

UNIT 3: Volcanoes in Washington State and Tanzania

By Nani Castor-Peck, John Stanford International School, Seattle, WA

Introduction: One geographic feature that Washington State and Tanzania have in common is volcanoes. Volcanoes make a great “hook” for students and the study of geography because they are easily seen, exciting when they blow, and relevant given the recent activity at Mount St. Helens and warnings of future activity at Mount Rainier.

The study of volcanoes in two different places, namely Washington and Tanzania in this lesson, can allow for an excellent exploration of these important geographic features and the cultural issues experienced by the people living around volcanoes in these two parts of the world. Comparing the two sites allows for cross-cultural comparisons and a stronger understanding of the connections between humans and the environment in different places around the world. This lesson involves the five elements of geography and encourages students to apply these elements to Washington and Tanzania.

Unit Organization: Unit organized into three lessons (3A, 3B, and 3C). Materials apply to the entire unit.

Target Audience: Grades 4-5

Materials:

Included:

- Know, Want to Know, Learned (KWL) Chart (page 3-8) and a large paper or board to write the responses on
- Display Boards Rubric (page 3-9)
- Background information on Volcanoes in Washington State and Tanzania, how to build a volcano information (page 3-10, 3-11)
- Slideshow of Tanzanian Volcanoes (PowerPoint)

This is in PowerPoint format or printed out, depending on what version of the curriculum you have. If you have the PowerPoint version and a projector in class, use that technology to display the slideshow. If you do not have the technology in class, print out the PowerPoint slide show and copy it onto overhead transparencies to display in class.

- Venn Diagram (page 3-12).

Note: Some teachers prefer to use “Double Bubble Maps” instead of Venn Diagrams. A “Double Bubble Map” looks like two connected bubble maps, and it is used to organize information about two things in order to compare and contrast them. Due to copyright restrictions, we were unable to provide a “Double Bubble Map” as part of this curriculum, but you can visit

<http://www.mapthemind.com/thinkingmaps/themaps/dbubble/> for on-line examples. You can find other examples of these maps and other similar writing tools by conducting a *Google* search for "Double Bubble Map."

- Comparing and Contrasting Paragraph Rubric (page 3-13)

Not Included:

- Colored markers, pens, pencils, notebooks
- Poster boards or butcher paper for student displays
- Overhead, chalkboard, or butcher paper
- Computers for Internet access or print-outs from these sites:
<http://vulcan.wr.usgs.gov/Volcanoes/framework.html>,
<http://volcanoworld.org>, <http://mtsthelensgifts.com/videos.html>,
<http://vulcan.wr.usgs.gov/Outreach/framework.html>
- Large pull-down world map; Washington State and Tanzania maps
- Overhead transparencies of Tanzania and Washington State maps

Additional Teacher Resources:

- Tolman, Marvin N. and Morton, James O., *Earth Science Activities for Grades 2-8* (Book III). West Nyack, New York: Parker Publishing Co., Inc., 1988
- Schaff, Barbara and Roth, Sue, *A Trip Around the World - Extended Thematic Unit*, Teacher Created Materials, Inc. Huntington Beach, CA. 1993

Lesson 3A: Volcanoes in Washington State

Time Allotment: Two, one-hour sessions

Objectives: Upon completing this unit, students will be able to:
Locate mountain ranges and volcanoes in the state of Washington.
Create a poster display on one specific volcano.

Procedure:

Day One:

Write this focus question on the blackboard, overhead projector, or poster board:

Where are some of the volcanoes in the state of Washington located?

Review what mountain ranges are and define the term *volcano*: A mountain range is a series of connected mountains. A volcano is, "an elevated area of land created from the release of lava and ejection of ash and rock fragments from and volcanic vent." (<http://www.physicalgeography.net/physgeoglos/v.html>, April 2004).

Assign students to work in cluster groups of four or five students to research the names of volcanoes in Washington State. If you have computer access, direct students to the sites listed in Materials. If you do not have computer access, have students use encyclopedias, atlases, maps, and other resources. If they need guidance, you might guide them to exploring the Cascade Range of mountains, specifically the volcanoes and volcanic sites listed below:

- Battle Ground Lake State Park
- Beacon Rock State Park
- Glacier Peak
- Mount Adams
- Mount Baker
- Mount Rainier
- Mount St. Helens

This activity is not meant to take a long time. Guide them in finding the names of volcanoes in order to move to the next step. You can also brainstorm with them, eliciting from them the names of volcanoes that they know, and then filling in the rest for them.

