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PELE'S PEAK

A Thematic Unit That Brings Volcanoes Alive for Your Students

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The nationwide movement for high standards has not only determined what students should learn, but also has mandated that students demonstrate what they know. PELE'S PEAK is a content-rich, standards-based program addressing Earth Science and English Language Arts Standards. During the simulation students learn about volcanoes, the Hawaiian Islands, and the myth of Pele. There are many opportunities for performance assessment in PELE'S PEAK. Working individually and in teams, they write daily logs, an original myth, a report, and create a travel brochure to earn points to travel to the top of Pele's Peak. The cooperative work and decision-making required throughout address Applied Learning Standards.

National Science Education Standards

Grades K–4

Content Standard D: Earth and Space Science

Structure of the Earth System

The solid earth is layered with a lithosphere; hot, convecting mantle; and dense, metallic core.

Landforms are the result of a combination of constructive and destructive forces. Constructive forces include deformation, volcanic eruption, and deposition of sediment, while destructive forces include weathering and erosion.

Content Standard F: Science in Personal and Social Perspectives

Natural Hazards

Internal and external processes of the earth system cause natural hazards, events that change or destroy human and wildlife habitats, damage property, and harm or kill humans. Natural hazards include earthquakes, landslides, wildfires, volcanic eruptions, floods, storms, and even possible impacts of asteroids.

Grades 3–6

Content Standard D: Earth and Space Science

Changes in the Earth and Sky

The surface of the earth changes. Some changes are due to slow processes, such as erosion and weathering, and some changes are due to rapid processes, such as landslides, volcanic eruption, and earthquakes.

Content Standard F: Science in Personal and Social Perspectives

Changes in Environment

Changes in environments can be natural or influenced by humans. Some changes are good, some are bad, and some are neither good nor bad. Pollution is a change in the environment that can influence the health, survival, or activities of organisms, including humans.

Some environmental changes occur slowly, and others occur rapidly. Students should understand the different consequences of changing environments in small increments over long periods as compared with changing environments in large increments over short periods.

STANDARDS

NCTE Standards for the English Language Arts

Standard 1: Students read a wide range of print and non-print texts to build an understanding of text, of themselves, and of the cultures of the United States and the world, to acquire new information; to respond to the needs and demands of society and the workplace; and for personal fulfillment. Among these texts are fiction and nonfiction, classic and contemporary works.

Standard 3: Students apply a wide range of strategies to comprehend, interpret, evaluate, and appreciate texts. They draw on their prior experience, their interactions with other readers and writers, their knowledge of word meaning and of other texts, their word identification strategies, and their understanding of textual features (e.g., sound-letter correspondence, sentence structure, context, graphics).

Standard 4: Students adjust their use of spoken, written, and visual language (e.g., conventions, style, vocabulary) to communicate with different audiences for a variety of purposes.

Standard 5: Students employ a wide range of strategies as they write and use different writing process elements appropriately to communicate with different audiences for a variety of purposes.

Standard 6: Students apply knowledge of language structure, language conventions, (e.g., spelling and punctuation), media techniques, figurative language, and genre to create, critique, and discuss print and non-print texts.

Standard 7: Students conduct research on issues and interests by generating ideas and questions, and by posing problems. They gather, evaluate, and synthesize data from a variety of sources (e.g., print and non-print text, artifacts, people) to communicate their discoveries in ways that suit their purpose and audience.

Standard 8: Students use a variety of technological and informational resources (e.g., libraries, databases, computer networks, video) to gather and synthesize information and to create and communicate knowledge.

Standard 11: Students participate as knowledgeable, reflective, creative, and critical members of a variety of literacy communities.

Standard 12: Students use spoken, written, and visual language to accomplish their own purposes (e.g., for learning, enjoyment, persuasion, and the exchange of information.)

California Applied Learning Standards

Standard 6. Students will understand how to apply communication skills and techniques. Students will demonstrate ability to communicate orally and in writing.

Standard 8. Students will understand the importance of teamwork. Students will work on teams to achieve project objectives.

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STRETCHING

PELE'S PEAK

PELE'S PEAK provides an integrated approach to teaching students about volcanoes. In this cross-curricular unit, students work in cooperative teams to complete activities that emphasize critical, creative, and visual-thinking skills.

Specifically, your students will experience the following:

Knowledge

- Learning about Hawaii
- Identifying the different kinds of volcanoes
- Understanding the various types of volcanic eruptions
- Developing a scientific vocabulary

Skills

- Relating science, language, and literature to a unit of study
- Following multi-step oral and written directions
- Reading maps
- Listening for information
- Expanding vocabulary through class discussions, reading, and the use of dictionaries
- Writing in a variety of styles including response to literature, content-area writing, and correspondence
- Using media center and available technology as sources of information and pleasure
- Recording information in a log
- Drawing conclusions and making generalizations
- Choosing appropriate resources for finding information

Attitudes

- Developing positive attitudes towards science and language arts
- Fostering a positive attitude toward working with others to achieve a common goal
- Recognizing the importance and relevance of studying volcanoes
- Appreciating natural wonders and the power of natural land formations

ESOPURP

OVERVIEW

PELE'S PEAK

OVERVIEW

PELE'S PEAK introduces students to the science and mystery of volcanoes. Students become volcanologists traveling to Hawaii in their quest to reach Pele's Peak, learning about Hawaiian mythology, geography, and history as they proceed on their journey. The goal of each "Trekking Trio" is to be the first team to climb 7,000 feet to the top of the volcano.

Students begin PELE'S PEAK by taking a pretest to gauge their knowledge of volcanoes. Over the course of 10 flexible lessons, students accumulate a greater knowledge of the science behind volcanoes, the role of a volcanologist, and the state of Hawaii.

Each lesson consists of activities that challenge students to think critically and creatively. Throughout the unit, students complete Volcano Vocabulary, write an original myth, write a letter to a volcanologist, and research a volcano and the Hawaiian Islands. Students earn opportunities to draw Fate Cards by completing team tasks. These cards reveal the daily fate of each Trekking Trio and determine their progress towards Pele's Peak. At the end of each lesson, students write in their Lava Logs to reflect on the day's events.

As a culminating activity, students host a luau complete with Hawaiian food and music! Students apply what they have learned in the unit by performing a skit and erupting clay volcanoes. These volcanologists then receive a certificate for participating in PELE'S PEAK indicating their level of accomplishment as an Expert, Master, Apprentice, or Novice based on the quality of their class work completed during the unit.

1. Before You Begin

Carefully read PELE'S PEAK in its entirety to become familiar with its elements, lessons, and procedures. Plan your time and adjust this unit to meet your students' needs and abilities.

2. Prepare Your Classroom

Developing a Hawaiian environment enhances the atmosphere of the unit and sets the stage for the culminating luau.

- Display the PELE'S PEAK CHART prominently in your classroom as a focal point. Use this chart as a large-scale gameboard to map the progress of each team. Leave space around the chart to display student activities and projects created during the unit.
- Use three-dimensional palm trees and tropical elements. Include a sandy beach with shells and sea creatures as well as a small chair and beach towel. It is especially exciting when the classroom display reaches out into the hallway!
- Make a real travel brochure for the unit to heighten student interest for their simulated adventure in Hawaii.
- Set up a research center to house additional materials. Collect books about Hawaii, volcanoes, and myths. Bring in atlases, travel brochures, and other items to use as reference materials to enhance the learning experience. Make these resources accessible to students during their free time.

By the end of PELE'S PEAK, your entire classroom could be a tropical paradise!

3. Timing

PELE'S PEAK consists of 10 lessons and a culminating luau. The **Unit Time Chart** suggests that you work with each lesson for approximately 60-90 minutes. You can do the unit daily, bi-weekly, or weekly, depending on your schedule. Spacing out the lessons gives you more opportunities to include some of the extra activities within the unit. See the **Unit Time Chart** on page 16 to assist in long range planning.



Creating a travel brochure for display provides a helpful model for students later in the unit when they make their own brochure.



10+ hours

Take time to carefully look at the schedule and adapt the unit to fit the needs of your classroom and your students.

SETUP DIRECTIONS

PELE'S PEAK

4. Cooperative Learning

Students work in cooperative learning groups, called Trekking Trios, during this unit. Working together, students experience the satisfaction of achieving a common goal. A group can achieve more than a single student by pooling knowledge, creating group spirit, and providing encouragement to each other. This unit gives students of all abilities and learning styles a chance to excel. It may be necessary to go over the rules of cooperative learning groups with your students before beginning the simulation. Set clear behavioral standards for cooperative learning groups. The success of PELE'S PEAK depends on how effectively students work together. Use the following Trekking Trio Rubric if you wish to formally assess your students' cooperative behavior.

Rubric Score	Qualitative Description
4	Student consistently and actively helps the group achieve its goals by communicating well with group members, encouraging the group to work together, and willingly completing the work for his/her role.
3	Student usually helps the group achieve its goals by communicating with group members, encouraging the group to work together, and willingly completing the work for his/her role.
2	Student makes some effort to help the group achieve its goals.
1	Student makes little or no effort to help the group achieve its goals.



Trekking Trios

If you cannot divide your students evenly into teams of three, group the remaining students into a team of "Peak Pals."

5. Grouping Students

Divide your class into teams of three, or *Trekking Trios*. Group your students in advance to include equal distribution of students' abilities. Strive to set up fair cooperative learning groups. Once the teams have been selected, each team creates a team flag to place on the PELE'S PEAK CHART. These flags should include a team name, symbol, and color. Each Trekking Trio may also create a larger flag to place at their desks.

6. Assigning and Rotating Team Roles

Within each trio, students assume a particular role. Assign each student one of the roles to begin the simulation. Rotate roles each day so that all students have a chance to be the leader and to be responsible for the team's duties. Rotate students so that the *Veteran Volcanologist* assumes the role of the *Disaster Prevention Specialist* who takes on the duties of the *Ring of Fire Recorder*. The *Ring of Fire Recorder* becomes the *Veteran Volcanologist*.

- **Veteran Volcanologist** The Veteran Volcanologist is the team leader responsible for seeing that all members are working cooperatively and completing each activity. The Veteran Volcanologist delivers the destiny of the group by choosing the Fate Card.
- **Disaster Prevention Specialist** The Disaster Prevention Specialist collects and returns supplies to the supply cabinet and folders (optional) to the designated area. This person ensures that his/her team has what it needs to complete the day's activities. This person is also responsible for leaving a clean work area.
- **Ring of Fire Recorder** The Ring of Fire Recorder records the activities of the day, the result of the Fate Card, and any observations or reflections on the team's progress in their Lava Log.

7. PELE'S PEAK Folders (Optional)

To help your students organize their work for this unit, use pocket folders to keep all of their PELE'S PEAK activities, Lava Logs, and Student Guides. Students will access these folders on a daily basis. You may give a pocket folder to each student or create folders using a large piece of construction paper.

8. Materials

Prior to beginning PELE'S PEAK assemble the following materials in the quantities indicated in *Italics*. See the Daily Directions for more specific information. Encourage parents and other teachers to help collect items for the classroom.

- Atlas — *several*
- Baking soda — *one teaspoon per Trekking Trio*
- Ball (small) — *one*
- Blank paper (8.5" x 11") — *one per Trekking Trio*
- Construction paper — *as needed*
- Folders (optional) — *class set*



If you have a team with more than three students, make the additional students Disaster Prevention Specialists.



Post each day's materials on the board so that the Disaster Prevention Specialist can make sure his or her team is prepared for the day's activities.

SETUP DIRECTIONS

PELE'S PEAK

- Glue — *one per Trekking Trio*
- Hawaii travel brochures — *several*
- Hole punch — *as needed*
- Index cards 3" x 5" (cut in half) — *one per Trekking Trio*
- Index cards 5" x 7" — *class set*
- Lined paper — *twenty sheets per student*
- Liquid soap — *one bottle per Trekking Trio*
- Markers, crayons, or colored pencils — *several per Trekking Trio*
- Modeling clay — *two sticks per Trekking Trio*
- Paintbrush — *one per Trekking Trio*
- Permanent marker — *one per Trekking Trio*
- Plastic spoons — *one per Trekking Trio*
- Poster board or butcher paper — *one piece per Trekking Trio*
- Red food coloring — *one bottle per Trekking Trio*
- Resource materials — *as needed*
- Ribbons — *as needed*
- Scissors — *class set*
- Small jar — *one per Trekking Trio*
- Stapler — *as needed*
- String — *as needed*
- Student Guides — *class set*
- Stryofoam plate — *one per Trekking Trio*
- Tape — *one roll per Trekking Trio*
- Vinegar — *eight ounces per Trekking Trio*
- White glue — *one bottle per Trekking Trio*

9. Online Resources

Interact's website provides links to some excellent electronic resources to enhance this unit. Please visit our website at **www.teachinteract.com** and click on the Resources button to find PELE'S PEAK.

10. Duplication

For your convenience, the Reproducible Masters are listed in the order of use and are located at the end of the **Daily Directions**. You may duplicate them now or wait until you need them. The quantity of each is indicated in *Italics*.

- VOLCANOLOGIST LETTER — *class set*
- INTRODUCTORY PARENT LETTER — *class set*
- LUAU INVITATION — *class set*
- PRE/POSTTEST — *two class sets*
- PEAK PREPARATION — *class set*
- MY LAVA LOG — *class set*

PELE'S PEAK

- MOUNTAIN CLIMBING SONG/CHEER — *transparency*
- PEAK POINTS — *class set*
- MY MYTH: PRE-WRITING — *class set*
- MY MYTH: CHECKLIST — *class set*
- VOLCANOLOGIST SCAVENGER HUNT — *one per Trekking Trio*
- SCAVENGER HUNT ANSWERS — *three*
- VOLCANO VISUAL CHECKLIST — *class set*
- PREDICTING VOLCANIC ERUPTIONS — *one per Trekking Trio*
- PREDICTING VOLCANIC ERUPTIONS CODE — *class set*
- CREATING A TRAVEL BROCHURE — *class set*
- ISLAND INFORMATION — *class set*
- VOLCANOES — *one per Trekking Trio*
- VOLCANO RESEARCH — *class set*
- VOLCANO RESEARCH PROJECT CHECKLIST — *class set*
- LUAU SKIT — *as needed*
- VOLCANOLOGIST CERTIFICATE — *class set*

11. Introducing the Unit to Students' and Families

PELE'S PEAK includes three sample letters. Use them as printed, or adapt them to your class situation. The letters encourage home involvement and will also provide an opportunity for your students to learn about volcanoes in a meaningful way as the class writes to a volcanologist. The letters and their function are:

- **Volcanologist Letter** This sample letter is written from the student's perspective, and requests a response from the recipient. Some younger students will probably fill in the blanks and send the Volcanologist Letter that you copy for them. Older students can use the Volcanologist Letter as a model to write their own letters. Give students the sample VOLCANOLOGIST LETTER. Discuss with students the proper way to write a letter requesting information. Incorporate this exercise into a writing lesson to reinforce writing skills and prepare for the upcoming unit. Invite students to share the letters from the volcanologists as they receive them. Set aside time for students to share them during each lesson. ***Send one month before you begin the unit.***



If you do not have the unit a month before you are to begin, send the Volcanologist Letter as early as possible in advance of the unit.

SETUP DIRECTIONS

PELE'S PEAK

Begin communication with students' families at least one week prior to beginning the unit.

- **Introductory Parent Letter** This letter informs parents what their children will be studying in PELE'S PEAK. This letter also asks for parent volunteers to help coordinate, decorate, or supply food for the luau. *Send one week before you begin the unit.*
- **Luau Invitation** This letter confirms the date and time of the culminating luau and invites parents to share in the festivities. *Send one week before the luau.*

12. Unit Components

- **Warm-up Activities** Warm-up Activities stimulate students mentally and physically, preparing them to trek up the mountain! Students excite their bodies and their minds by stretching and doing cross-lateral activities.
- **Lava Logs** Lava Log [Journal] entries give students an opportunity to express and synthesize their ideas and reflections about the day's lesson. For some entries, students respond to writing prompts that spur their thinking and personalize the learning. The Lava Log also provides students with a means to record and use their Volcano Vocabulary.
- **Volcano Vocabulary** Consisting of concrete words that enrich the day's learning, Volcano Vocabulary sharpens students' listening and comprehension skills. The vocabulary for a lesson is listed in the **Daily Directions** and the words are defined in the **Glossary**. (Note: There are not vocabulary words every day.) A good way to handle the Volcano Vocabulary is to write a list of some or all of the day's words on the board or on chart paper at the beginning of each lesson. Instruct students to record the words in their Lava Logs and have them leave some space between each one. As you discuss the day's lesson students define the words using context clues and their dictionaries. This method encourages attentive listening, using vocabulary to teach students how to take notes, and recording information for future reference. If students are not able to record the definitions for all of the words during the lesson, direct them to complete this exercise during their free time or as a take home assignment.



Volcano Vocabulary is a component that naturally lends itself to differentiated instruction. For those students needing more challenge, some of the scientific terms are perfect! Select the most appropriate words for your class, or encourage students to explore other terms related to volcanology to enhance learning.

- **Fate Cards** The Fate Cards describe real life situations that indicate the outcome of the day's journey, delivering a positive or negative fate. Students draw Fate Cards after completing a specific task and may move closer to the peak, may be forced to retreat, or remain in the same position. The Veteran Volcanologists (team leaders) draw these cards and return them to you after their teams have read them. Include all Fate Cards every day. Since the cards will be distributed and collected several times, you may wish to laminate them.
- **Extension Activities** Extension Activities offer more opportunities to enhance the learning experience.
- **Student Guide** The Student Guide contains essays from five lessons, *The Myth of Pele* (Lesson 1), *Volcanoes* (Lesson 3), *Volcanoes and Volcanologists* (Lesson 4), *Predicting Eruptions* (Lesson 5), and *Highlighting Hawaii* (Lesson 6). Students will be able to listen and follow along as you read the information. The Student Guide also includes volcano and earth diagrams and maps of the Ring of Fire and the Hawaiian Islands as a convenient reference.

13. Culminating Luau

- Recruit parents to organize this for you. One week before the culminating celebration send home the LUAU INVITATION.
You will need:
 - **Food Chairperson** to coordinate food for the luau
 - **Decoration Chairperson** to help coordinate any decorations and/or setup that needs to be done within the classroom
 - **Cleanup Chairperson** to help cleanup and take down luau decorations
- Plan a meeting with those willing to help. Enlist volunteers to provide other items such as plates, cups, napkins, forks, and party favors.
- Use Hawaiian music to enhance the atmosphere of the luau.
- Make sure that all presentation materials are in order and that student work is displayed appropriately.

14. Assessment

PELE'S PEAK provides many opportunities to assess your students' knowledge, skills, and behaviors. Use the following generic rubric to assess each activity, or create your own, establishing specific expectations and parameters. As with all assignments, adjust according to your students' needs.



Separate positive Fate Cards as a classroom management tool to reward deserving trios or to advance students to ensure a winning team.

As an extension, allow students to write and design additional Fate Cards.



Possible food items include papaya, pineapple, mango, kiwi, macadamia nut cookies, or any other Hawaiian food. Make your favorite punch and call it "Pele Punch" to complete your luau!

