomy Crossword*.”

Volcano Anatomy Crossword

- Class copies of “*Volcano Anatomy Crossword*”
- Class copies of “*Volcano Anatomy*” clues
- Pencils or pens

Vocabulary: Ash, crater, debris flow, earthquake, eruption, fractures, fumarole, gas, glacier, hydrothermal alteration, lahar, landslide, lava, magma, magma chamber, magma conduit, pyroclastic flow, rockfall, rubble, seismologist, tephra, volcanologist

Skills: Application, interpretation, listening

Benchmarks:

See benchmarks in Introduction.

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Rock Rubble Review

Chapter 2

Rock Rubble Review-continued . . .



1. **Before class begins, review the “True” and “False” questions provided. You may wish to develop additional or alternate questions.**
2. **Select a large field or gym for the Volcano on the Run activity.**
3. **Mark the boundaries for the game. There should be two “safe” lines or zones at opposite ends of the game area and a central line or zone at the midway.**

Procedure

Conduct “*Geocharades*,” “*Volcano on the Run*,” “*Volcano Anatomy Crossword*,” or any combination of these activities about volcanic processes as a review activity or assessment.

Adaptations: Other Review Options

- ◆ ***The Match Making Game.*** Make cards with the definitions of volcanic processes and other cards with pictures of the processes. Mix up the cards and lay them upside down. Take turns flipping over two cards at a time and see if students can match a definition to a picture.
- ◆ ***Vocabulary Stories.*** Ask students to write a story using vocabulary words selected from the activities in Chapter 2
- ◆ ***Storyboarding.*** Instruct students to draw a storyboard of one of the geologic processes discussed in Chapter 2.
- ◆ ***Field Trip Fun.*** On a field trip to Mount Rainier National Park, ask students to describe or “read” a landscape in selected locations and identify the various geologic processes that shaped it. This may be done as an informal class discussion or in individual student journals.

Assessment

Use this activity as a learning tool, or as an assessment of students’ knowledge about volcano terminology. After completing this activity, students should be able to recognize and define the terms. Assess each student’s ability to answer the questions correctly and record them.



References

Kennedi, C.A., Brantley, S.R., Hendley J.W., II, and Stauffer, P.H., 2000, Volcanic ash fall—A “hard rain” of abrasive particles: U.S. Geological Survey Fact Sheet 027–00 (revised April 2002), 2 p.

Myers, B., Brantley, S.R., Stauffer, P.H., and Hendley, J.W., II, 1997, What are volcano hazards? (revised March, 2008): U.S. Geological Survey Fact Sheet 002–97, 2 p.



Refer to **Internet Resources Page** for a list of resources available as a supplement to this activity.

Geocharades Game

What to do before class begins:

1. Before class begins make geology process cards by writing each of the following vocabulary words on an index card. Add additional relevant words if desired.



subduction

glaciation

lahar

eruption

rising magma

lava flow

Ring of Fire

plate tectonics

ashfall

pyroclastic flow

landslide

hydrothermal alteration

2. Laminate the cards for durability (optional).

Procedure

1. Divide the class into groups or teams of 3 to 4 students each.
2. Instruct students to decide on a geology-oriented team name.
3. Distribute geology process cards to each group.
4. Provide teams five minutes to brainstorm, plan, and practice how they will act out a silent skit that visually describes their assigned geological term. Teams should select a spokesperson and must incorporate every member into the skit.
5. Ask one team at a time to perform their skit.
6. After each skit, the other teams should discuss and reach consensus on which geologic process they think was portrayed.
7. A spokesperson from each team informs the class of their team's guess and explains why they chose it.
8. Direct the group to perform it again if no one gets it right.
9. Introduce scoring to the activity to inspire more creative or higher quality skits. Each team gets one point for correctly guessing another group's process. The acting team also gets a point for every group that correctly guesses their process. You can also deduct points if students do not collaborate or use consensus-building skills.
10. Repeat until all the processes have been covered.
11. Discuss any processes that need more clarification.



Volcano on the Run Game

Procedure

The teacher can choose a favorite scheme for team competition regarding true and false questions. Here is one suggestion.

1. Divide the class into two teams, A and B. Teams face each other in parallel lines and spaced at arms length apart near the center of a field or gym.
2. Designate parallel lines approximately ten strides behind each team to represent a “True” and a “False” line. Mark these lines with flagging or bandanas.
3. A teacher or student referee asks students questions from the “*Volcano on the Run*” question sheet and (or) makes up other true or false questions. The teacher must say “go” before students begin movement.
4. If the answer is true, students run toward the “True” line. If the answer is false, students run to the “False” line. Once a student runs in one direction, they cannot change their mind and turn toward the opposite line. If they attempt to do so, they are called out of the competition. The teacher or a designated student counts and writes down the number of students at the true and the false line for each question. Discuss the correct answer after students respond to the question and run to a position.
5. When all questions have been asked, or when you designate an ending time, tally the number of people on each team who have chosen the correct line. The team with the most correct choices wins the competition.

Volcano Anatomy Crossword

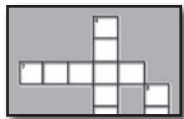
Procedure

1. Give each student a “*Volcano Anatomy*” Crossword and Clues list.
2. Ask each student to work independently or with a partner to complete the crossword puzzle.