If you have not already, introduce the students to the five elements of geography, described below. Go through them to be sure that they understand the difference between absolute and relative location, etc. Tell them to choose one volcano per group to investigate further. The questions below are designed to guide them in their research.

Five Themes of Geography

Location

What is the absolute location of the volcano (longitude and latitude)?
What is the relative location of the volcano (what is to the north, south, east or west, distance from your school)?

Place

What is the place around the volcano like?
What are the physical features to the setting?
What is the climate like?
What makes it different from other places?

Human-Environment Interaction

How do people interact with the volcano?
How do they depend on it?
How have they adapted to it?
Where do most people live with respect to the volcano?

Movement

How does the volcano affect movement of people and goods?
How does it affect communication?

Regions

What general region is this volcano located in?
Does it share any physical or human characteristics with other world regions?

Day Two:

Start by having students report back their findings from yesterday. Write the various volcanoes on the board (see pages 3-10 and 3-11 for background information... to make sure all were covered). Review the five elements of geography with respect to volcanoes and what they learned about volcanoes along the Cascade Range. This knowledge will be used again in thinking about volcanoes in Tanzania.

Extension: Assign each cluster group to a specific volcano to do further research and gather more information in order to create a poster board about the specific volcano (more than one cluster group can be assigned to the same volcano). Ask students to spend time making a display of the volcano information on a poster board. Next, have each cluster group present the information they found about the specific volcanoes.

To explore even further, you can:

- Invite a geologist or volcanologist to visit and speak to students.
- Watch and discuss the video: "The Eruption of Mount St. Helens" (Directed by George V. Casey, 1996, 52 minutes).

Assessment:

Use the Display Boards Rubric (page 3-9) and fill in the Volcanoes in WA State portion. Keep the rubric to assess Unit 3B.

Lesson 3B: Volcanoes in Tanzania

Time Allotment: Three one-hour sessions, one 20-minute session (Day 4)

Objectives: Upon completing this unit, students will be able to:

- Locate and identify Tanzania on a map of Africa.
- Locate mountain ranges and volcanoes in Tanzania.
- Create a poster display on one specific volcano.

Procedure:

Write these focus questions on the blackboard, overhead projector, or poster board:

Is our knowledge about volcanoes in Washington useful in learning about volcanoes in another part of the world?

Encourage students to share their thoughts on this question. Ask for specifics about why or why not they think so.

Tell the students that the class is going to explore this question using Tanzania as a point of comparison. Point out to students that Washington State that they

worked on in lesson 3A is part of the country, the United States. Now, they are going to focus on the entire country of Tanzania (not just one state in or part of Tanzania). Refer to Unit 2 of this curriculum to teach your students basic information about Tanzania, as well as for maps of Tanzania to help introduce where it is within the continent of Africa.

Day One-Two:

Pass out copies of the KWL Chart (page 3-8). Draw a large KWL chart on the overhead projector, blackboard, or posterboard. As a class, work on a KWL chart of the geography of Tanzania. They should use their exploration of the five elements of geography of Washington volcanoes from lesson 3A in this generation of ideas of what to investigate with regards to Tanzania.

Review again what mountain ranges are and define what a volcano is. Ask students to recall from the lesson on volcanoes in Washington State.

Ask students to work in the same cluster groups as lesson 3A to research the names of volcanoes in Tanzania. If you have computer access, direct students to the sites listed in Materials. If you do not have computer access, have students use encyclopedias, atlases, maps, and other resources. For your reference, the list of volcanoes in Tanzania include the following:

- Ol Doiyo Lengai
- Kilimanjaro
- Meru
- Igwisi Hills
- Unnamed
- SW Usangu Basin
- Ngozi
- Izumbwe-mpoli
- Rungwe
- Kieyo

Remind them about the five elements of geography, described in lesson 3A. Again, tell them to choose one volcano per group to investigate further. They should again use the five elements of geography questions in lesson 3A and take notes on what they learn.

Day Three:

Ask students to spend time making a display of the volcano information on a poster board. This display should include each of the 5 elements of geography and an artistic interpretation of that volcano. Next, have each cluster group present the information they found about the specific volcanoes.

Revisit the KWL chart to see how much students learned and what else there is to learn.

Day Four:

Tell students they will now see some photos of volcanoes in Tanzania taken by a teacher who visited there. Show the Slideshow of Tanzanian Volcanoes (PowerPoint). Have students reflect on what they notice in the slides that they did not learn from their research. Write these on the overhead, chalkboard, or butcher paper. Specific questions to ask include:

- Does the vegetation suggest to you a certain climate? What kind of climate?
- Do the pictures look similar or different to volcanoes in Washington State?
- Do you see any evidence of human life in these pictures? Note the farming pictured in the PowerPoint slides. Why do farmers plant along the slope of the hill rather than in the flat parts?
- Do you see any evidence of movement? Roads?
- How does communication happen for people living in this area?
- What geographical region is this area part of? (marshland, grassland, forest, etc.)