SETUP DIRECTIONS

PELE'S PEAK



These rubric scores can translate into letter grades if your district requires that. Use your discretion.

On a 4-point rubric scale, encourage students to re-do any work that is unsatisfactory. If students need more time to do quality work, give them the time; if they need more support or more discipline, give it to them. Set clear and high expectations, and students will rise to the “peak” in all ways! If you do not currently use rubrics in your classroom, make time at the beginning to explain and demonstrate your assessment method.

Rubric Score	Qualitative Description
4	<i>Expert:</i> Student exceeds the standard for this activity, doing more than you expected. Student consistently, willingly, and actively demonstrates mastery of the assignment. Wow!
3	<i>Master:</i> Student meets the standard for this activity, doing what you expected. Student masters the content and can demonstrate understanding with good quality.
2	<i>Apprentice:</i> Student nearly meets the standard for this activity but still needs a little extra reinforcement. Student most likely either demonstrates an inconsistent effort or misunderstands the content or expectations.
1	<i>Novice:</i> Student has not met the standard in content and/or in quality. This student needs to re-do the assignment and may require help understanding content and/or expectations.

Use some or all of the following activities to formally assess your students in PELE’S PEAK with the rubric provided or using your own assessment tools:

- Volcano Vocabulary (Daily)
Assess effort, accuracy, and completion
- Original Myth (Lesson 2)
Assess language arts elements using the checklist provided
- Volcano Visual (Lesson 4)
Assess quality and accuracy of volcano depiction using the checklist provided

- Predicting Volcanic Eruptions (Lesson 5)
Assess code accuracy
- Hawaii Travel Brochure (Lesson 6)
Assess quality and completion using the checklist provided
- “Volcanoes Are Actually Good” (Lesson 7)
Assess persuasive writing skills
- Volcano Research Project (Lessons 8/9)
Assess information and presentation using checklist provided
- Posttest (Lesson 10)
Assess objective knowledge
- Cooperative Behavior (Daily)
Assess how well students demonstrated cooperation in their Trekking Trios. Monitor and provide feedback frequently to ensure appropriate behavior.

At the end of the unit use the rubric *mode*, or score, that each student has earned most often throughout the unit to determine their final status or ranking as an **Expert, Master, Apprentice,** or **Novice Volcanologist**. For example, if you assigned rubric scores for six activities in the unit and a student earned ratings of: 4, 3, 3, 4, 2, and 3, that student would be a **Master** (rating of 3). To simplify—if a student *usually exceeded* your standard, they are an **Expert**; if he or she *usually met* your standard, they are a **Master**; a student with two or three *less than standard* assignments should be considered an **Apprentice**.

15. Special Needs Adaptations

Like all Interact units, PELE'S PEAK provides differentiated instruction through its various learning opportunities. Students learn and experience the knowledge, skills, and attitudes through kinesthetic, hands-on activities. Adjust the level of difficulty as best fits your students and encourage special needs students to select activities which utilize their strengths and allow them to succeed. Work together with the Resource Specialist, Gifted and Talented Specialist, or other itinerant teacher to coordinate instruction.

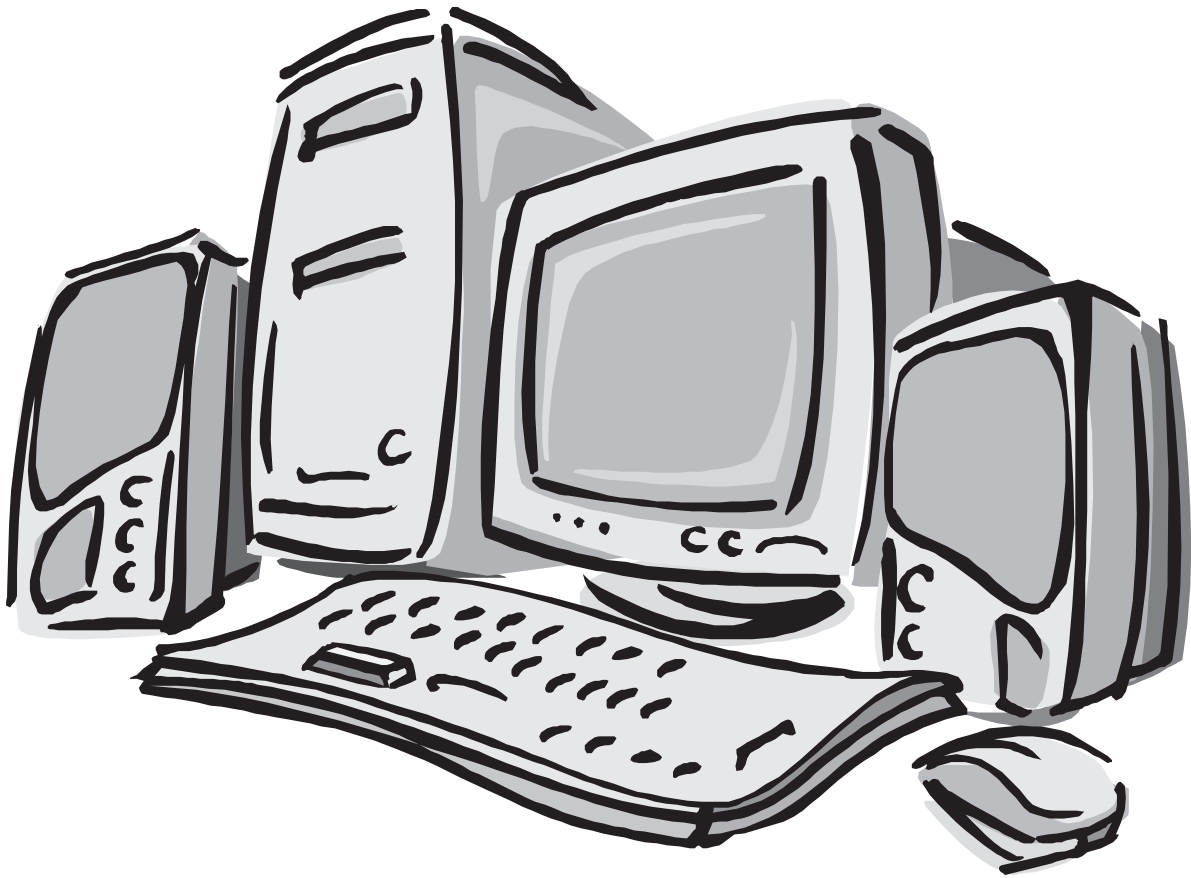


You might adjust the ratings, weighting certain projects or assignments more heavily.

RESOURCES

PELE'S PEAK

For additional resources on myth, go to
www.socialstudies.com/interact_resources



GLOSSARY

PELE'S PEAK

All these terms appear in the passages found in the Student Guide as well as the Daily Directions. Select only the vocabulary terms appropriate for your students and your standards.

Lesson 2: Myths

Gods/Goddesses — characters in myths with special powers

Hero/Heroine — strong and courageous man (hero) or woman (heroine), generally the lead character in a story

Myth — story used to explain some natural phenomenon

Pele — Hawaiian goddess of fire

Tsunami (tsoo-NAH-mee) — huge wave produced by earthquakes, volcanoes, or landslides

Lesson 3: Volcanoes

Aa (ah-AH) — lava that contains rough, angular fragments; it cools to be very jagged and sharp

Active Volcano — erupting volcano

Archipelago (ar-ke-PEL-ah-go) — group of islands

Crater — steep-sided, circular depression formed by an explosion at a volcanic vent

Crust — earth's top layer of solid rock

Dormant Volcano — volcano that is between eruptions – sleeping

Eruption — process by which material is erupted onto the earth's surface

Extinct Volcano — volcano no longer capable of erupting

Lava — magma that has reached the surface through a volcanic eruption

Magma — hot, liquid rock

Pahoehoe (PAH-ho-eh-ho-eh) — fluid lava that pours out of a volcano; it cools to be smooth or ropy

Ring of Fire — region of mountain-building earthquakes and volcanoes that surround the Pacific including the coasts of North America, South America, Australia, and Asia

Volcano — geological land form created by magma and layers of lava, rock, ash, and other sediment

Lesson 4: Volcanoes and Volcanologists

Composite Volcano — volcanic mountain built by both lava flows and fragmented material

Cinder Cone Volcano — steep, but small volcanic cone built entirely of loose fragmented material from an explosive eruption

Seismograph — instrument that records vibrations of the earth

Shield Volcano — gently sloping volcano in the shape of a flattened dome made of lava flows

Volcanologist — someone who studies volcanoes

Volcanology — study of volcanoes

Lesson 5: Predicting Eruptions

Eruption Cloud — column of gases, ash, and rock rising from a crater or vent

Pyroclastic Flows — turbulent mixture of hot gases, ash, and other materials that move at high speeds like rivers destroying anything in their path

Lesson 6: Highlighting Hawaii

Aloha — Hawaiian word for love

Hawaii — “The Big Island”

Kauai — “The Garden Island”

Lanai — “The Pineapple Island”

Maui — “The Valley Island”

Molokai — “The Lonely Island”

Oahu — “The Gathering Place”



UNIT TIME CHART

PELE'S PEAK

LESSON 1	LESSON 2	LESSON 3	LESSON 4
Introduction <ul style="list-style-type: none">• PRETEST• PEAK PREPARATION• MY LAVA LOG• MOUNTAIN CLIMBING SONG/CHEER• PEAK POINTS• Student Guides	Myths <ul style="list-style-type: none">• MY MYTH: PREWRITING• MY MYTH: CHECKLIST	Volcanoes <ul style="list-style-type: none">• VOLCANO SCAVENGER HUNT• SCAVENGER HUNT ANSWERS• Fate Cards• Student Guides	Volcanoes and Volcanologists <ul style="list-style-type: none">• VOLCANO VISUAL CHECKLIST• Fate Cards• Student Guides
LESSON 5	LESSON 6	LESSON 7	LESSON 8
Predicting Eruptions <ul style="list-style-type: none">• PREDICTING VOLCANIC ERUPTIONS• PREDICTING VOLCANIC ERUPTIONS CODE• Fate Cards• Student Guides	Highlighting Hawaii <ul style="list-style-type: none">• CREATING A TRAVEL BROCHURE• ISLAND INFORMATION• Fate Cards• Student Guides	The Good and Bad of Volcanoes <ul style="list-style-type: none">• Fate Cards	Volcano Research <ul style="list-style-type: none">• VOLCANOES• VOLCANO RESEARCH• VOLCANO RESEARCH PROJECT CHECKLIST• Fate Cards
LESSON 9	LESSON 10	CULMINATION	
Volcano Presentation <ul style="list-style-type: none">• Fate Cards	Building a Volcano <ul style="list-style-type: none">• POSTTEST• LUAU SKIT• Fate Cards	<ul style="list-style-type: none">• VOLCANOLOGIST CERTIFICATE• Ribbons (optional)	

DAILY DIRECTIONS

LESSON 1: INTRODUCTION

PELE'S PEAK

Lesson 1: Introduction

Objectives

- Take pretest to gauge understanding of volcanoes
- Set individual learning expectations
- Understand the purpose of the unit
- Become a team member
- Comprehend the rules of cooperative learning
- Choose a team name
- Make a team flag
- Create a team song or cheer
- Record song or cheer in Lava Log
- Review Peak Points

Materials

- PRETEST — *class set*
- PEAK PREPARATION — *class set*
- MY LAVA LOG — *class set*
- MOUNTAIN CLIMBING SONG/CHEER — *transparency*
- PEAK POINTS — *class set*
- Construction paper — *one sheet per student*
- Glue — *one per Trekking Trio*
- Hole punch — *as needed*
- Index cards 3" x 5" (cut in half) — *one per Trekking Trio*
- Index cards 5" x 7" (optional) — *class set*
- Lined paper — *twenty sheets per student*
- Markers, crayons, or colored pencils — *several per Trekking Trio*
- Scissors — *class set*
- Stapler — *as needed*
- String — *as needed*
- Student Guides — *class set*

Warm-up Activity

- *Pele's Peak Pretest* - Give students the PRETEST to assess their knowledge. This initial exercise will get students thinking about volcanoes and will help them determine what they want to learn from the unit.
 1. T
 2. F
 3. T
 4. F
 5. T
 6. F
 7. F
 8. T
 9. T
 10. F



*Whole class instruction
and Trekking Trios*



*Feel free to design your own
Pretest or to forgo this initial
assessment based on the needs of
your class. This Pretest offers a
quick objective glance at students'
background knowledge of volcano-
related facts.*

DAILY DIRECTIONS

LESSON 1: INTRODUCTION

PELE'S PEAK



Remember to allow time for students to report on letters received from their volcanologists at the beginning or end of each lesson throughout the unit.

If this exercise is too advanced for the developmental level of your students, adjust the activity accordingly.



Encourage your students to read along with you as you read this version of the myth of Pele aloud. Stop and discuss any new terms as needed. In the next lesson, your students will write their own myth so you may re-read this myth in more detail at that time.

Procedure

1. Introduce the race to the peak with PELE'S PEAK CHART and give an overview of the unit (see **Setup Directions #2, Prepare Your Classroom**). Explain the concept of Fate Cards so students understand that the outcome of PELE'S PEAK depends on fate as well as hard work (just like life).
2. Distribute PEAK PREPARATION. Discuss what students want to learn and how they want to obtain this information. This could be done in a whole class webbing or brainstorming session. Then, instruct students to complete PEAK PREPARATION. Have them focus on three questions:
 - What are the things I want to learn from this unit?
 - How can I do my best to learn these things?
 - Why is it important for me to learn these things?
3. Direct students to page 1 of their **Student Guides**. Present the myth of Pele, the Volcano Goddess. Read or tell along with students:

Once upon a time there was a beautiful goddess named Pele. She and her brothers and sisters lived in a magnificent valley on the island of Hawaii. On the island was a big, black mountain that was a volcano!

Unlike many ordinary people of this long-ago time, Pele and her family were not afraid of this mountain. They bravely built their houses in the valley at the foot of this fiery volcano. The other people of Hawaii said they must always be good to Pele and do what she wanted so the fire from the volcano would not hurt them.

There was a giant on another island people called the Hog Man (Kamapuaa). He loved Pele and wanted to marry her, but she was not interested in marrying the Hog Man. This made the Hog Man very angry, so he set out to kill Pele and her brothers and sisters.

Pele was very smart and she knew what the Hog Man was trying to do. She took her brothers and sisters, went up the volcano's side, and hid in a cave.

The determined Hog Man would not give up! Finally, he found Pele's dog, and it led him right to the cave where Pele and her family were hiding. Now that he knew where she was, he would return the next morning to get her.

When the Hog Man arrived at the cave, he made a fire in front of the cave to force them out from hiding. However, his plan backfired. A wind came out of the cave and blew the smoke right in the eyes of the Hog Man!

Then, as he stood there, the ground began to shake and red, hot lava poured down the sides of the mountain.

The Hog Man fled down the mountain, barely able to stay ahead of the lava. At last, he reached the sea and sailed away in his canoe. The flowing lava did not hurt Pele and her family.

Still today, the people of Hawaii tell their children that Pele was the goddess of the volcano, and that she made the fire and the lava come from the volcano so that the Hog Man would not take her from her home. Now, according to the myth, Pele lives at the peak of the mountain and takes care of all the volcanoes in Hawaii. People tell this story of the Goddess Pele to explain the amazing natural power and unpredictability of volcanoes.

DAILY DIRECTIONS

LESSON 1: INTRODUCTION

PELE'S PEAK



4. Introduce the team concept. Read or tell:
You are about to become teams of volcanologists. Pele's Peak is where Pele lives, and in order to keep her happy and prevent the volcano from erupting, you and your Trekking Trio need to study and work hard to successfully climb the mountain each day.
5. Divide students into Trekking Trios (see **Setup Directions #5, Grouping Students** for more information). Set expectations for the cooperative groups. Make sure students understand the importance of teamwork. Explain the team roles and assign each member a position.
6. Distribute a 3" x 5" index card cut in half to each Trekking Trio. Instruct each team to choose a name and create a flag that will represent their team. Have teams consider the color of their flag and what emblem (star, palm tree, volcano, etc.) they might use to symbolize their team. Have students make a larger version of their team flag on 5" x 7" index cards to keep at their desks (optional).
7. Distribute MY LAVA LOG to each student. Provide time for students to decorate the cover of their journals. Assist students in assembling their Lava Logs with lined paper for the inside and construction paper for the back cover. Use staples or string to bind the journal.
8. Display the MOUNTAIN CLIMBING SONG/CHEER transparency. Teach the students how to write a mountain climbing song or cheer using the limerick poetry writing style or cheer format. Get students started, then allow each Trekking Trio to compose their masterpiece! The students will use this song/cheer every time they climb the mountain. Allow trios to share these with the class if time (and desire) permits.
9. Have students record their team song or cheer in their Lava Logs.



A chant or a cheer might be good for the younger students who may have trouble composing a limerick poem.

DAILY DIRECTIONS

LESSON 1: INTRODUCTION

PELE'S PEAK

10. Distribute PEAK POINTS and explain the rubric. Tell students that the quality and completion of their assignments determine their rank as volcanologists (**Expert, Master, Apprentice, or Novice**) and that they should track their own Peak Points throughout the unit on this page.

Extension

- Students work together to make a paper chain using construction paper strips and glue. Students should aim to create a chain 70 feet long. Tell them that 100 of these chains equals the distance to Pele's Peak. This exercise will help students conceive the lengths they will "climb" and will also give them experience in measuring distance.



Depending on student capabilities, allow them to keep track of their own points with PEAK POINTS or you keep track for them.

DAILY DIRECTIONS

LESSON 2: MYTHS

PELE'S PEAK



Whole class instruction



Use your local librarian or media center teacher as a guide to find resources on myths.

Define the word *tsunami* (a huge wave produced by an underwater earthquake or volcano) as you stretch. A tsunami is like a big stretch of the ocean!



If students are not able to record all of the definitions, instruct them to find the definitions on their own.



Lesson 2: Myths

Objectives

- Learn about myths and their importance in early civilizations
- Begin Volcano Vocabulary
- Record responses to literature in Lava Logs
- Write an original myth

Materials

- MY MYTH: PRE-WRITING — *class set*
- MY MYTH: CHECKLIST — *class set*
- Lava Logs — *class set*
- Resource Materials (myths from many cultures)

Warm-up Activity

- *Tsunami Stretch* - This warm-up activity allows students a few minutes to get their brains and bodies awake and functioning before beginning the lesson. Do the Tsunami Stretch as a whole class or allow each team (led by the Veteran Volcanologist) to do their own stretching exercises. Have students stand and complete some stretches. Suggestions include: stand on tiptoes and reach for the ceiling, or bend over and reach for the floor, side stretches, arm stretches, leg stretches, etc.

Procedure

1. Write the Volcano Vocabulary on the board or on chart paper at the beginning of the lesson. Have students record the words in their Lava Logs and encourage them to use these in their myths.
 - Gods/Goddesses
 - Hero/Heroine
 - Myth
 - Pele
 - Tsunami
2. Introduce the day's lesson. Read or tell:

Today we are going to talk about myths and their importance around the world. Remember, we have already learned the myth of Pele. Now, I am going to read some other myths and then you will summon your creative energies to write an original one!