Volcano on the Run

	Questions	Answers
1.	Cascade volcanoes are no longer a threat to people because they erupted a long time ago.	False
2.	A volcano's shape remains the same throughout its lifespan.	False
3.	Glaciers can influence the movement of lava flows.	True
4.	Magma is defined as molten rock on Earth's surface.	False
5.	Volcanic gases threaten the lives of people thousands of kilometers (miles) from an erupting volcano because they travel in high concentration for long distances.	False
6.	Lava flows can break apart during eruptions, and form avalanches of hot rock and gas called pyroclastic flows.	True
7.	Tephra is a word used to describe all volcanic rocks.	False
8.	Volcanic ash consists of burnt plant material.	False
9.	Thick layers of wet and heavy volcanic ash can destroy buildings and trees.	True
10.	With the addition of water, pyroclastic flows can form lahars.	True
11.	Volcanic ash clouds can be a threat to aviation.	True
12.	Buildings and trees are unaffected by the force of a moving lava flow.	False
13.	The appearance of lava rocks is influenced by the conditions under which they cooled.	True
14.	Volcanic ash is generally non-poisonous, though it can be abrasive to equipment and can make vision and breathing difficult for people and animals.	True
15.	You can run faster than a lahar.	False
16.	Volcanic bombs erupted from the volcano fall to the ground thousands of kilometers (miles) from an erupting volcano.	False
17.	Past behavior at a volcano provides some indication of the type of eruptions that might happen in the future.	True
18.	The safest place to be during a lahar warning is on the valley floor.	False
19.	Scientists find that weakened rock can collapse as a landslide and form a lahar.	True
20.	Lahars happen most often during noneruptive times.	False
21.	Heated and acidic ground water is capable of changing the texture of rocks from hard to soft.	True
22.	Lahars can cause floods because they fill river channels with rocks and mud.	True
23.	The Law of Superposition states that older rock layers will be deposited on top of rock layers that are younger.	False
24.	The following statement describes a common sequence of events that happens during eruptions at Mount Rainier: lava flows break apart as pyroclastic flows, which then melt snow and ice and form lahars.	True



Volcano Anatomy Crossword

CLUES

ACROSS:

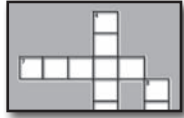
2. Ejection of volcanic materials into the atmosphere or onto the Earth's surface
6. Masses of moving ice on the volcano
7. Large rocks thrown from the volcano
9. Scientist who studies volcanoes
11. Fragments of rock thrown from a volcano
15. Molten rock within the earth
16. Avalanche of hot rock and gas
17. Sliding of a mass of loosened rock down an hillside
18. Volcano releases this usually invisible substance into the atmosphere
19. Depression usually at the summit of a volcano
21. Cracks in the rock that magma follows to the surface
22. Once molten magma that has hardened by cooling on Earth's surface
23. Scientist who studies earthquakes

DOWN:

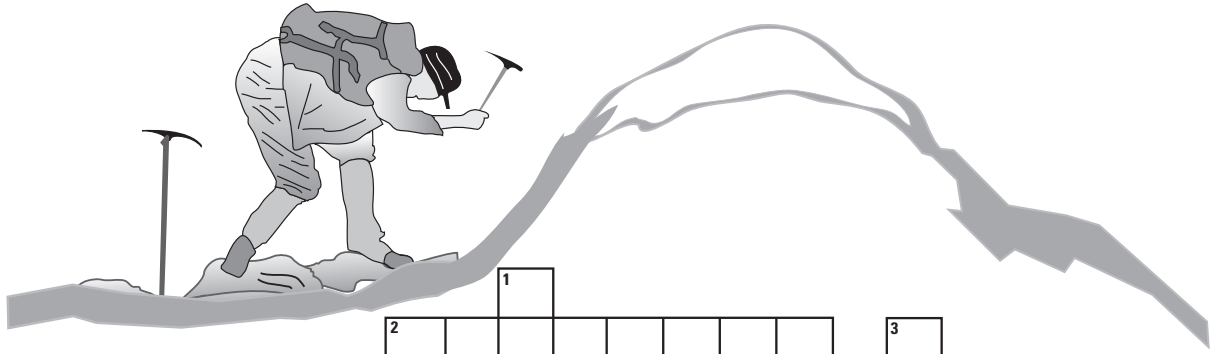
1. Vent that emits steam and gases
3. Chemical process that causes weakening of rock
4. Loose and crumbling rock on the top of a lava flow
5. Shaking of the earth
8. Tiny fragments of rock erupted in to the atmosphere
10. The throat of a volcano
12. Area where magma resides beneath the volcano
13. Moving mass of water, mud and boulders that rushes down valley for a few kilometers (miles) from the volcano
14. Falling rocks
20. Moving mass of water, mud and boulders that rush down valleys for tens of kilometers (miles) from a volcano

Words in the Puzzle:

<i>ash</i>	<i>gas</i>	<i>magma conduit</i>
<i>bombs</i>	<i>glacier</i>	<i>pyroclastic flow</i>
<i>crater</i>	<i>hydrothermal alteration</i>	<i>rockfall</i>
<i>debris flow</i>	<i>lahar</i>	<i>rubble</i>
<i>earthquake</i>	<i>landslide</i>	<i>seismologist</i>
<i>eruption</i>	<i>lava</i>	<i>tephra</i>
<i>fractures</i>	<i>magma</i>	<i>volcanologist</i>
<i>fumarole</i>	<i>magma chamber</i>	



Volcano Anatomy Crossword



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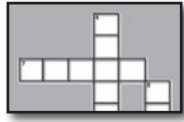
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Volcano Anatomy Crossword

ANSWERS

ACROSS:

2. eruption
6. glacier
7. bombs
9. volcanologist
11. tephra
15. magma
16. pyroclastic flow
17. landslide
18. gas
19. crater
21. fractures
22. lava
23. seismologist

DOWN:

1. fumarole
3. hydrothermal alteration
4. rubble
5. earthquake
8. ash
10. magma conduit
12. magma chamber
13. debris flow
14. rockfall
20. lahar