To explore further, you can have students:

- Locate neighboring countries and geological features of countries near Tanzania.
- Research tropical coastal area, dry plains area, and the fertile highlands of Tanzania.
- Build models of volcanoes in class (see 3C Background Information... for guidance).

Assessment:

Use the Display Boards Rubric (page 3-9) that was used in lesson 3A. Now, fill in the Volcanoes in Tanzania portion.

Lesson 3C: Compare and Contrast
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Time Allotment: 1-2 one-hour sessions

Objectives: Upon completing this unit, students will be able to:

- Identify and chart similarities and differences between volcanoes in Washington State and Tanzania.
- Share what they have learned about volcanoes with other grade levels.
- Work cooperatively, practicing communication skills.

Procedure:

Day One:

Write this focus question on the blackboard, overhead projector, or poster board:

What are some of the similarities and differences between volcanoes in Washington State and Tanzania?

Have students revisit maps of Washington State and Tanzania, side by side, and pinpoint each volcano researched (a flag or push pin may be use for this activity).

Ask students to work in the same cluster groups as lesson 3A and 3B. Review the following terms: compare, similarities, and differences. Pass out the Venn Diagram (page 3-12) and ask students to write "Washington Volcanoes" and "Tanzanian Volcanoes" in the two larger center circles. Tell students to put the common elements, or similarities, in the center bubbles that connect the two circles, and the differing elements in the outer bubbles.

Day Two:

Draw a Venn Diagram or double bubble map on the overhead, board, or on butcher paper at the front of the class. Ask each cluster group to share one similarity or difference and note them on the double bubble map up front. Once each group has shared, ask the whole class for any that have not been shared yet. Ask each student to write a paragraph comparing and contrasting volcanoes in Washington State with volcanoes in Tanzania. This can be done in-class or be assigned as homework.

To explore further, you can:

- Talk about the advantages and disadvantages of volcanoes. On one hand, volcanic ash produces remarkably fertile soil that benefits farming. On the other hand, volcanoes can become natural disasters that have profoundly bad effects on humans and where they live. Encourage students to come up with a list of good and bad characteristics about volcanoes.
- Ask students to develop oral presentations based on their findings. They will use the two poster boards they created in lessons 3A and 3B and the double bubble chart as visual aides. They can then share their findings with other grade levels.
- Depending on the expertise of the students and if there is computer access in the classroom or a lab, encourage the students to prepare PowerPoint presentations on their findings.

Assessment:

Use the Comparing and Contrasting Paragraph Rubric (page 3-13).

KWL Chart

K - What the students **K**now

W - What the students **W**ant to Know

L - What the students have **L**earned

K	W	L

Display Boards Rubric

Name: _____

Date: _____

Volcanoes in Washington State	Below Avg.	Satisfactory	Excellent
1. Format	1, 2, 3	4, 5, 6	7, 8, 9
2. Mechanics of speaking/writing	1, 2, 3	4, 5, 6	7, 8, 9
3. Organization and structure	1, 2, 3	4, 5, 6	7, 8, 9
4. Creativity	1, 2, 3	4, 5, 6	7, 8, 9
5. Demonstrates knowledge of five elements of geography	1, 2, 3	4, 5, 6	7, 8, 9
6. Other:	1, 2, 3	4, 5, 6	7, 8, 9

Total Score: _____

Teacher(s) Comments:

Volcanoes in Tanzania	Below Avg.	Satisfactory	Excellent
1. Format	1, 2, 3	4, 5, 6	7, 8, 9
2. Mechanics of speaking/writing	1, 2, 3	4, 5, 6	7, 8, 9
3. Organization and structure	1, 2, 3	4, 5, 6	7, 8, 9
4. Creativity	1, 2, 3	4, 5, 6	7, 8, 9
5. Demonstrates knowledge of five elements of geography	1, 2, 3	4, 5, 6	7, 8, 9
6. Other:	1, 2, 3	4, 5, 6	7, 8, 9

Total Score: _____

Teacher(s) Comments:

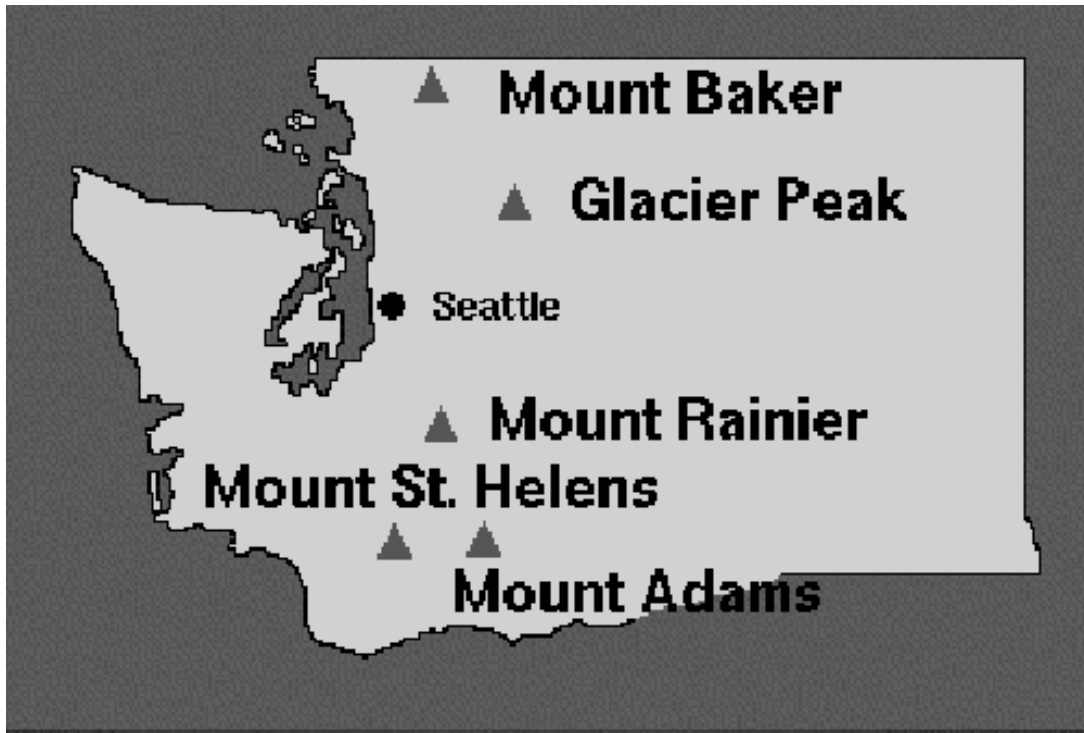
Rubric designed at http://www.teach-nology.com/cgi-bin/project_rub.cgi.

Background information on Volcanoes in Washington State and Tanzania



Map courtesy of USGS/Cascades Volcano Observatory
http://vulcan.wr.usgs.gov/Volcanoes/Africa/Maps/map_tanzania_volcanoes.html, 2004