DAILY DIRECTIONS

LESSON 2: MYTHS

PELE'S PEAK

3. Distribute MY MYTH: PRE-WRITING and MY MYTH: CHECKLIST to each student.
4. Define a myth (see **Glossary** on **page 14**).
5. Cover background information about myths and read some selections to the class from your resources. These may include any number of cultures (e.g., Greek, Roman, Norse, Hawaiian, Egyptian, etc.). Identify the natural phenomenon being explained in these myths, and discuss the author's craft.
6. Discuss the elements of a myth with emphasis on plot, purpose, characters, and setting; use MY MYTH: PRE-WRITING as a tool to explain these elements and help students organize their thoughts. Also, highlight the Volcano Vocabulary in your discussion.
7. Review MY MYTH: CHECKLIST with students. This checklist clearly establishes the expectations and the distribution of the points for this exercise. After students have sufficient understanding of the requirements for the myth and have completed MY MYTH: PRE-WRITING, give them time to write an original myth in their Lava Logs.
8. Collect Lava Logs when students finish their myths. Return them to students with feedback before the next lesson.

Extension

- Pretend that Pele has formed a volcano in your backyard. What would it look like? What would your neighbors say about it? Draw a picture of what you might see and write about what is happening in the picture.



If appropriate, introduce the Greek god Hephaestus and the Roman god Vulcan, the equivalent to Pele from those ancient civilizations.

Writing a well-crafted myth is a tough task! Set realistic expectations and guide your students carefully through the writing process as your time allows.



To maximize the language arts/ writing element of this lesson, dedicate plenty of time to myth writing. At least one additional class period, with revising and re-writing, would produce more developed myths.

DAILY DIRECTIONS

LESSON 3: VOLCANOES

PELE'S PEAK



Whole class instruction
and Trekking Trios



Before you begin this lesson, reproduce SCAVENGER HUNT ANSWERS and hide them for the scavenger hunt.

For classes with confident readers and writers, reproduce three sets of SCAVENGER HUNT ANSWERS. When students find an answer, they should write it on the appropriate line, leaving the answer in its hiding place.

For other classes, reproduce one set of answers per Trekking Trio, allowing students to remove the answer and tape or glue the answer on the VOLCANOLOGIST SCAVENGER HUNT sheet.

Lesson 3: Volcanoes

Objectives

- Acquire general knowledge of volcanoes
- Develop Volcano Vocabulary
- Record writing responses and reflections in Lava Logs
- Introduce Fate Cards and begin official trek towards Pele's Peak

Materials

- VOLCANOLOGIST SCAVENGER HUNT — *one per Trekking Trio*
- SCAVENGER HUNT ANSWERS — *three*
- Fate Cards — *as needed*
- Glue or tape (optional) — *one per Trekking Trio*
- Lava Logs — *class set*
- Resource Materials (about volcanoes)
- Student Guides — *class set*
- Volcano Video (optional) — *one*

Warm-up Activity

- *Aloha Air Swimming* - Excite students for the day's lesson by having them stand at their seat and create a forward swimming motion. After a few seconds have students switch to a backstroke motion. After another few seconds have them make a forward motion with their right arm and a backstroke motion with their left arm.

Procedure

1. Instruct students to include the following Volcano Vocabulary in their Lava Logs. Remind them to listen for the words as the lesson proceeds.
 - Aa
 - Active Volcano
 - Archipelago
 - Crater
 - Crust
 - Dormant Volcano
 - Eruption
 - Extinct Volcano
 - Lava
 - Magma
 - Pahoehoe
 - Ring of Fire
 - Volcano

2. Show students a video or read a picture book about volcanoes. After watching the video or sharing the book and its pictures, have students try to define a volcano (possibly through webbing or brainstorming together as a class with information on the board).
3. Convey some basic information about volcanoes to students to reinforce the video or book. Direct students to page 2 in their Student Guides. Read or tell along with students:

Our planet earth is made up of many layers. The top layer of solid rock is called the **crust**. Deep beneath the crust it is so hot that some rock melts. The liquid rock that comes up from the outer core of our earth is called **magma**. A **volcano** forms from a vent or crack in the earth's plates when melted rock and gas explode. Magma pushes its way up through the cracks. This is called a volcanic **eruption**. When magma pours forth on the surface, it is called **lava**. The boiling lava forms fiery rivers and lakes. **Pahoehoe** lava is very hot and fluid. It pours out of the volcano top like brownie batter. It flows around rocks or hills in its path. Pahoehoe cools to have a smooth or ropy surface. **Aa** lava is not as hot. It is less fluid and cools to be very jagged and sharp. It pushes right through things in its path. Sometimes a Pahoehoe lava flow thickens to form an Aa lava flow. All lava cools and hardens to form volcanic rocks (also called *igneous rock*).

Volcanoes are either: 1) **active** (presently erupting) 2) **dormant** (between eruptions) or 3) **extinct** (will never erupt again).



Since the awesome power of a volcano is difficult to truly comprehend, an effective video can particularly enhance the understanding of this natural drama.

If your Media Center has a video specifically on Mount Saint Helens, use that one; or a video about volcanoes in general, such as one from the Eyewitness Video Series, works well.



Refer students to the diagram of the Earth's layers in their Student Guides.



If you have vivid pictures of each type, use them to further demonstrate the different types of eruptions.

DAILY DIRECTIONS

LESSON 3: VOLCANOES

PELE'S PEAK



Refer students to the map of the Ring of Fire in their Student Guides.

Active volcanoes erupt in different ways. During a *quiet eruption*, lava flows freely from the volcano's **crater**, the opening on top of the volcano. This lava may flow many kilometers down the slopes of the volcano. In an *explosive eruption*, molten rock discharges forcefully from the volcano in billowing clouds of volcanic ash and cinders.

The Hawaiian Islands are actually the tops of a chain of volcanic mountains that rise from the ocean floor. The islands are also considered to be an **archipelago**, a group of islands.

Volcanoes can be found all over the world. However, most of them are in the area of the Pacific Ocean called the **Ring of Fire**. This area includes the coasts of North America, South America, Australia, and Asia.

There have been many devastating volcanoes in the world. The most destructive in the United States in recent history was Mount Saint Helens in central Washington. Mount Saint Helens erupted in May of 1980. Sixty people died as hot gases, rocks, and ash covered an area of 230 square miles. Hundreds of houses and cabins were destroyed leaving many people homeless. Miles of highways, roads, and railways were badly damaged. The force of the eruption blew down entire forests as if they were rows of matchsticks. Ash rose into the sky and fell back to earth hundreds of miles away from the volcano. Since then, life has been slowly returning to normal in the areas surrounding this powerful volcano.

DAILY DIRECTIONS

LESSON 3: VOLCANOES

PELE'S PEAK

4. Divide students into Trekking Trios and remind them to rotate roles. The Veteran Volcanologist from the previous day is now the Disaster Prevention Specialist; the Disaster Prevention Specialist is now the Ring of Fire Recorder and the Ring of Fire Recorder is now the Veteran Volcanologist.
5. Give each team VOLCANOLOGIST SCAVENGER HUNT.
6. Introduce the team task. Read or tell:

Today, your Trekking Trio will participate in a scavenger hunt! You are looking for the answers to the questions on VOLCANOLOGIST SCAVENGER HUNT. The answers are hidden in the classroom (or another location you choose). Each team has 30 minutes to locate the answers to all questions. The Trekking Trios that complete the team task successfully will draw a Fate Card.
7. After 30 minutes, assess the status of each Trekking Trio. Determine which teams will choose a Fate Card.
8. As the Veteran Volcanologists draw the Fate Cards, team members may either sing or chant their song or cheer.
9. Move the team flags based upon the results of the Fate Cards on the PELE'S PEAK CHART.
10. Advise the Ring of Fire Recorders to document the outcome of their team Fate Card in their Lava Logs and any observations or reflections on the team's progress.
11. Direct students to write in their Lava Logs. The writing prompt for the day is: "We can only imagine that ancient people were probably terrified of volcanoes. Without all this new information you are learning, how would you explain a volcanic eruption?"

Extension

- Create a diagram of Mount Saint Helens in Washington State. This can be done using poster board. Be sure the diagram is labeled. A cross-section diagram is also acceptable.



Depending on the level of your class, instruct your students to either locate and tape/glue the answers to their sheet or locate and write down the answer on the appropriate line, leaving the answer in its hiding place.

DAILY DIRECTIONS

LESSON 4: VOLCANOES AND VOLCANOLOGISTS

PELE'S PEAK



Whole class instruction
and Trekking Trios

Lesson 4: Volcanoes and Volcanologists

Objectives

- Understand the different kinds of volcanoes
- Learn about the job of a volcanologist
- Create a visual of a volcano
- Expand Volcano Vocabulary
- Write in Lava Logs

Materials

- VOLCANO VISUAL CHECKLIST — *class set*
- Construction paper — *as needed*
- Fate Cards — *as needed*
- Glue — *as needed*
- Lava Logs — *class set*
- Markers, crayons, or colored pencils — *several per Trekking Trio*
- Posterboard or butcher paper — *one piece per Trekking Trio*
- Resource materials (about types of volcanoes)
- Student Guides — *class set*

Warm-up Activity

- *Magma March* - The activity for today is cross-lateral. Arm and leg crossover activities are fun, but they also force both sides of our brain to talk to each other better. Have students march in place while patting opposite knees.

Procedure

1. Instruct students to include the following Volcano Vocabulary in their Lava Logs. Remind them to listen for the words as the lesson proceeds.
 - Cinder Cone Volcano
 - Composite Volcano
 - Seismograph
 - Seismologist
 - Shield Volcano
 - Volcanologist
 - Volcanology
2. Discuss the term volcanology and the job of a volcanologist with students. Direct student to page 4 in their Student Guides.

DAILY DIRECTIONS

LESSON 4: VOLCANOES AND VOLCANOLOGISTS

PELE'S PEAK

Read or tell along with students:

Volcanology is the study of volcanoes. This includes their structure, formation, classification, and the kinds of materials that are ejected from a volcano (ash, dust, lava, and gas). A person who studies volcanoes is called a **volcanologist**.

A volcanologist studies and researches what makes a volcano erupt and how other things like earthquakes impact them. The main reason that volcanologists study volcanoes is to try to predict when they will erupt. Volcanologists use different equipment and instruments to help them predict volcanic eruptions. One of the instruments is a **seismograph**. This instrument records seismic waves or vibrations of the earth.

3. Discuss the different kinds of volcanoes with students. Read or tell:

Volcanoes have produced some of the world's best-known mountains. Mount Etna in Sicily and Mount Kilimanjaro in Africa are volcanic mountains.

There are three types of volcanic mountains: **Shield Volcanoes**, **Cinder Cone Volcanoes**, and **Composite Volcanoes**. These volcanoes differ in size, shape, and the way they are formed.

Shield Volcanoes – In a quiet eruption, the free-flowing lava spreads out over the earth's surface and hardens into rock. Repeated lava flows build a wide mountain with gentle slopes called a Shield Volcano. Shield Volcanoes are the largest type of volcanic mountain. Mauna Loa and Mauna Kea are the two major volcanoes that make up the Hawaiian Islands. Both of these volcanoes rise almost 10 kilometers (6.2 miles) from the ocean floor. Mauna Loa is the largest volcano on earth.



Refer students to pages 4–5 of their Student Guides for the diagrams of these types of volcanoes.

DAILY DIRECTIONS

LESSON 4: VOLCANOES AND VOLCANOLOGISTS

PELE'S PEAK

Cinder Cone Volcanoes – In an explosive eruption, lava spews high into the air. The lava cools and hardens into cinders and ash before falling to the ground. The ashes and cinders along with mud, lava, and rock pile up around the central vent to form a steep Cinder Cone Volcano. These volcanoes are relatively small, with steeper sides than a Shield Volcano. Cinder Cone Volcanoes may form quite rapidly. Mount Saint Helens is a Cinder Cone Volcano.

Composite Volcanoes – A volcanic mountain built up by both lava flows and layers of ash and cinders is called a Composite Volcano. Although not as big as Shield Volcanoes, Composite Volcanoes are generally much larger than Cinder Cones. They have both slow and sticky lava as well as fast-flowing lava. Many Composite Volcanoes are quite famous, either for their classic, cone-shaped peaks, or their powerful, explosive eruptions. Some well-known Composite Volcanoes are Mount Fuji in Japan and Mount Vesuvius in Italy.

4. Divide students into Trekking Trios and remind them to rotate roles. The Veteran Volcanologist from Lesson Three is now the Disaster Prevention Specialist; the Disaster Prevention Specialist is now the Ring of Fire Recorder and the Ring of Fire Recorder is now the Veteran Volcanologist.

5. Introduce the team task. Read or tell:

Today your Trekking Trio must complete a visual of one of the kinds of volcanoes in order to ascend the mountain. You may use any of the available resource materials in the classroom. Label the parts of the volcano and identify which type of volcano it is. Choose either a tear art model or draw a poster. Be creative! You have 30 minutes to bring your volcano to life! Teams that successfully complete this activity will draw a Fate Card.



DAILY DIRECTIONS

LESSON 4: VOLCANOES AND VOLCANOLOGISTS

PELE'S PEAK

6. Distribute VOLCANO VISUAL CHECKLIST to each student. Review the elements. This checklist clearly establishes the expectations for this exercise. After students have sufficient understanding of the requirements for the visual, allow them to begin creating their explosive works of art!
7. After 30 minutes (or less if your students work quickly), assess the status of each Trekking Trio. Determine which teams will choose a Fate Card.
8. As the Veteran Volcanologists draw the Fate Cards, team members may either sing or chant their song or cheer.
9. Move the team flags based upon the results of the Fate Cards on the PELE'S PEAK CHART.
10. Advise the Ring of Fire Recorders to document the outcome of their team Fate Card in their Lava Logs and any observations or reflections on the team's progress.
11. Direct students to write in their Lava Logs.
The writing prompt for the day is: "What do you think it would be like to be a volcanologist? Discuss why you would or would not like to study and research volcanoes."

Extension

- Read about the three types of volcanoes. Write *at least* five sentences about each one. (Encourage your students to use more than five sentences.) Create a Venn diagram showing how they are similar and different.
- Invite a geologist or volcanologist to visit the classroom.
- Write a biography about a volcanologist.

DAILY DIRECTIONS

LESSON 5: PREDICTING ERUPTIONS

PELE'S PEAK



*Whole class instruction
and Trekking Trios*

Lesson 5: Predicting Eruptions

Objectives

- Learn methods to predict volcanic eruptions
- Add Volcano Vocabulary
- Write in Lava Logs

Materials

- PREDICTING VOLCANIC ERUPTIONS — *one per Trekking Trio*
- PREDICTING VOLCANIC ERUPTIONS CODE — *class set*
- Fate Cards — *as needed*
- Lava Logs — *class set*
- Student Guides — *class set*

Warm-up Activity

- *Hula B-O-D-Y Spells* - This activity is a great way to energize students and allow each student to introduce him/herself to Pele, who wants to know the name of every student in the class! Have students stand individually and spell their names using their bodies to introduce themselves. They should try to form letters using their arms and legs.

Procedure

1. Instruct students to include the following Volcano Vocabulary in their Lava Logs. Remind them to listen for the words as the lesson proceeds.
 - Eruption cloud
 - Pyroclastic flows
2. Discuss with students the following information about predicting volcanoes. Direct students to page 5 in their Student Guide. Read or tell along with students:



Adjust this information to the level of your students. Assure them that although volcanoes and pyroclastic flows are certainly dangerous, your students are not in imminent danger of death by volcano!

Volcanologists study volcanoes to help predict when an eruption may occur. There are warning signs before an eruption takes place. Some of these are: escaping gases from the mountain, increasing levels of an invisible gas called sulfur dioxide, emission of ash, and an increase in the size of the lava dome. By measuring the earth's movements and the bulging of the volcanoes' sides, scientists have been able to give warning of impending eruptions.

DAILY DIRECTIONS

LESSON 5: PREDICTING ERUPTIONS

PELE'S PEAK

There are approximately half a billion people that live close to the 600 or so active volcanoes around the world. Scientists think that more than 300 of these volcanoes are so active that they should be watched carefully. Not only are active volcanoes a threat, but long-dormant volcanoes can come back to life unexpectedly!

During an eruption, rivers of hot ash and gases can rush down the mountain. These rivers are called **pyroclastic flows**. A column of gases, ash, and rock can rise from a vent or crater forming an **eruption cloud**. Volcanoes are dangerous in many ways, with their poisonous gases, ash falls, flows of molten rock, and fires. The early warnings of volcanologists and other scientists save many people's lives.

3. Divide students into Trekking Trios and remind them to rotate roles. The Veteran Volcanologist from Lesson Four is now the Disaster Prevention Specialist; the Disaster Prevention Specialist is now the Ring of Fire Recorder and the Ring of Fire Recorder is now the Veteran Volcanologist.
4. Distribute PREDICTING VOLCANIC ERUPTIONS to each Trekking Trio and PREDICTING VOLCANIC ERUPTIONS CODE to each student.
5. Introduce the team task. Read or tell:

Natives fear that Pele's Peak is about to erupt! As practicing volcanologists, you must uncover the warning signs and assure the people that this disaster will not occur. Your Trekking Trio has 30 minutes to complete PREDICTING VOLCANIC ERUPTIONS. You must decipher the PREDICTING VOLCANIC ERUPTIONS CODE to complete the first part of the activity. Then, pool your group knowledge to finish the task. Each team that meets this challenge will draw a Fate Card.



Depending on the ability level of your class, you may want to have student trios divide their list and work independently to solve two to three of the messages on PREDICTING VOLCANIC ERUPTIONS CODE. Then, have students pool their knowledge to complete PREDICTING VOLCANIC ERUPTIONS as a team.



DAILY DIRECTIONS

LESSON 5: PREDICTING ERUPTIONS

PELE'S PEAK



6. Use the following answer key to evaluate the work of each trio.
 1. Mountainside becomes bigger
 2. Movement under the mountain
 3. Escaping gases
 4. Increase level of sulfur dioxide
 5. Increase in lava dome size
 6. Ash coming out
 7. Steam rising from vents
7. After 30 minutes, assess the status of each Trekking Trio. Determine which teams will choose a Fate Card.
8. As Veteran Volcanologists draw the Fate Cards, team members may either sing or chant their song or cheer.
9. Move the team flags based upon the results of the Fate Cards on the PELE'S PEAK CHART.
10. Advise the Ring of Fire Recorders to document the outcome of their team Fate Card in their Lava Logs and any observations or reflections on the team's progress.
11. Direct students to write in their Lava Logs. The writing prompt for the day is: "What do you think would be the most difficult job of a volcanologist?"

Extension

- Have students create their own message and code for other teams to decipher using facts learned from PELE'S PEAK.

DAILY DIRECTIONS

LESSON 6: HIGHLIGHTING HAWAII

PELE'S PEAK

Day 6: Highlighting Hawaii

Objectives

- Increase Volcano Vocabulary
- Learn background information about Hawaii
- Identify specifics about location, climate, temperature, and exports of the Islands
- Write in Lava Logs

Materials

- CREATING A TRAVEL BROCHURE — *class set*
- ISLAND INFORMATION — *class set*
- Atlas — *several*
- Blank Paper (8.5" x 11") — *one per Trekking Trio*
- Fate Cards — *as needed*
- Glue — *one per Trekking Trio*
- Hawaii vacation brochures — *several*
- Lava Logs — *class set*
- Markers, crayons, or colored pencils — *several per Trekking Trio*
- Resource Materials (about Hawaii including a map with both the continental United States and Hawaii)
- Scissors — *class set*
- Student Guides — *class set*
- Tape — *one roll per Trekking Trio*

Warm-up Activity

- “Pele Says” - The purpose of this activity is to work both sides of the brain, enhancing the attention span and the learning process! Have students stand and stretch. Play “Pele Says” for five minutes. It is good to work in some cross-lateral movements and some marching movements.

Procedure

1. Instruct students to include the following Volcano Vocabulary in their Lava Logs. Remind them to listen for the words as the lesson proceeds.
 - Aloha
 - Hawaii
 - Kauai
 - Lanai
 - Maui
 - Molokai
 - Oahu



*Whole class instruction
and Trekking Trios*



8.5" x 11" is only a recommended size. You may want to use a larger piece of paper for this project.



“Pele Says” is simply the familiar game of “Simon Says” with a Pele twist!

DAILY DIRECTIONS

LESSON 6: HIGHLIGHTING HAWAII

PELE'S PEAK



Have students use an atlas and locate San Francisco and the Hawaiian Islands.



If you have travel books or pictures you can show, do so at this time.

2. Share the following information about Hawaii with students. Direct student to page 6 in their Student Guides. Read or tell along with students:

Hawaii is made up entirely of islands located in the middle of the Pacific Ocean (remember—it is an archipelago). Honolulu – the capital and largest city – is about 2,400 miles west of San Francisco, California.

Hawaii is world-famous for its beauty and pleasant climate. It has deep blue seas, brilliant flowers, graceful palm trees, and plunging waterfalls. The friendliness of its people gives Hawaii the nickname of the Aloha State. **Aloha** is the Hawaiian word for love. Approximately one million people live in the state of Hawaii.

The six major islands of Hawaii have many unique features!

Oahu – “The Gathering Place” – Hawaii’s island chiefs used to meet on Oahu, the third-largest Hawaiian island, and that is how it got its name. Almost three-quarters of the people in Hawaii live on Oahu. Honolulu, the capital, is Oahu’s major city. Honolulu is the economic, social, and political center of the Hawaiian Islands. Many tourists visit the beachfront resorts in Waikiki every year. Pearl Harbor, a major World War II site, is a bay on Oahu. Oahu’s rainforests, beaches, and cliffs blend with the sugarcane and pineapple fields to create an island of natural splendor.

DAILY DIRECTIONS

LESSON 6: HIGHLIGHTING HAWAII

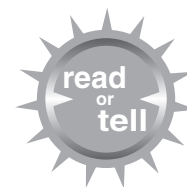
PELE'S PEAK

Maui – “The Valley Island” – “Maui No Ka Di,” Maui is the best. People use this phrase to describe Hawaii’s second largest island. The town of Lahaina served as Hawaii’s capital in the early 1800s. Agriculture and shipping helped create jobs for people on Maui. Haleakala National Park is home to a large, extinct crater that is 25 square miles and 3,000 feet deep! The island has many tropical forests with waterfalls and natural pools, and a coastal string of beaches and resorts.

Kauai – “The Garden Island” – Kauai is the eastern-most and oldest of the major islands. The island looks like a circle made of volcanic rock. Kauai is very lush and tropical with magnificent gardens and plummeting waterfalls. Nature created a gorgeous island by carving great canyons, valleys, mountains, and sea cliffs from the long extinct volcano called Waialeale. Today, Waialeale’s peak is considered the wettest spot on earth, averaging between 450 and 650 inches of rain annually!

Molokai – “The Lonely Island” – Until about 50 years ago Molokai was known as “The Lonely Island” because people who suffered from a deformative disease called leprosy lived there. They were segregated by the natural isolation of the Kalaupapa Peninsula.

Lanai – “The Pineapple Island” – Pineapple still grows in abundance on Lanai, the smallest of Hawaii’s main islands. Most of Lanai’s 2,400 people live in the plantation town of Lanai City. Lanai has many forests and beaches. Visitors enjoy snorkeling and scuba diving in some of Hawaii’s clearest water.



DAILY DIRECTIONS

LESSON 6: HIGHLIGHTING HAWAII

PELE'S PEAK



Hawaii – “The Big Island” – More than twice as big as all the other islands combined, Hawaii is an island of volcanic drama, great natural diversity, and powerful links to the Polynesian past. The big island’s rebuilt temples provide unique insights into the Hawaii of myth and legend. Its two active volcanoes, Kilauea and Mauna Loa (in Hawaii Volcanoes National Park) are among the safest yet most active volcanoes in the world.

Hawaii has so much to offer and explore! The dramatic landscape creates a spectacular backdrop for the human influence of the state, including cattle ranches, sugar plantations, macadamia nut orchards, coffee farms, and tropical flower nurseries.



Depending on the ability level of your class, you may want to have student trios divide the questions on ISLAND INFORMATION and work independently to answer specific questions. Then, have students pool their knowledge to complete their travel brochure as a team.



If you created a travel brochure to display during the unit, use it as a model.

3. Divide students into Trekking Trios and remind them to rotate roles. The Veteran Volcanologist from Lesson Five is now the Disaster Prevention Specialist; the Disaster Prevention Specialist is now the Ring of Fire Recorder and the Ring of Fire Recorder is now the Veteran Volcanologist.
4. Distribute CREATING A TRAVEL BROCHURE and ISLAND INFORMATION to each student.
5. Assign each Trekking Trio one of the following islands: Hawaii, Kauai, Lanai, Maui, Molokai, or Oahu.
6. Introduce the team task. Read or tell:

Today your Trekking Trio must cooperatively create a Hawaiian travel brochure featuring one of the six major islands. The brochure should include information about the island such as: climate, vegetation, land types, exports, population, major attractions, etc. You may use the internet, encyclopedias, or other resource materials on Hawaii in the classroom. The brochure should also include a map of the six islands identifying the one your team has been assigned. Make your brochure exciting and interesting to attract visitors to the island! Completing an exciting and interesting travel brochure earns your team a Fate Card.

DAILY DIRECTIONS

LESSON 6: HIGHLIGHTING HAWAII

PELE'S PEAK

8. Instruct students to carefully read the instructions for CREATING A TRAVEL BROCHURE before beginning. Review the elements of the Travel Brochure Checklist (on the bottom of CREATING A TRAVEL BROCHURE) with students. This checklist clearly establishes the expectations for this assignment.
9. After students have sufficient understanding of the requirements for this assignment, allow them time to be creative and resourceful as they work on their brochures. Inform teams that they will present their work to the class during the next lesson (optional).
10. Assess the progress of each Trekking Trio. Determine which teams will choose a Fate Card.
11. As Veteran Volcanologists draw the Fate Cards, team members may either sing or chant their song or cheer.
12. Move the team flags based upon the results of the Fate Cards on the PELE'S PEAK CHART.
13. Advise the Ring of Fire Recorders to document the outcome of their team Fate Card in their Lava Logs and any observations or reflections on the team's progress.
14. Direct students to write in their Lava Logs. The writing prompt for the day is: "My favorite island is _____ because _____."

Extension

- Create a map of the world showing the location of various volcanoes.



You may need to allot extra time today for teams to complete their travel brochures.

DAILY DIRECTIONS

LESSON 7: THE GOOD AND BAD VOLCANOES

PELE'S PEAK



Day 7: The Good and Bad of Volcanoes

Objectives

- Learn about the negative and positive effects of a volcano
- Relate knowledge about volcanoes to the formation of the Hawaiian Islands
- Write in Lava Logs

Materials

- Ball (small) — *one*
- Fate Cards — *as needed*
- Lava Logs — *class set*

Warm-up Activity

- *Ring of Fire Review* - This activity provides a fun review, while waking everyone up at the same time! Have students stand in a circle around the room. Review Volcano Vocabulary by playing a ball toss game for about 5 minutes. The teacher will always toss the ball. This way he/she can call out the vocabulary definition as the ball is tossed to the next student. Each student will have 10 seconds to call out the correct term.

Procedure

1. Divide students into Trekking Trios and remind them to rotate roles. The Veteran Volcanologist from Lesson Six is now the Disaster Prevention Specialist; the Disaster Prevention Specialist is now the Ring of Fire Recorder and the Ring of Fire Recorder is now the Veteran Volcanologist.

2. Allow each team time to finish their travel brochures and present them to the class (optional).

3. Introduce the team task. Read or tell:

Today, we are going to discuss the negative and positive effects of volcanoes. Pele would like you to understand that good things can come from natural disasters. Your Trekking Trio must listen carefully to the class discussion. Cooperative behavior and participation will determine whether your team earns a Fate Card.



Display the students' travel brochures in the classroom as decorations for the luau.



DAILY DIRECTIONS

LESSON 7: THE GOOD AND BAD VOLCANOES

PELE'S PEAK

4. Ask students: **“How can a volcanic eruption be good?”**
Discuss this question and write down the answers on the board.
Guide students to deduce the positive aspects of a volcanic eruption: liberated gases (carbon dioxide and water vapor), the formation of new land, and the addition of nutrients to the land.
5. Raise the question: **“How can a volcanic eruption be bad?”**
Discuss this question and write down the answers on the board.
Guide students to conclude: the release of lava, the release of poisonous gases, the emission of ash (killing people and crops), the formation of tidal waves, and the effect on weather worldwide.
6. Determine which teams will choose a Fate Card. Award Fate Cards based on cooperative behavior and class participation.
7. As Veteran Volcanologists draw the Fate Cards, team members may either sing or chant their song or cheer.
8. Move the team flags based upon the results of the Fate Cards on the PELE'S PEAK CHART.
9. Advise the Ring of Fire Recorders to document the outcome of their team Fate Card in their Lava Logs and any observations or reflections on the team's progress.
10. Direct students to write in their Lava Logs. The writing prompt for the day is: “You have been assigned the topic ‘Volcanoes make the world a better place.’ Your job is to convince a group of people that this notion is true. Write a persuasive argument.”

Extension

- Create a cross-section diagram showing how a volcano erupts. The diagram should be labeled.



Now would be a good time to talk about the formation of the Hawaiian Islands from various volcanoes in more depth.

DAILY DIRECTIONS

LESSON 8: VOLCANO RESEARCH

PELE'S PEAK



Day 8: Volcano Research

Objectives

- Research a particular volcano
- Prepare presentation
- Write in Lava Logs

Materials

- VOLCANOES — *one per Trekking Trio*
- VOLCANO RESEARCH — *class set*
- VOLCANO RESEARCH PROJECT CHECKLIST — *class set*
- Fate Cards — *as needed*
- Lava Logs — *class set*

Warm-up Activity

- *Hawaiian Air Surfing* - This activity improves students' gross motor skills and their ability to listen and follow directions. Have students stand by their seats and pretend they are on a surfboard in the Pacific. Students should stand and use their arms as surfers would do. Create different scenarios for them such as: a huge wave is coming behind you; you have ridden the last wave of the day and you are drifting to shore; and wipe-out!

Procedure

1. Divide students into Trekking Trios and remind them to rotate roles. The Veteran Volcanologist from Lesson Seven is now the Disaster Prevention Specialist; the Disaster Prevention Specialist is now the Ring of Fire Recorder and the Ring of Fire Recorder is now the Veteran Volcanologist.

2. Introduce the volcano research project. Read or tell:

Natives report steam rising from Pele's Peak. Only you can prevent Pele from erupting. Appease the goddess by applying what you have learned in this unit to research and present a volcano in the form of a skit, song, or speech. Nobody knows volcanoes better than Pele. Show her how much you have learned. If you do a good job, Pele will make certain that your team draws a positive Fate Card!



Separate positive Fate Cards so that Pele can reward deserving trios.

DAILY DIRECTIONS

LESSON 8: VOLCANO RESEARCH

PELE'S PEAK

3. Distribute one VOLCANOES to each Trekking Trio and VOLCANO RESEARCH and VOLCANO RESEARCH PROJECT CHECKLIST to each student.
4. Have each Trekking Trio choose a particular volcano to research.
5. Review VOLCANO RESEARCH and VOLCANO RESEARCH PROJECT CHECKLIST with students. The checklist clearly establishes the expectations for this assignment.
6. After students have sufficient understanding of the requirements for this assignment, advise them that Pele wants to know the answers to the six questions on VOLCANO RESEARCH today!
7. Direct students in each trio to divide the questions on VOLCANO RESEARCH. Allow students time to gather information on their volcano.
8. Once teams have answered the questions, they may begin working on their skit, song, or speech.
9. After 60 minutes, assess which Trekking Trios successfully completed the questions and worked well together, earning the opportunity to select a positive Fate Card.
10. As Veteran Volcanologists draw the Fate Cards, team members may either sing or chant their song or cheer.
11. Move the team flags based upon the results of the Fate Cards on the PELE'S PEAK CHART. One or more of the teams should be close to finishing the race to the top!
12. Advise the Ring of Fire Recorders to document the outcome of their team Fate Card in their Lava Logs and any observations or reflections on the team's progress.
13. Direct students to write in their Lava Logs. Prompt students to write about some interesting facts they learned about their research volcano.

Extension

- Create a board game about volcanoes.



Make sure Trekking Trios have selected a variety of different volcanoes to research.



Once students have found their answers instruct them to meet with their Trekking Trio and share their answers. This exercise holds each student accountable for his/her work.

DAILY DIRECTIONS

LESSON 9: VOLCANO PRESENTATION

PELE'S PEAK



"Pele Pokey" is simply the familiar game of "Hokey Pokey" with a Pele twist!



Read this note only if every group's presentations met your minimum requirements and all teams earn a positive Fate Card. Be sure to separate only the positive cards!

Lesson 9: Volcano Presentation

Objectives

- Finish presentation preparation
- Present research on a volcano
- Write in Lava Logs

Materials

- Construction paper — *as needed*
- Fate Cards — *as needed*
- Lava Logs — *class set*
- Markers, crayons, or colored pencils — *several per Trekking Trio*
- Poster board or butcher paper — *as needed*

Warm-up Activity

- *"Pele Pokey"* - This activity will hone students' listening skills and excite their minds and bodies for the day's lesson! Have students stand in a circle around the room. Play *"Pele Pokey"* for five minutes. Tell students that the circle represents the mouth of a volcano and that they must follow directions or Pele might make the volcano erupt.

Procedures

1. Divide students into Trekking Trios and remind them to rotate roles. The Veteran Volcanologist from Lesson Eight is now the Disaster Prevention Specialist; the Disaster Prevention Specialist is now the Ring of Fire Recorder and the Ring of Fire Recorder is now the Veteran Volcanologist.
2. Allow students time to practice their skit, song, or speech and to create their visuals.
3. Have each team present their volcano and assess their performance.
4. Read or tell:

No more steam has been reported rising from Pele's Peak. The Natives thank you and want to hold a luau in your honor; and Pele is so pleased with your presentations that she would like all Trekking Trios to choose a Fate Card!

DAILY DIRECTIONS

LESSON 9: VOLCANO PRESENTATION

PELE'S PEAK

5. As Veteran Volcanologists draw the Fate Cards, team members may either sing or chant their song or cheer.
6. Move the team flags based upon the results of the Fate Cards on the PELE'S PEAK CHART. One or more of the teams might reach the top!
7. Advise the Ring of Fire Recorders to document the outcome of their team Fate Card in their Lava Logs and any observations or reflections on the team's progress.
8. Direct students to write in their Lava Logs. Prompt students to write about some interesting facts they learned from other students' presentations.
9. Before students leave for the day, tell them to think about what type of volcano (Shield, Cinder Cone, or Composite) they want to build during Lesson 10!

Extension

- Write a letter to your parents describing the volcano you researched.

DAILY DIRECTIONS

LESSON 10: BUILDING A VOLCANO

PELE'S PEAK



You can also make volcanoes with sand. The erosion of the volcano is a bit more dramatic!



Lesson 10: Building a Volcano

Objectives

- Make clay model of a volcano
- Take posttest
- Prepare for the luau

(Note: The volcanoes need to dry overnight so plan accordingly!)

Material

- POSTTEST — *class set*
- LUAU SKIT — *as needed*
- Fate Cards — *as needed*
- Lava Logs — *class set*
- Modeling clay — *two sticks per Trekking Trio*
- Paintbrush — *one per Trekking Trio*
- Permanent marker — *one per Trekking Trio*
- Small jar — *one per Trekking Trio*
- Stryfoam plate — *one per Trekking Trio*
- White glue — *one bottle per Trekking Trio*

Warm-up Activity

- *Eruption Exercises* - Have each Trekking Trio lead a stretching exercise or cross-lateral exercise before beginning the lesson.

Procedure

1. Divide into Trekking Trios and remind students to rotate roles. The Veteran Volcanologist from Lesson Nine is now the Disaster Prevention Specialist; the Disaster Prevention Specialist is now the Ring of Fire Recorder and the Ring of Fire Recorder is now the Veteran Volcanologist.
2. Introduce the team task. Read or tell:

Today Pele wants your Trekking Trio to build a model volcano. Keep in mind this activity is your last chance to earn a Fate Card and reach Pele's Peak!
3. To begin building the volcano, have each team put their name on the edge of the plate with a permanent marker and place the jar in the center of the plate.

DAILY DIRECTIONS

LESSON 10: BUILDING A VOLCANO

PELE'S PEAK

4. Instruct students to roll out their clay sticks and begin wrapping the clay around the jar starting at the bottom. Make sure students press the clay against the jar as they apply it. Allow students to work with the clay to shape it into a volcano around the jar.
5. Direct each trio to use a paintbrush to apply white glue on the volcano coating the whole surface. After the first coat dries, have students apply a second coat. (Each volcano should have a thick coat of glue.)
6. Tell students to make sure the inside of their jar is dry and clean.
7. Leave the volcanoes to dry overnight so that they harden.
8. Assess the status of each Trekking Trio. Determine which teams will choose a Fate Card.
9. As Veteran Volcanologists draw the Fate Cards, team members may either sing or chant their song or cheer.
10. Move the team flags based upon the results of the Fate Cards on the PELE'S PEAK CHART. One or more of the teams should have reached the top!
11. Advise the Ring of Fire Recorders to document the outcome of their team Fate Card in their Lava Logs and any observations or reflections on the team's progress.
12. Distribute the POSTTEST and allow students time to complete it. Use this test to gauge student learning through the course of the unit.
13. Plan for the presentation at the luau. Creating a skit is a good way to demonstrate what students have learned during PELE'S PEAK. *A sample presentation, LUAU SKIT, is included within the unit.*

If you use LUAU SKIT, we recommend that you cut each numbered part into a strip for students to read or memorize. Allow them to take their part home to practice reading. On the day of the skit, arrange students in order of their part to facilitate a smooth flow. Also, display visual aids for guests as students read. A map of the Hawaiian Islands and images of volcanoes would be useful visuals during the skit.