Major Volcanoes of Washington State

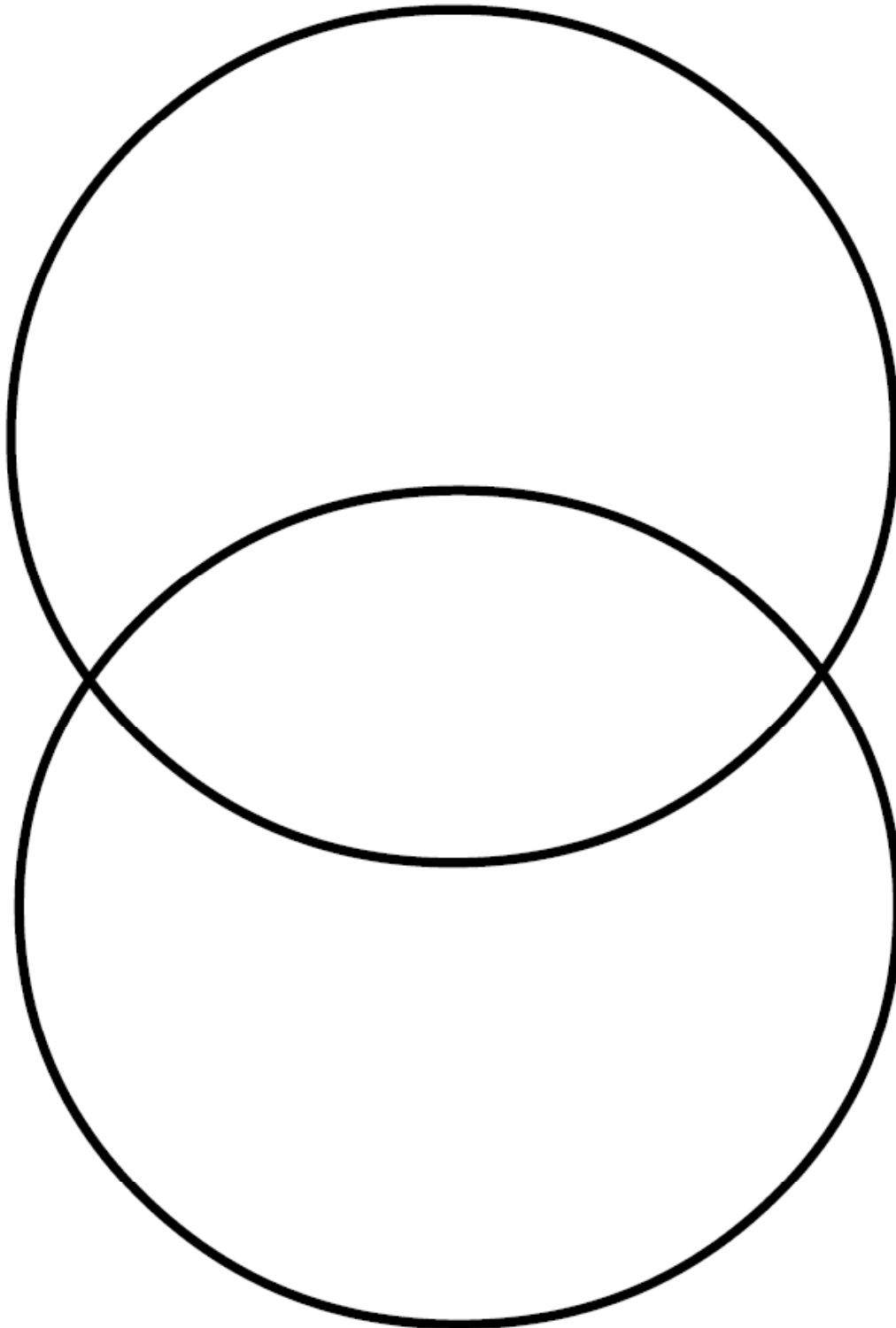


Map courtesy of USGS/Cascades Volcano Observatory
http://vulcan.wr.usgs.gov/Photo/Pictograms/washington_volcanoes_bw.html, 2004

Online Volcano Model Resources

- USGS – How to Build a Volcano -
http://vulcan.wr.usgs.gov/Outreach/FunStuff/build_volcano.html
- Building Volcano Models -
http://volcano.und.nodak.edu/vwdocs/volc_models/models.html
- Teachervision: Build a Volcano Lesson Plan -
<http://www.teachervision.fen.com/lesson-plans/lesson-335.html>
- How to Build a Volcano -
<http://chemistry.about.com/cs/howtos/ht/buildavolcano.htm>
- Build a Volcano -
http://thebrownschool.com/Kid_Space/Experiment/build_a_volcano.htm

Venn Diagram



Washington Volcanoes **Tanzania Volcanoes**

Comparing and Contrasting Paragraph Rubric

Student Name: _____

Teacher: _____

	Criteria				Points
	4	3	2	1	
Main/Topic Idea Sentence	Main/Topic idea sentence is clear, correctly placed, and is restated in the closing sentence.	Main/Topic idea sentence is either unclear or incorrectly placed, and is restated in the closing sentence.	Main/Topic idea sentence is unclear and incorrectly placed, and is restated in the closing sentence.	Main/Topic idea sentence is unclear and incorrectly placed, and is not restated in the closing sentence.	_____
Supporting Detail Sentence(s)	Paragraph(s) have three or more supporting detail sentences that relate back to the main idea.	Paragraph(s) have two supporting detail sentences that relate back to the main idea.	Paragraph(s) have one supporting detail sentence that relate back to the main idea.	Paragraph(s) have no supporting detail sentences that relate back to the main idea.	_____
Elaborating Detail Sentence(s)	Each supporting detail sentence has three or more elaborating detail sentences.	Each supporting detail sentence has at least two elaborating detail sentences.	Each supporting detail sentence has one elaborating detail sentence.	Each supporting detail sentence has no elaborating detail sentence.	_____
Legibility	Legible handwriting, typing, or printing.	Marginally legible handwriting, typing, or printing.	Writing is not legible in places.	Writing is not legible.	_____
Mechanics and Grammar	Paragraph has no errors in punctuation, capitalization, and spelling.	Paragraph has one or two punctuation, capitalization, and spelling errors.	Paragraph has three to five punctuation, capitalization, and spelling errors.	Paragraph has six or more punctuation, capitalization, and spelling errors.	_____
				Total--->	_____

Rubric designed at <http://teachers.teach-nology.com/cgi-bin/para.cgi>.