Extension

- Make Hawaiian leis with paper or real flowers.

DAILY DIRECTIONS

CULMINATION

PELE'S PEAK



For your convenience, set the materials for the volcanoes on trays for each trio before you begin the culmination.



Welcome the parents into your Hawaiian paradise by presenting them with leis made by the students.

This activity can be messy. Make sure you have paper towels handy in case the eruptions are too explosive!

Culmination

Objectives

- Perform skit or give presentation
- Erupt volcanoes
- Celebrate accomplishments

Materials

- VOLCANOLOGIST CERTIFICATE — *class set*
- Baking soda — *one teaspoon per Trekking Trio*
- Decorations
- Hawaiian food
- Hawaiian music
- Lava Logs — *class set*
- Liquid soap — *one bottle per Trekking Trio*
- Plastic spoon — *one per Trekking Trio*
- Red food coloring — *one bottle per Trekking Trio*
- Ribbons (for students that reached Pele's Peak) — *as needed*
- Vinegar — *eight ounces per Trekking Trio*

Procedure

Before the parents arrive:

1. Rehearse the presentation.
2. Have students write their final Lava Log entry. Encourage them to reflect on the whole unit. They should consider what they learned and what they enjoyed the most.
3. Ask students to display materials they have made throughout the unit. Have students compile all paper activities in their Lava Logs and place them on their desks.

As parents arrive:

4. Welcome parents into your classroom.

After the parents arrive:

5. Set the stage for students to perform a skit or give a presentation.
6. Have each team get their volcano they made during Lesson 10. Supervise as Trekking Trios erupt their volcanoes.

PELE'S PEAK

7. **Erupting the Volcano**
 - Give each trio an eight-ounce cup of vinegar. Have them add a drop of red food coloring and a drop of liquid soap to the vinegar.
 - Instruct students to put a teaspoon of baking soda into their volcanoes and begin pouring the vinegar mixture over the baking soda until the liquid starts to bubble out the top of the volcano as it erupts.
8. Distribute a VOLCANOLOGIST CERTIFICATE to each student (with the appropriate title) for completing PELE'S PEAK.
9. Award ribbons to each Trekking Trio that reached the top.
10. Enjoy the luau!



Before the luau, determine which students earned the title of Expert, Master, Apprentice, or Novice Volcanologist using the 4-point rubric average or mode.

Dear _____,

I am a student at _____ School and we are studying volcanoes and volcanologists. I would like for you to tell me about your job. Here are some questions that may help you in sending us some information.

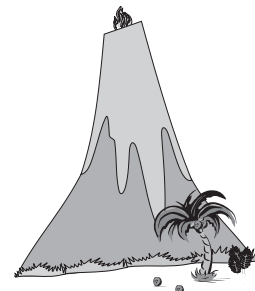
1. Explain exactly what you do.
2. What kind of instruments do you use?
3. What kind of readings from instruments do you take when studying volcanoes?
4. What are some warning signs?
5. Are you able to accurately predict when volcanoes are going to erupt?
6. What is the scariest part of your job?

7. _____

8. _____

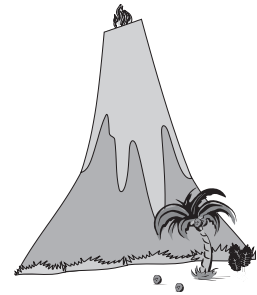
Thank you for your help. The answers to these questions will be helpful to my classmates and me as we learn about volcanoes.

Sincerely,



Dear Students and Parents:

Have you ever wondered what it would be like to study a volcano? Well you are about to find out. Our class is embarking on a journey that will take us to the beautiful Hawaiian Islands as well as make each of us an expert in volcanology. PELE'S PEAK is an interactive unit of study that combines the study of Hawaii with the study of volcanoes.



Students will be working in small cooperative learning teams or Trekking Trios. Each team will complete certain tasks as they make their way to the top of Pele's Peak.

There is a short research section with this unit as students find information about one of the Hawaiian Islands and a famous volcano. Students will receive information about both of those assignments later. All of the research and writing will be done in the classroom.

As part of PELE'S PEAK, we will have a culmination to celebrate our accomplishments. If you are available to help coordinate, decorate, or supply food for our luau, please let me know. I will need to meet with those who can help to organize what we will need for the day. If you can be of assistance, please complete the following information and return it to me by _____.

This is an exciting adventure full of hands-on learning. I am looking forward to our journey to the peak.

Thank you in advance for your help.

Sincerely,

.....

_____ I am available to help coordinate the event. (This will include calling others to organize what kind of food, decorations, etc.)

_____ I can help supply food for the luau.

_____ I can help with decorations in the classroom the afternoon before the luau.

_____ I am available to assist wherever you need me.

Parent signature



LUAU INVITATION

PELE'S PEAK

Dear Parents:

This letter is to confirm the date and time for our class luau as a culmination to PELE'S PEAK. We are excited about all the things we will be able to share with you at our celebration.

Please make plans now to attend our special afternoon luau on _____ beginning _____. We look forward to seeing you there. Aloha!

Sincerely,

Please complete the information below and return it by _____.

_____ I will be attending the luau.

_____ I will be bringing _____ people with me.

_____ I will not be able to attend the celebration luau.

Parent signature



Dear Parents:

This letter is to confirm the date and time for our class luau as a culmination to PELE'S PEAK. We are excited about all the things we will be able to share with you at our celebration.

Please make plans now to attend our special afternoon luau on _____ beginning _____. We look forward to seeing you there. Aloha!

Sincerely,

Please complete the information below and return it by _____.

_____ I will be attending the luau.

_____ I will be bringing _____ people with me.

_____ I will not be able to attend the celebration luau.

Parent signature



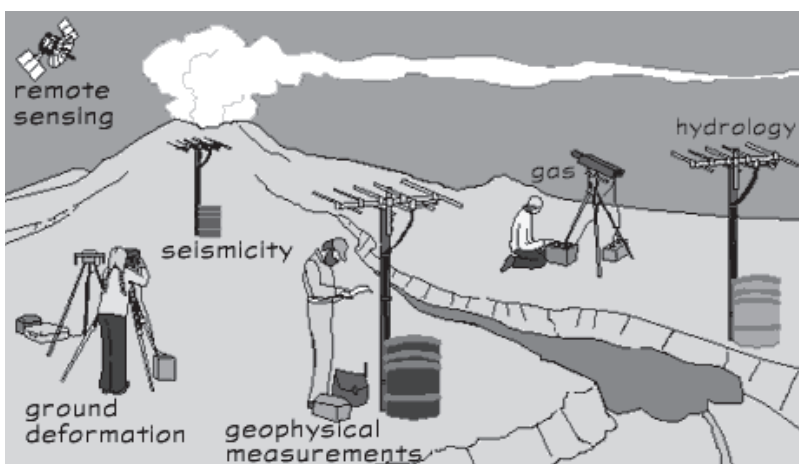
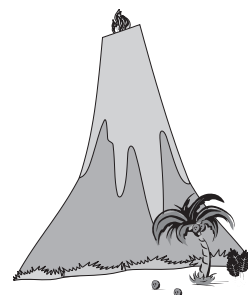
PRE/POSTTEST



PELE'S PEAK

Circle True or False to answer the following questions.

1. **True or False:** A volcano is a crack in the earth through which molten rock and gas erupt.
2. **True or False:** A volcano that is presently erupting is called a *dormant volcano*.
3. **True or False:** A volcanic eruption could be classified as a *quiet eruption*.
4. **True or False:** An *archipelago* is an underwater arch-shaped bridge.
5. **True or False:** Mount Saint Helens was the most devastating volcano in recent United States history.
6. **True or False:** All volcanoes erupt regularly.
7. **True or False:** Most of the active volcanoes in the world are located in the Atlantic Ocean in an area known as the *Ring of Fire*.
8. **True or False:** A *volcanologist* is someone who studies volcanoes.
9. **True or False:** A volcanic eruption spews lava.
10. **True or False:** *Volcanologists* accurately predict volcanic eruptions.





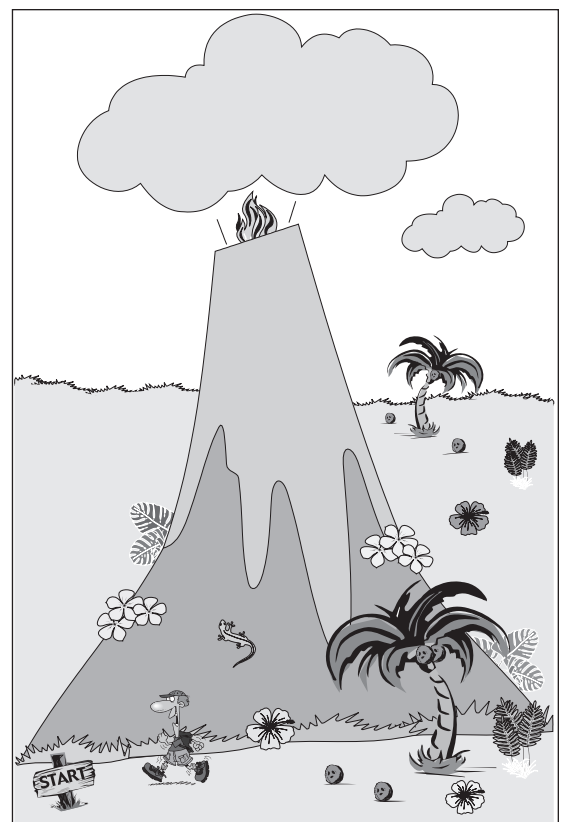
PEAK PREPARATION

PELE'S PEAK

1. What do I want to learn from this unit?

2. How can I do my best to learn these things?

3. Why is it important for me to learn these things?



PELE'S PEAK

MY LAVA LOG

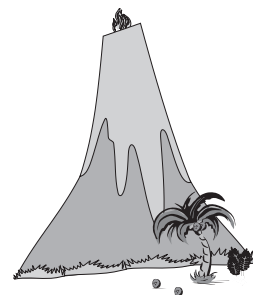
NAME _____

START



MOUNTAIN CLIMBING SONG/CHEER

PELE'S PEAK



Song Example

There was a volcano called Pele's Peak,
That challenged the climbers to daily seek;
An adventure so high,
Way up in the sky,
So come on along for a quick sneak peek.

Line 1 _____ a

Line 2 _____ a

Line 3 _____ b

Line 4 _____ b

Line 5 _____ a

Cheer Example

Go team, Go!
Reach For The Top
Climb that peak, climb that peak
Here We Go, Team, Here We Go

PEAK POINTS

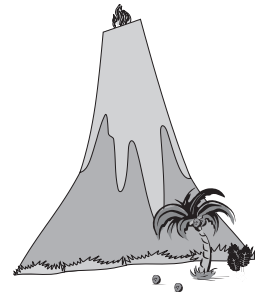


PELE'S PEAK

It is important that you complete all activities within the specified time limit.
Do your best work!

My Rubric Scores (1–4)

- _____ Peak Preparation (Lesson 1)
- _____ Original Myth (Lesson 2)
- _____ Volcano Vocabulary (Lessons: 2, 3, 4, 5, and 6)
- _____ Volcanologist Scavenger Hunt (Lesson 3)
- _____ Volcano Visual (Lesson 4)
- _____ Predicting Volcanic Eruptions (Lesson 5)
- _____ Hawaii Travel Brochure (Lesson 6)
- _____ The Good and Bad of Volcanoes: Cooperative Behavior & Participation (Lesson 7)
- _____ Volcano Research Project (Lesson 8/9)
- _____ Volcano Model (Lesson 10)
- _____ Posttest (Lesson 10)
- _____ **Score Earned Most Often**



Rubric Score	Qualitative Description
4	Expert: You exceeded the standard for this activity, doing more than expected. You consistently, willingly and actively mastered the assignment. Wow!
3	Master: You met the standard for this activity, doing what was expected. You demonstrated understanding with good quality.
2	Apprentice: You nearly met the standard for this activity but still need a little extra. You most likely either demonstrated an inconsistent effort or misunderstood the content or expectations.
1	Novice: You have not met the standard in content and/or in quality. You need to re-do the assignment.



MY MYTH: PRE-WRITING

PELE'S PEAK



Setting (Where?)

Characters (Who?)

Purpose (Why?)
(What natural phenomenon am I trying to explain?)

Plot (What?)

MY MYTH: CHECKLIST



PELE'S PEAK

Purpose - (The “why” of the myth)

What natural event (earthquake, hurricane, fire, volcano, thunder, snow, etc.) are you trying to explain with your myth?



Characters - (The “who” of the myth)

Create at least three people (your heroes and heroines) that are important in your myth.

Describe:

- How they look
- How they communicate
- What they believe
- What they feel
- How they act

Create:

- Interesting personalities with vivid details

Setting - (The “where” and “when” of the myth)

Describe the *place* and *time* of your story:

- Use vivid details such as *a deep, dark canyon with a loud stream running through the middle and long ago, in the time of dragons and castles.*

Plot - (The “what” of the myth)

The plot tells what is happening in your myth. Every myth has:

- A main idea
- A problem that the hero or heroine solves
- An ending that follows the high point of the story

Sentences and writing structure

Write complete sentences and use your best writing skills.

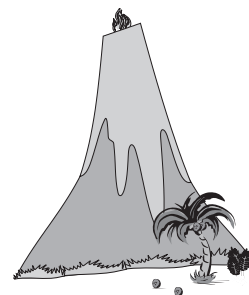
General Comments:



VOLCANOLOGIST SCAVENGER HUNT

PELE'S PEAK

1. What is a volcano?



2. What makes a volcano erupt?

3. What are the two types of Hawaiian lava? How are they different?

4. Describe the most violent volcanic event in the United States.

5. Where are most of the world's volcanoes found?

6. What is an archipelago? Give one example of an archipelago.

SCAVENGER HUNT ANSWERS



PELE'S PEAK

Duplicate answers and cut apart. Mount these on construction paper and hide them around the classroom (or another location you choose). Give students 30 minutes to locate and match or write down the answers on VOLCANOLOGIST SCAVENGER HUNT.

✂

1. A volcano is a geological landform created by magma and layers of lava, rock, ash, and other sediment.

✂

2. Deep beneath the earth's crust it is so hot that rock melts. This melted or molten rock is called magma. As the heat increases and pressure builds, cracks form in the earth's crust. The magma is then able to push its way up through the cracks. This is called a volcanic eruption.

✂

3. Lava is magma that has reached the surface. There are two kinds of Hawaiian lava: *aa* and *pahoehoe*. Aa contains rough angular fragments. Pahoehoe has a smooth or ropy surface. When lava cools and hardens, it forms volcanic rocks.

✂

4. The eruption of Mount Saint Helens was the most destructive in the recent history of the United States. Sixty people lost their lives as hot gases, rocks, and ashes covered an area of 230 square miles. The force of the eruption was so great that entire forests were blown down like rows of matchsticks.

✂

5. Most of the world's volcanoes are found along the Ring of Fire.

✂

6. An archipelago is a group of islands. Hawaii is one example of an archipelago.

✂



VOLCANO VISUAL CHECKLIST

PELE'S PEAK

Content

The content includes:

- Type of volcano clearly depicted and identified
- Volcano parts clearly labeled



Quality

The quality includes:

- Overall presentation (neatness and look)

= Rubric Score

General Comments:



Content

The content includes:

- Type of volcano clearly depicted and identified
- Volcano parts clearly labeled



Quality

The quality includes:

- Overall presentation (neatness and look)

= Rubric Score

General Comments:

PREDICTING VOLCANIC ERUPTIONS



PELE'S PEAK

A.) Identify seven things that help volcanologists predict a volcanic eruption.

1. _____

2. _____

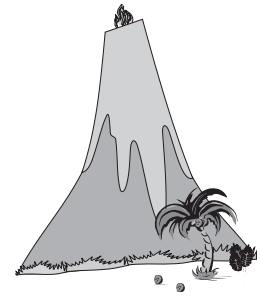
3. _____

4. _____

5. _____

6. _____

7. _____



B.) What do volcanologists use to measure movement under the mountain?

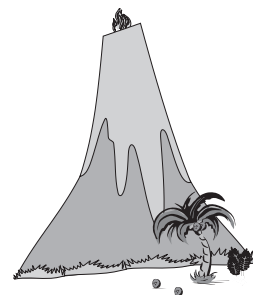
C.) Identify 5 questions you would like to ask a volcanologist.



PREDICTING VOLCANIC ERUPTIONS CODE

PELE'S PEAK

Using the following code to identify seven things that help volcanologists predict a volcanic eruption.



m	o	r	t	v	x	a	c	e	g	i	k
1	2	3	4	5	6	7	8	9	10	11	12

n	p	s	u	w	b	d	f	h	j	l	z
13	14	15	16	17	18	19	20	21	22	23	24

1. $\frac{1}{1} \frac{2}{2} \frac{16}{16} \frac{13}{13} \frac{4}{4} \frac{7}{7} \frac{11}{11} \frac{13}{13} \frac{15}{15} \frac{11}{11} \frac{19}{19} \frac{9}{9}$

$\frac{18}{18} \frac{9}{9} \frac{8}{8} \frac{2}{2} \frac{1}{1} \frac{9}{9} \frac{15}{15} \frac{18}{18} \frac{11}{11} \frac{10}{10} \frac{10}{10} \frac{9}{9} \frac{3}{3}$

2. $\frac{1}{1} \frac{2}{2} \frac{5}{5} \frac{9}{9} \frac{1}{1} \frac{9}{9} \frac{13}{13} \frac{4}{4} \frac{16}{16} \frac{13}{13} \frac{19}{19} \frac{9}{9} \frac{3}{3}$

$\frac{4}{4} \frac{21}{21} \frac{9}{9} \frac{1}{1} \frac{2}{2} \frac{16}{16} \frac{13}{13} \frac{4}{4} \frac{7}{7} \frac{11}{11} \frac{13}{13}$

3. $\frac{9}{9} \frac{15}{15} \frac{8}{8} \frac{7}{7} \frac{14}{14} \frac{11}{11} \frac{13}{13} \frac{10}{10} \frac{10}{10} \frac{7}{7} \frac{15}{15} \frac{9}{9} \frac{15}{15}$

4. $\frac{11}{11} \frac{13}{13} \frac{8}{8} \frac{3}{3} \frac{9}{9} \frac{7}{7} \frac{15}{15} \frac{9}{9} \frac{23}{23} \frac{9}{9} \frac{5}{5} \frac{9}{9} \frac{23}{23} \frac{2}{2} \frac{20}{20}$

$\frac{15}{15} \frac{16}{16} \frac{23}{23} \frac{20}{20} \frac{16}{16} \frac{3}{3} \frac{19}{19} \frac{11}{11} \frac{2}{2} \frac{6}{6} \frac{11}{11} \frac{19}{19} \frac{9}{9}$

5. $\frac{11}{11} \frac{13}{13} \frac{8}{8} \frac{3}{3} \frac{9}{9} \frac{7}{7} \frac{15}{15} \frac{9}{9} \frac{11}{11} \frac{13}{13} \frac{23}{23} \frac{7}{7} \frac{5}{5} \frac{7}{7}$

$\frac{19}{19} \frac{2}{2} \frac{1}{1} \frac{9}{9} \frac{15}{15} \frac{11}{11} \frac{24}{24} \frac{9}{9}$

6. $\frac{7}{7} \frac{15}{15} \frac{21}{21} \frac{8}{8} \frac{2}{2} \frac{1}{1} \frac{11}{11} \frac{13}{13} \frac{10}{10} \frac{2}{2} \frac{16}{16} \frac{4}{4}$

7. $\frac{15}{15} \frac{4}{4} \frac{9}{9} \frac{7}{7} \frac{1}{1} \frac{3}{3} \frac{11}{11} \frac{15}{15} \frac{11}{11} \frac{13}{13} \frac{10}{10} \frac{20}{20} \frac{3}{3} \frac{2}{2} \frac{1}{1}$

$\frac{5}{5} \frac{9}{9} \frac{13}{13} \frac{4}{4} \frac{15}{15}$

CREATING A TRAVEL BROCHURE



PELE'S PEAK

Create an interesting travel brochure on one of the Hawaiian Islands. Follow these steps to complete your travel brochure.

1. Complete ISLAND INFORMATION.
2. Browse through the travel brochures to get an idea of what a brochure looks like.
3. Fold the paper in two or three sections.
4. Place information and pictures onto each section of the folded paper.
5. Edit your information making sure that words are spelled correctly and sentences are complete.
6. Go over the written information with a pen or colored pencil.
7. Color the pictures in your brochure.
8. Turn in the brochure when it is complete.



Option: design and complete your travel brochure on the computer!

Travel Brochure Checklist



Content

The content includes all facts on ISLAND INFORMATION:

- What the name of the island means
- Climate and scenery
- Population
- Culture
- Major tourist attractions
- Economy

Quality

The quality includes:

- Folding of the brochure
- Correct spelling of words
- Complete sentences
- Overall presentation (neatness and look)

= Rubric Score

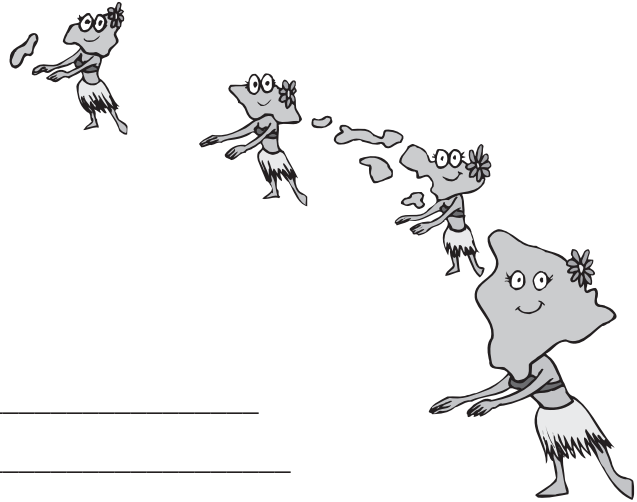
General Comments:



ISLAND INFORMATION

PELE'S PEAK

1. What does the name of the island mean?



2. Describe the climate of the island.

3. Write 5 complete sentences describing the scenery of the island.

4. What is the population of the island and the cultural heritage of its people?

5. What are the major tourist attractions on the island?

6. Name the major industries or businesses of the island.

VOLCANOES



PELE'S PEAK



1. Mount Fuji (Japan)

2. Osarno (Chile)

3. El Misti (Peru)

4. Mount Saint Helens
(Washington)

5. Mount Pinatubo
(Philippines)

6. Popocatepetl (Mexico)

7. Mount Shasta (California)

8. Mount Redoubt (Alaska)

9. Mount Vesuvius (Italy)

10. Etna (Sicily)

11. Kilauea (Hawaii)

12. Santa Maria (Guatemala)

13. Mayon (Philippines)

14. Laki (Iceland)

15. Tambora (Indonesia)

16. Pelee (Martinique)

17. Rokatinda
(Dutch East Indies)

18. Nyamlogira (Belgian Congo)

19. Nevado del Ruiz (Columbia)

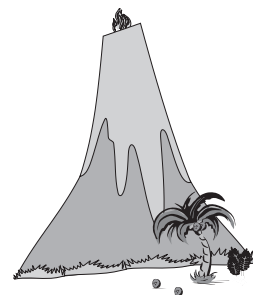
20. Mauna Loa (Hawaii)



VOLCANO RESEARCH

PELE'S PEAK

This assignment requires you and your Trekking Trio to research a famous volcano and present the information in a format that you choose. You must have a visual for your presentation to the class. Include the following information:



1. Name of the volcano

2. Location of volcano (find a map to share with your classmates)

3. Date of the most recent eruption

4. Were volcanologists able to predict the eruption?

5. Describe the damage to people, plants, animals, buildings, roads, etc.

6. Other information you find interesting

Choose one of the following formats to do your presentation:

- skit
- speech
- song

Include visuals such as charts, maps, or posters and any other props.

VOLCANO RESEARCH PROJECT CHECKLIST



PELE'S PEAK

Content

The content includes all facts on VOLCANO RESEARCH:

- Name of volcano
- Location
- Recent eruption
- Damage
- Other interesting information



Presentation

The presentation includes how well the material was relayed in the chosen format (skit, speech, or song):

- Can your classmates hear you?
- Did I speak clearly?
- Did I look at my classmates?
- Is my presentation interesting?

Quality

The quality includes the overall quality and the effectiveness of a visual (chart, map, poster, or prop) during the presentation:

- Neat
- Brightly colored
- Good size
- Supports content

= Rubric Score

General Comments:



LUAU SKIT

PELE'S PEAK

“Hawaii, Here We Come”

Scene: The students are waiting to go on their class field trip to Hawaii.

Teacher: This is the day of the big trip! We all have our plane tickets and the school van should be here in one hour to take us to the airport. Before long, we will all be on our way to the islands to study volcanoes!

✂

#1: I've got my swimsuit, sun tan lotion, CDs, and CD player. I'm ready!

✂

#2: We are going on this field trip to research volcanoes, not “to catch rays” at the beach. You need to take clothes and shoes for hiking over rough terrain, a canteen, a good compass...in other words ALL the things you are NOT packing!

✂

#3: But I thought we said H-A-W-A-I-I, you know Hawaii? “Surf's up dude!”

✂

#4: Right! Hawaii! The Hawaiian Islands are an awesome example of an **archipelago**.

✂

#5: An ARCH a what?

✂

#6: Also commonly known as a group of islands. In Hawaii's case, islands formed as a result of volcanic activity.

✂

#7: Haven't you been paying attention in science lab this week?

✂

LUAU SKIT



PELE'S PEAK

✂

#8: Actually, NO! I have been so worried about a test that I have not been concentrating on volcanoes. Can you HELP me catch up?

✂

#9: SURE! Where do we need to start?

✂

#10: The VERY beginning, and I DO MEAN the VERY beginning!

✂

#11: There is more to Hawaii than sandy beaches and luaus. The Hawaiian Islands are located in the Pacific Ocean in an area known as **The Ring of Fire**.

✂

#12: Hawaii, Oahu, Maui, Kauai, Molokai, and Lanai are the major Hawaiian Islands that were formed by a series of volcanic events that took place on the ocean floor millions of years ago. The early Hawaiian people believed in a volcano goddess named **Pele**.

✂

#13: They did everything they could to keep Pele happy, hoping that she would prevent the volcanoes from erupting.

✂

#14: Do all volcanoes erupt? How does that happen? Do we know when it is going to happen? What tools do scientists use to find out?

✂

#15: One question at a time please! Let's begin with how volcanoes erupt. Volcanoes erupt when the pressure inside the crater can no longer be contained.

✂



LUAU SKIT

PELE'S PEAK

✂

#16: Not all volcanoes erupt. There are different types of volcanoes and they are not all capable of erupting.

✂

#17: Volcanoes that are still capable of erupting are known as **active** volcanoes. Volcanoes that are asleep, so to speak, but could awaken and become active, are called **dormant** volcanoes. Volcanoes that a **volcanologist** no longer worries about are called **extinct**.

✂

#18: Volcan-what?

✂

#19: A volcanologist is a scientist who takes the study of volcanoes seriously. They use many different scientific instruments, like a **seismograph**, to predict when a volcano could become a threat to human life. Did you know that approximately half a billion people worldwide live near some 600 volcanoes that scientists are watching carefully?

✂

#20: Volcanologists do not just read instruments back at some lab, they actually go on site and study volcanoes firsthand. They check on the levels of escaping gases like sulfur dioxide, emissions of ash, and the size of the lava dome.

✂

#21: Volcanologists have to also study the top layer of the earth known as the **crust**, the hot molten liquid called **magma**, and then the actual lava flow when the volcano IS erupting.

✂

#22: Their job is SO DANGEROUS, that it is not uncommon for them to become seriously injured or even killed!

✂

#23: Are lava flows always the same? Do all volcanoes give off the same warning signals?

✂

LUAU SKIT



PELE'S PEAK

✂

#24: No. The Hawaiians have two words for the lava flows they have witnessed over time. **Aa** often has jagged, sharp pieces floating in it, and **pahoehoe** flows more smoothly and has a thin skin with very hot lava underneath.

✂

#25: Do not forget **pyroclastic flows**. It sounds like lava, but it actually is a huge cloud of hot ash and gases that forms when there is a sudden, powerful eruption. This cloud can travel at 80 miles per hour and destroys everything in its path.

✂

#26: Is that what happened at Mount Saint Helens in recent years and Mount Vesuvius long ago?

✂

#27: Absolutely! You know, not all volcanoes are made exactly in the same way; therefore, it is not a piece of cake for scientists to predict just when and how some volcanoes will erupt.

✂

#28: The largest known active volcano on earth is Mauna Loa. It is a **Shield Volcano** or quiet volcano. The lava it produces flows down the side slowly.

✂

#29: Then there is the **Cinder Cone Volcano**, which is a steep, explosive volcano. And lastly, the **Composite Volcano** is what you were talking about earlier when you mentioned Mount Vesuvius.

✂

#30: So the bottom line is that ALL volcanic action is BAD!

✂

#31: Yes and No. Yes, volcanoes do release poisonous gases, destroy crops, property, create tidal waves, and affect our weather.

✂



LUAU SKIT

PELE'S PEAK

✂

#32: But, volcanoes are helpful, too. Volcanoes add needed nutrients to the soil, create new land masses, and liberate gases such as carbon dioxide and water.

✂

#33:Wow! I never knew that volcanoes could be so interesting. Volcanoes, here we come!

✂



VOLCANOLOGIST CERTIFICATE

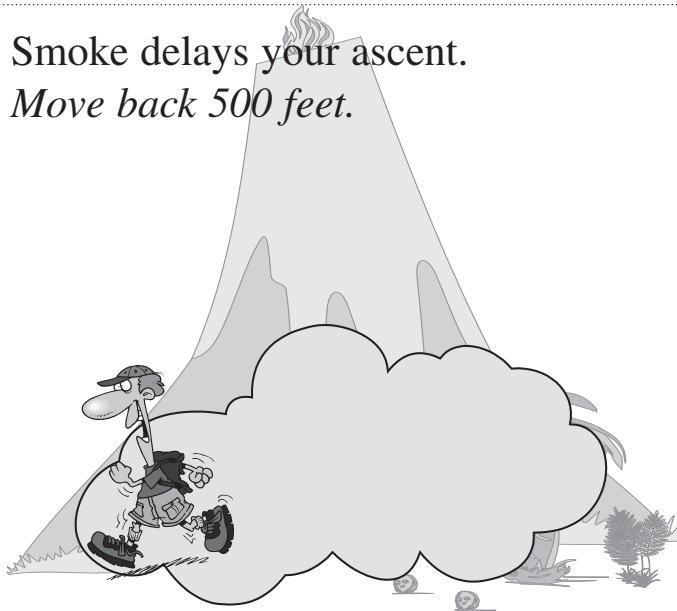
NAME:

RANK:

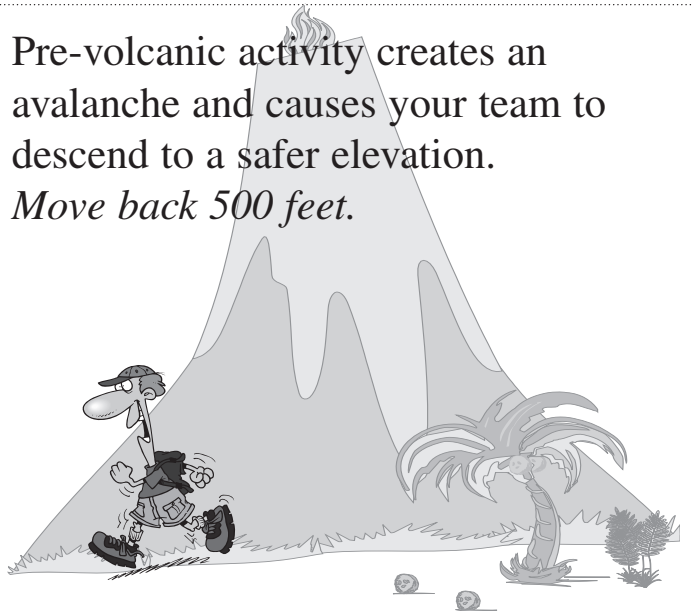
DATE

TEACHER

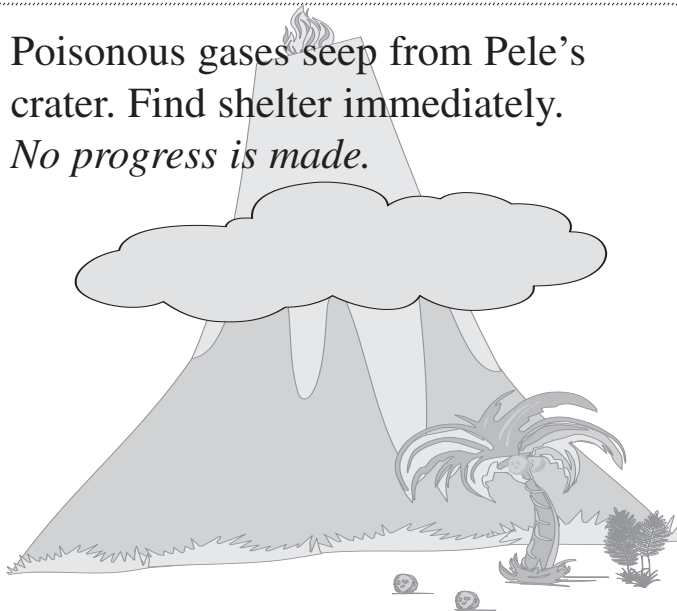
Smoke delays your ascent.
Move back 500 feet.



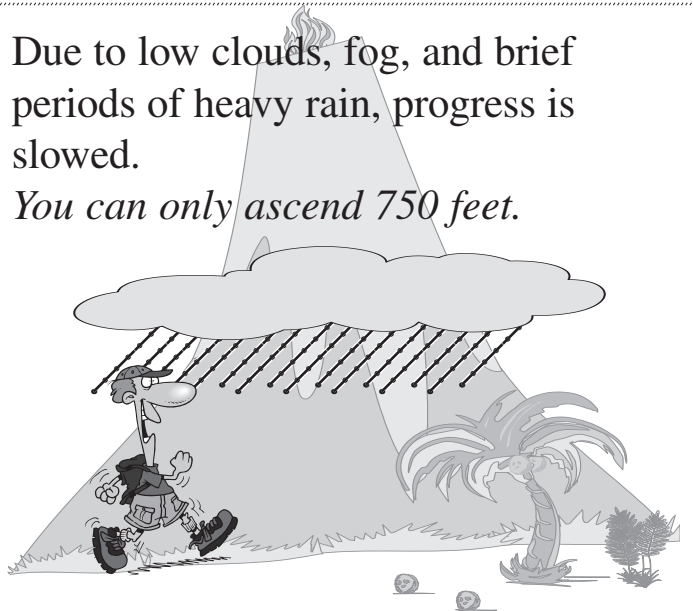
Pre-volcanic activity creates an
avalanche and causes your team to
descend to a safer elevation.
Move back 500 feet.



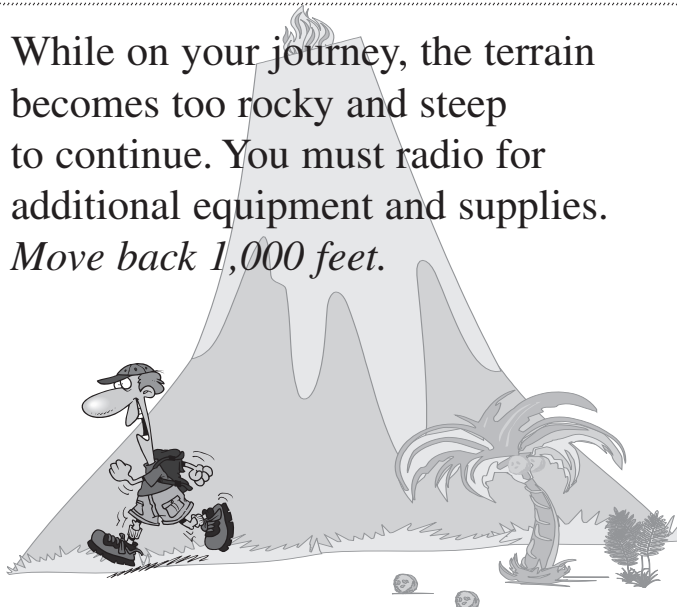
Poisonous gases seep from Pele's
crater. Find shelter immediately.
No progress is made.



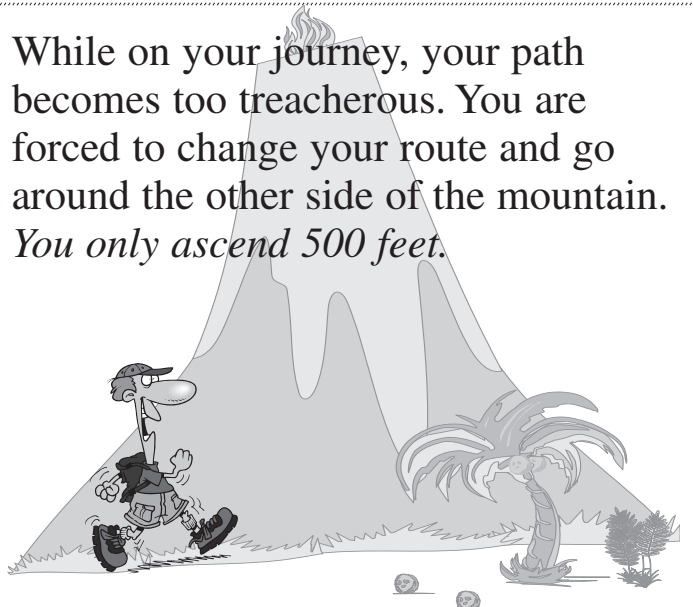
Due to low clouds, fog, and brief
periods of heavy rain, progress is
slowed.
You can only ascend 750 feet.



While on your journey, the terrain
becomes too rocky and steep
to continue. You must radio for
additional equipment and supplies.
Move back 1,000 feet.

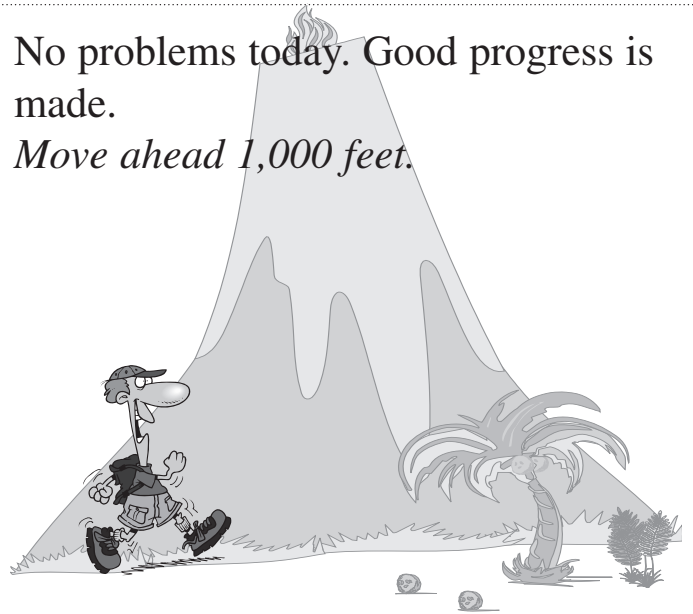


While on your journey, your path
becomes too treacherous. You are
forced to change your route and go
around the other side of the mountain.
You only ascend 500 feet.

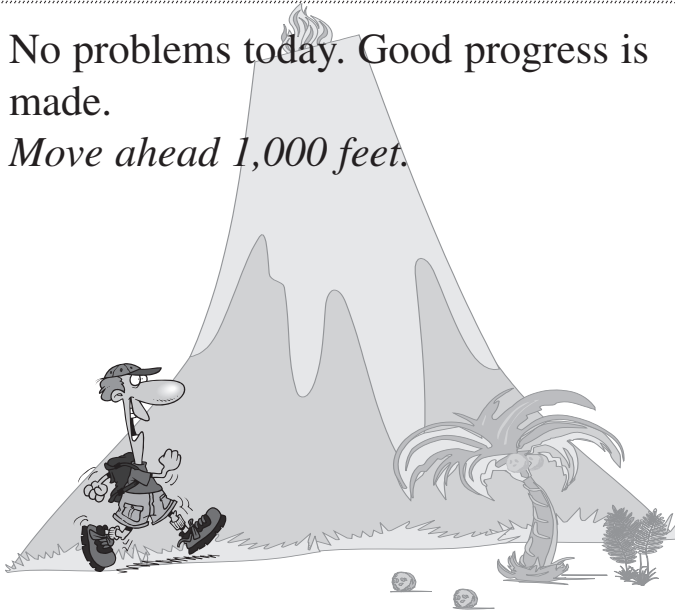


Pele is angered by discontent in the camps. A significant, yet not deadly, amount of lava, rock, and gas shoots forth from her peak. Return to camp.
No progress is made.

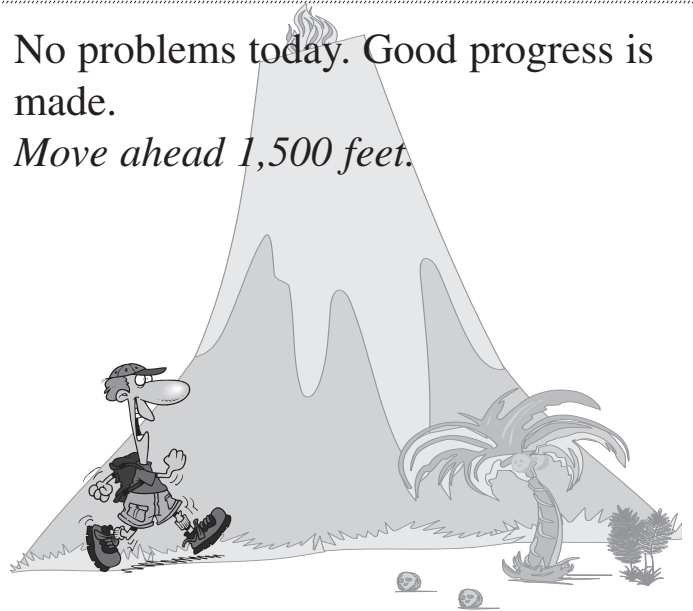
No problems today. Good progress is made.
Move ahead 1,000 feet.



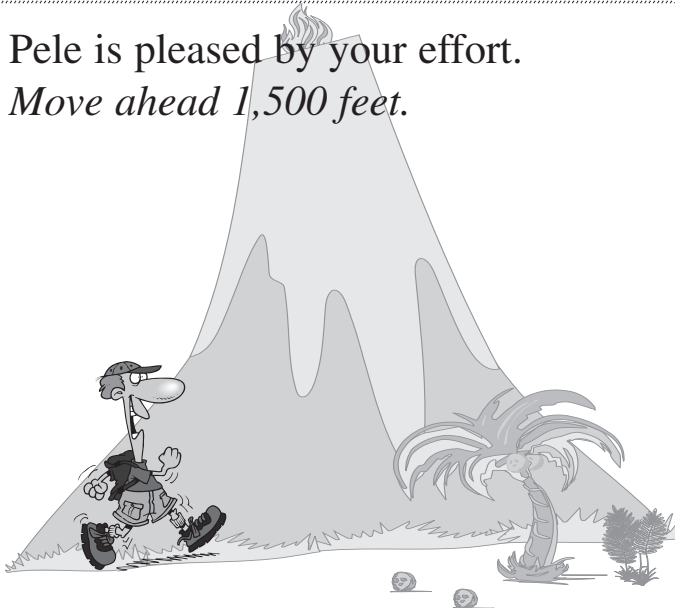
No problems today. Good progress is made.
Move ahead 1,000 feet.



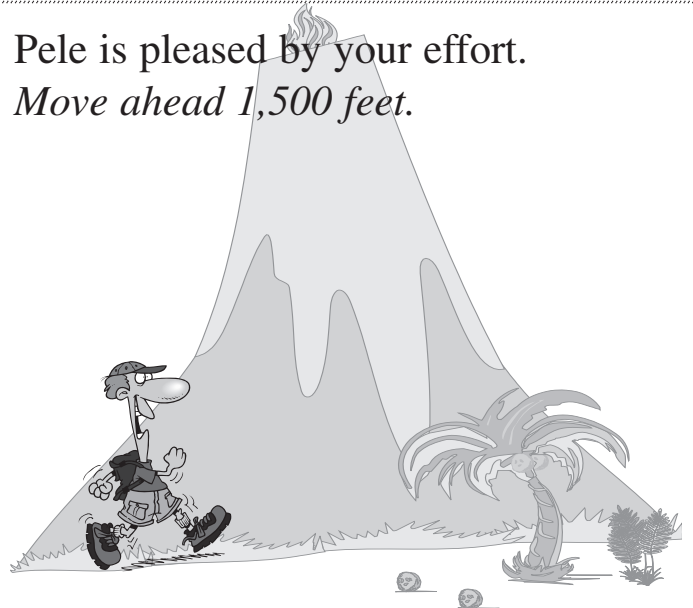
No problems today. Good progress is made.
Move ahead 1,500 feet.



Pele is pleased by your effort.
Move ahead 1,500 feet.



Pele is pleased by your effort.
Move ahead 1,500 feet.



The smoke has cleared. Good weather for your journey.

Move ahead 1,500 feet.



Your skills as volcanologists prove useful. You appease the natives by assuring them that Pele's Peak is not about to erupt. Pele rewards you.

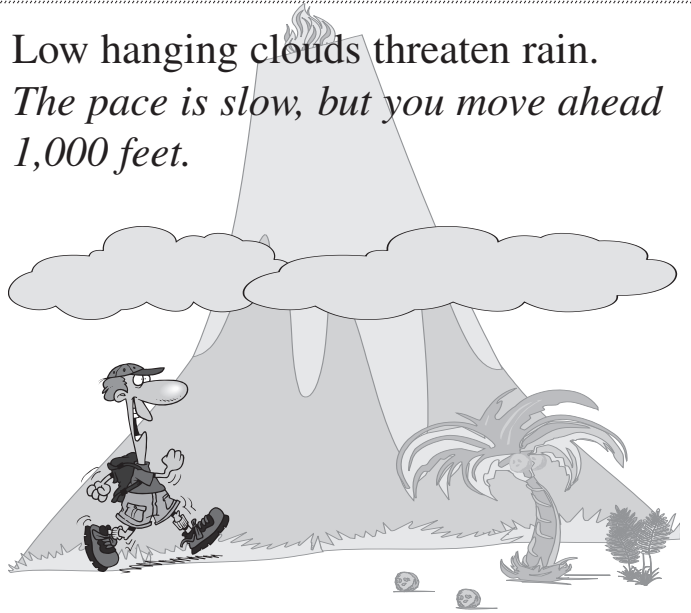
Move ahead 2,000 feet.



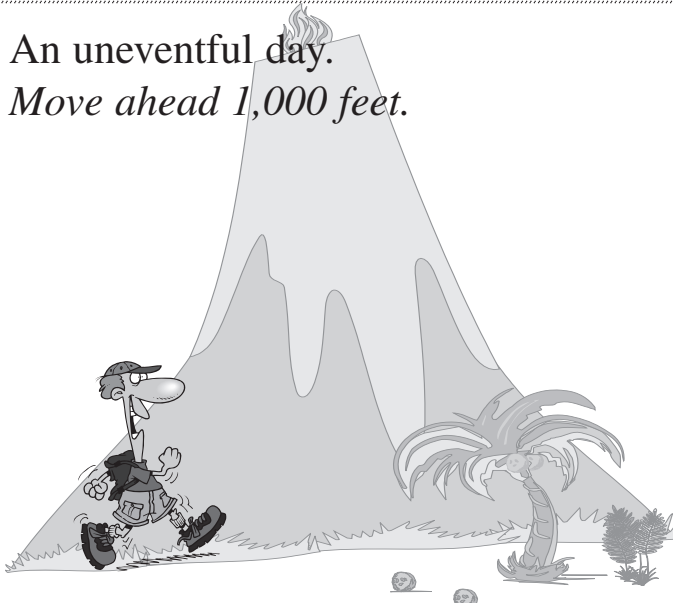
Your Head Volcanologist becomes ill. You must make camp for the night. No progress is made.



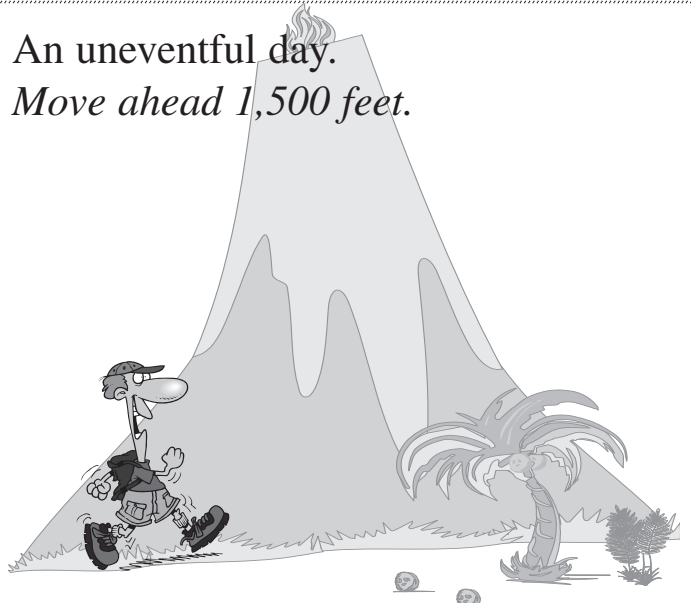
Low hanging clouds threaten rain. The pace is slow, but you move ahead 1,000 feet.



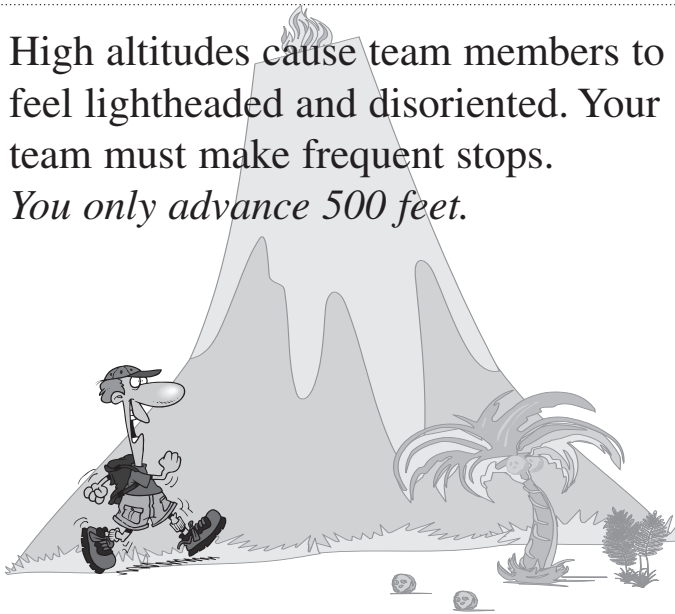
An uneventful day. Move ahead 1,000 feet.



An uneventful day. Move ahead 1,500 feet.



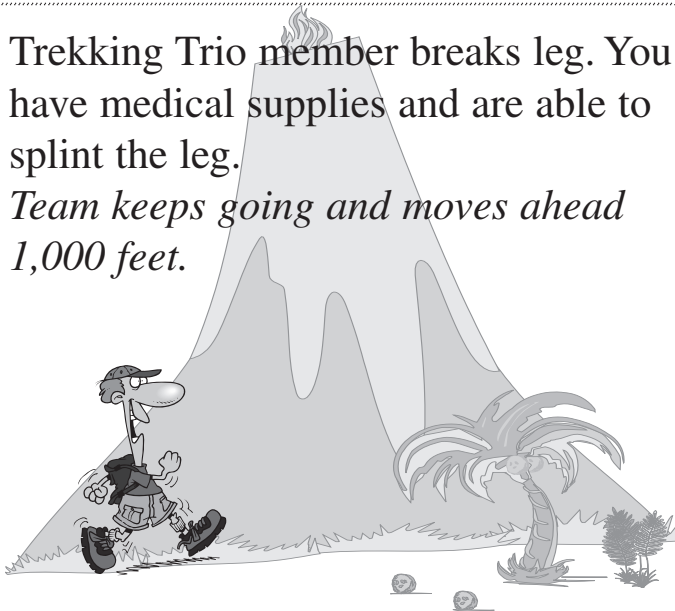
High altitudes cause team members to feel lightheaded and disoriented. Your team must make frequent stops.
You only advance 500 feet.



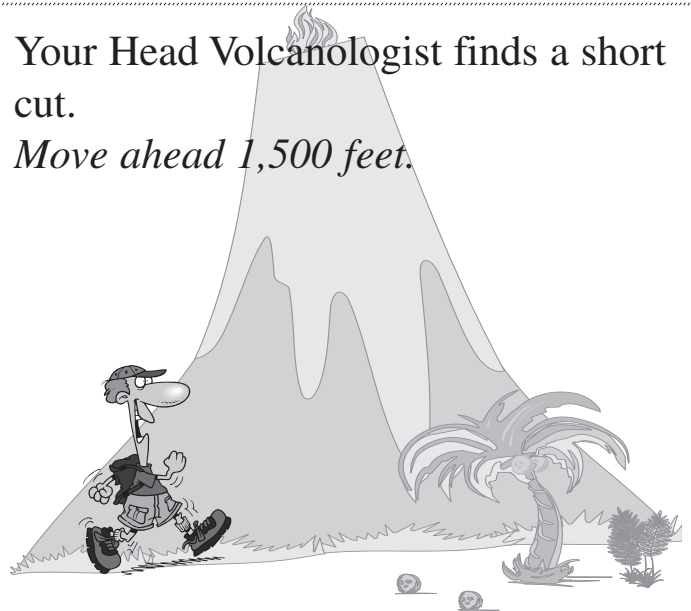
Food and water supplies are dwindling. Vegetation is sparse. Team members find small amounts of berries. Team cannot continue until supplies come.
Remain in your present location to receive supplies.



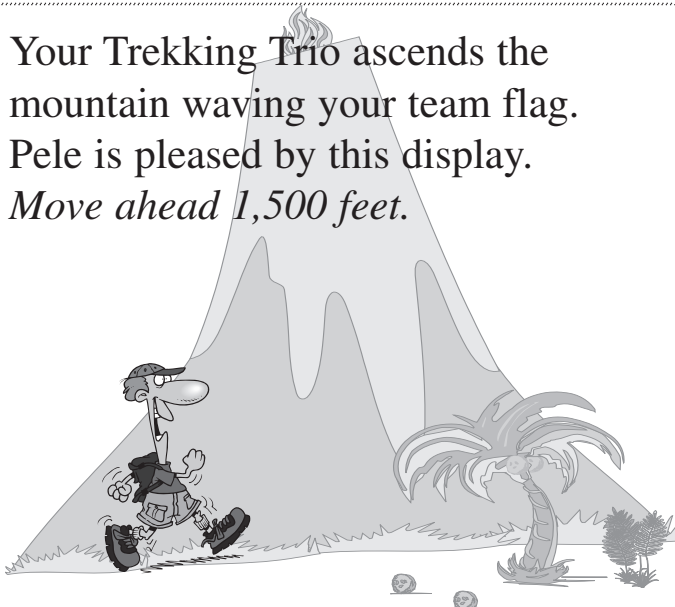
Trekking Trio member breaks leg. You have medical supplies and are able to splint the leg.
Team keeps going and moves ahead 1,000 feet.



Your Head Volcanologist finds a short cut.
Move ahead 1,500 feet.



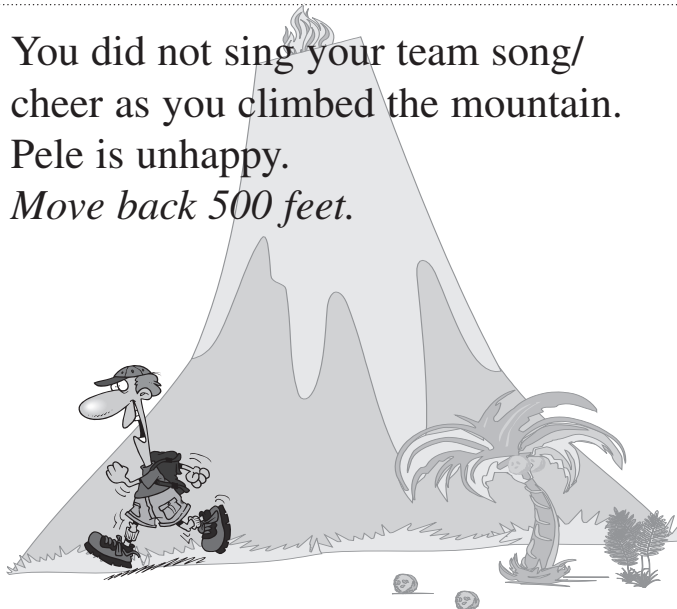
Your Trekking Trio ascends the mountain waving your team flag.
Pele is pleased by this display.
Move ahead 1,500 feet.



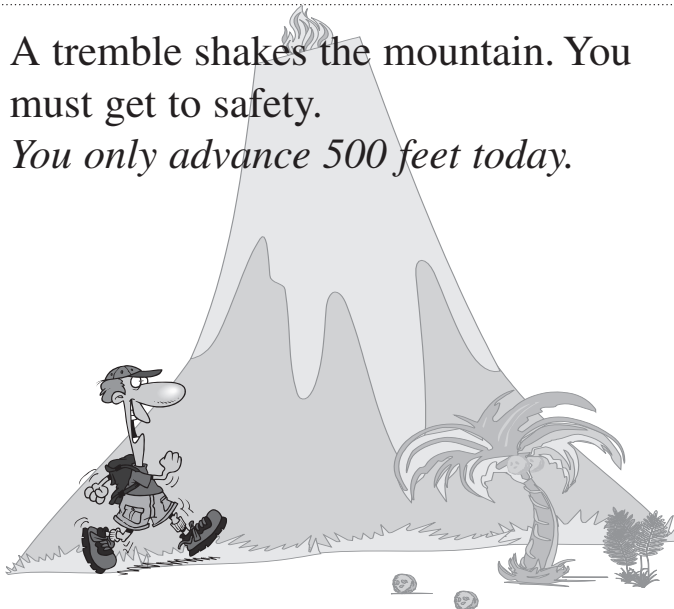
Your Disaster Prevention Specialist finds additional food. You are able to trek even longer.
Move ahead 1,500 feet.



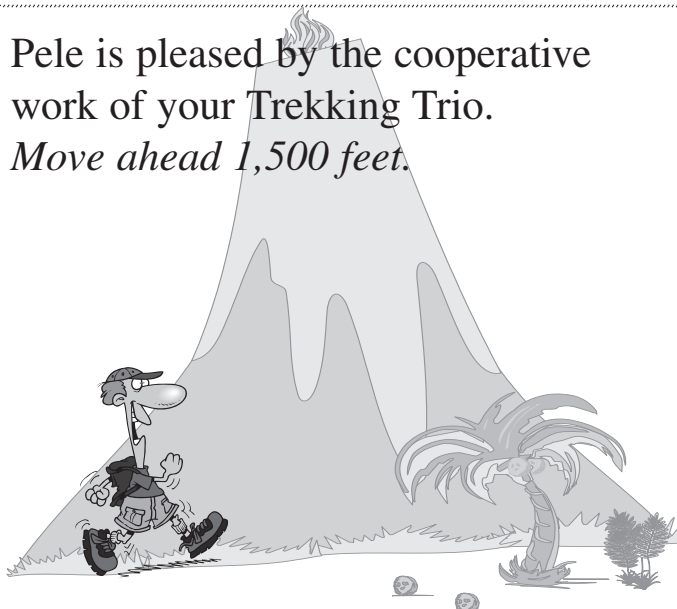
You did not sing your team song/
cheer as you climbed the mountain.
Pele is unhappy.
Move back 500 feet.



A tremble shakes the mountain. You
must get to safety.
You only advance 500 feet today.



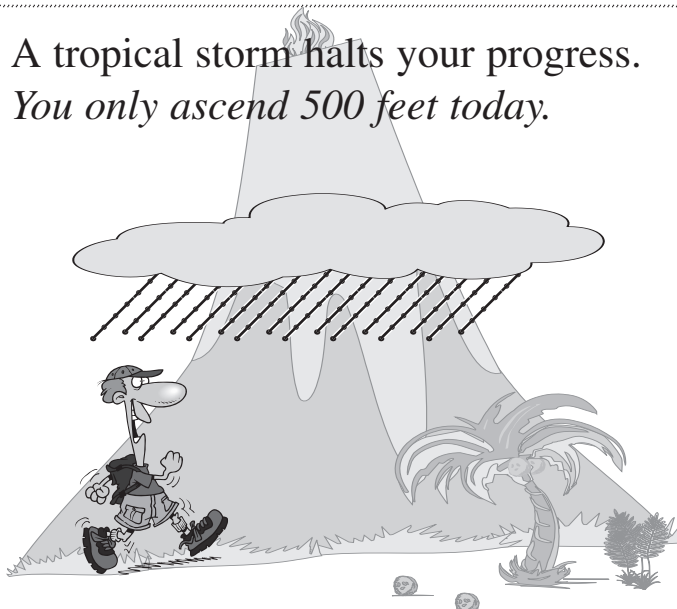
Pele is pleased by the cooperative
work of your Trekking Trio.
Move ahead 1,500 feet.



Your Head Volcanologist finds a short
cut. The short cut follows a circle that
takes you back to where you started
the day's journey.
No progress is made.



A tropical storm halts your progress.
You only ascend 500 feet today.



Your Ring of Fire Recorder spots a
narrow rope bridge across a ravine.
You save valuable time.
Move ahead 1,500 feet.



Teacher Feedback Form

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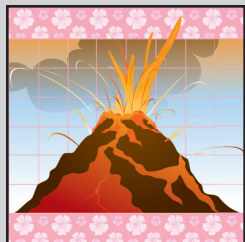
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PELE'S PEAK

THE MYTH OF PELE

Once upon a time there was a beautiful goddess named Pele. She and her brothers and sisters lived in a magnificent valley on the island of Hawaii. On the island was a big, black mountain that was a volcano!

Unlike many ordinary people of this long-ago time, Pele and her family were not afraid of this mountain. They bravely built their houses in the valley at the foot of this fiery volcano. The other people of Hawaii said they must always be good to Pele and do what she wanted so the fire from the volcano would not hurt them.

There was a giant on another island people called the Hog Man (Kamapuaa). He loved Pele and wanted to marry her, but she was not interested in marrying the Hog Man. This made the Hog Man very angry, so he set out to kill Pele and her brothers and sisters.



Pele was very smart and she knew what the Hog Man was trying to do. She took her brothers and sisters, went up the volcano's side, and hid in a cave.

The determined Hog Man would not give up! Finally, he found Pele's dog, and it led him right to the cave where Pele and her family were hiding. Now that he knew where she was, he would return the next morning to get her.

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Learn Through Experience

When the Hog Man arrived at the cave, he made a fire in front of the cave to force them out from hiding. However, his plan backfired. A wind came out of the cave and blew the smoke right in the eyes of the Hog Man!

Then, as he stood there, the ground began to shake and red, hot lava poured down the sides of the mountain. The Hog Man fled down the mountain, barely able to stay ahead of the lava. At last, he reached the sea and sailed away in his canoe. The flowing lava did not hurt Pele and her family.

Still today, the people of Hawaii tell their children that Pele was the goddess of the volcano, and that she made the fire and the lava come from the volcano so that the Hog Man would not take her from her home. Now, according to the myth, Pele lives at the peak of the mountain and takes care of all the volcanoes in Hawaii. People tell this story of the Goddess Pele to explain the amazing natural power and unpredictability of volcanoes.

VOLCANOES

Our planet earth is made up of many layers. The top layer of solid rock is called the **crust**. Deep beneath the crust it is so hot that some rock melts.

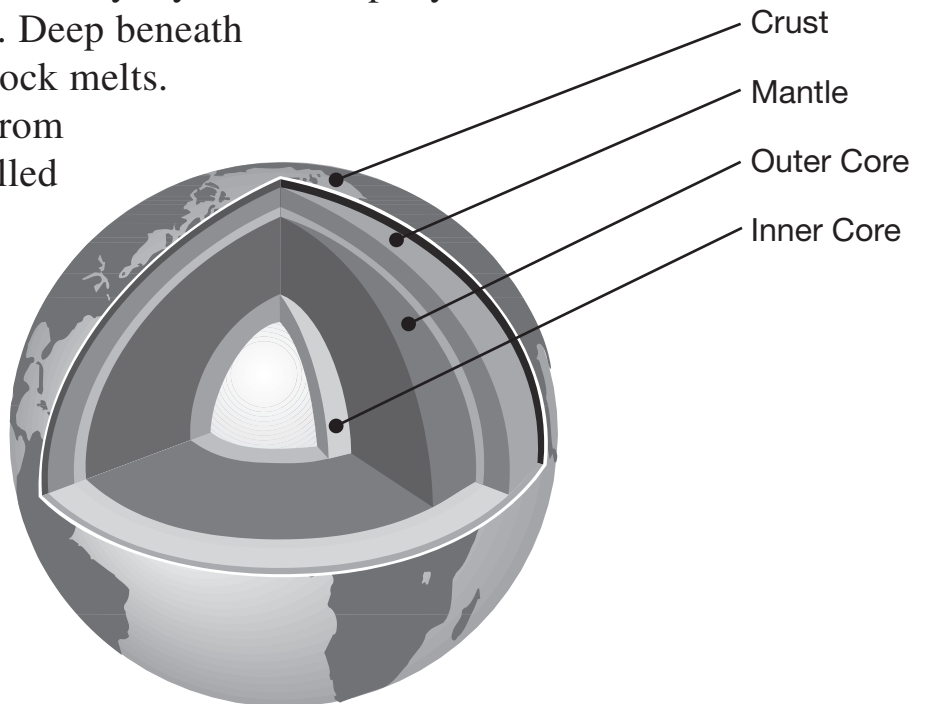
The liquid rock that comes up from the outer core of our earth is called

magma. A **volcano** forms from a vent or crack in the earth's

plates when melted rock and gas explode. Magma pushes its way up through the cracks. This is called a volcanic **eruption**. When magma pours forth on the surface, it is called **lava**.

The boiling lava forms fiery rivers and lakes. Some lava is thin and flows very quickly (**Aa**); other lava is

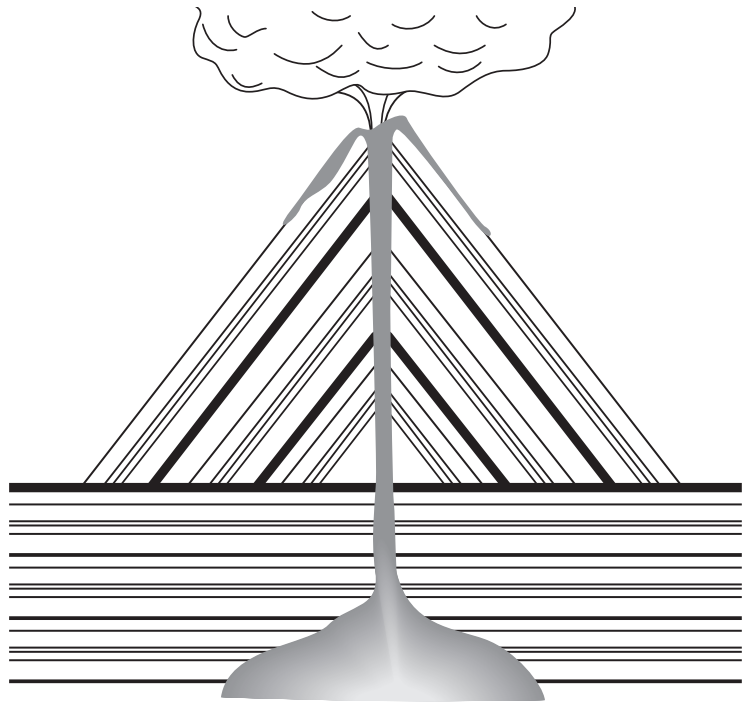
very thick and slow-moving (**Pahoehoe**). When the lava cools and hardens it forms volcanic rocks (also called *igneous rock*).



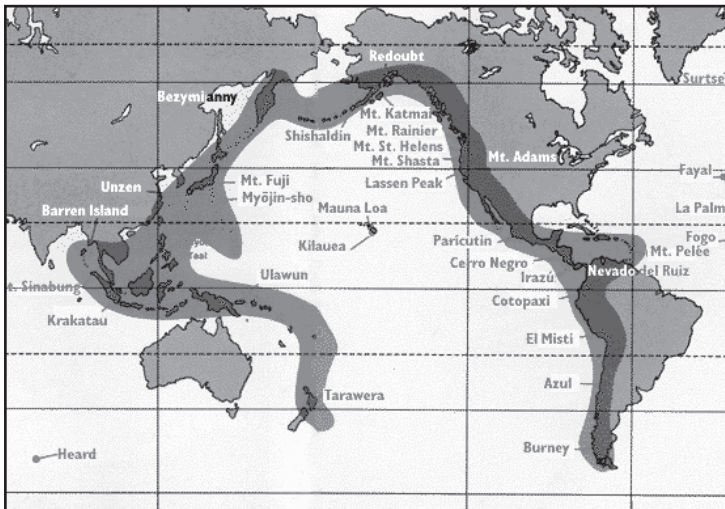
Volcanoes are either:

- 1) **active** (presently erupting)
- 2) **dormant** (between eruptions) or
- 3) **extinct** (will never erupt again).

Active volcanoes erupt in different ways. During a *quiet eruption*, lava flows freely from the volcano's **crater**, the opening on top of the volcano. This lava may flow many kilometers down the slopes of the volcano. In an *explosive eruption*, molten rock discharges forcefully from the volcano in billowing clouds of volcanic ash and cinders.



The Hawaiian Islands are actually the tops of a chain of volcanic mountains that rise from the ocean floor. The islands are also considered to be an **archipelago**, a group of islands.



Ring of Fire

Volcanoes can be found all over the world. However, most of them are in the area of the Pacific Ocean called the **Ring of Fire**. This area includes the coasts of North America, South America, Australia, and Asia.

There have been many devastating volcanoes in the world. The most destructive in the United States in recent history was Mount Saint Helens in central Washington. Mount Saint Helens erupted in May of 1980. Sixty people died as

hot gases, rocks, and ash covered an area of 230 square miles. Hundreds of houses and cabins were destroyed leaving many people homeless. Miles of highways, roads, and railways were badly damaged. The force of the eruption blew down entire forests as if they were rows of matchsticks. Ash rose into the sky and fell back to earth hundreds of miles away from the volcano. Since then, life has been slowly returning to normal in the areas surrounding this powerful volcano.

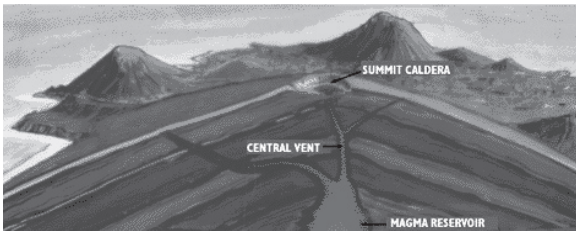
VOLCANOES AND VOLCANOLOGISTS

Volcanology is the study of volcanoes. This includes their structure, formation, classification, and the kinds of materials that are ejected from a volcano (ash, dust, lava, and gas). A person who studies volcanoes is called a **volcanologist**.

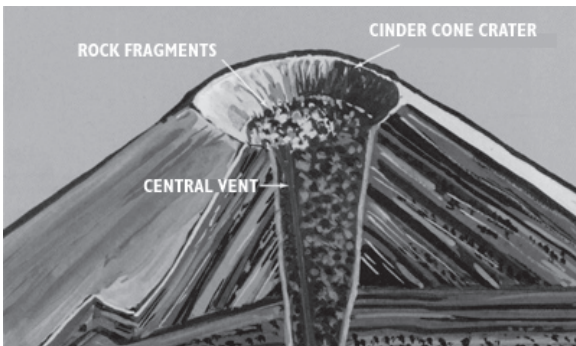
A volcanologist studies and researches what makes a volcano erupt and how other things like earthquakes impact them. The main reason that volcanologists study volcanoes is to try to predict when they will erupt. Volcanologists use different equipment and instruments to help them predict volcanic eruptions. One of the instruments is a **seismograph**. This instrument records seismic waves or vibrations of the earth.

Volcanoes have produced some of the world's best-known mountains. Mount Etna in Sicily and Mount Kilimanjaro in Africa are volcanic mountains.

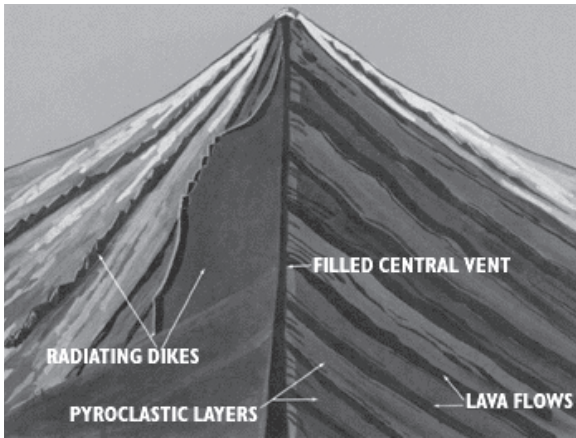
There are three types of volcanic mountains: **Shield Volcanoes**, **Cinder Cone Volcanoes**, and **Composite Volcanoes**. These volcanoes differ in size, shape, and the way they are formed.



Shield Volcanoes – In a quiet eruption, the free-flowing lava spreads out over the earth's surface and hardens into rock. Repeated lava flows build a wide mountain with gentle slopes called a Shield Volcano. Shield Volcanoes are the largest type of volcanic mountain. Mauna Loa and Mauna Kea are the two major volcanoes that make up the Hawaiian Islands. Both of these volcanoes rise almost 10 kilometers (6.2 miles) from the ocean floor. Mauna Loa is the largest volcano on earth.



Cinder Cone Volcanoes – In an explosive eruption, lava spews high into the air. The lava cools and hardens into cinders and ash before falling to the ground. The ashes and cinders along with mud, lava, and rock pile up around the central vent to form a steep Cinder Cone Volcano. These volcanoes are relatively small, with steeper sides than a Shield Volcano. Cinder Cone Volcanoes may form quite rapidly. Mount Saint Helens is a Cinder Cone Volcano.



Composite Volcanoes – A volcanic mountain built up by both lava flows and layers of ash and cinders is called a Composite Volcano. Although not as big as Shield Volcanoes, Composite Volcanoes are generally much larger than Cinder Cones. They have both slow and sticky lava as well as fast-flowing lava. Many Composite Volcanoes are quite famous, either for their classic, cone-shaped peaks, or their powerful, explosive eruptions. Some well-known Composite Volcanoes are Mount Fuji in Japan and Mount Vesuvius in Italy.

PREDICTING ERUPTIONS

Volcanologists study volcanoes to help predict when an eruption may occur. There are warning signs before an eruption takes place. Some of these are: escaping gases from the mountain, increasing levels of an invisible gas called sulfur dioxide, emission of ash, and an increase in the size of the lava dome. By measuring the earth's movements and the bulging of the volcanoes' sides, scientists have been able to give warning of impending eruptions.

There are approximately half a billion people that live close to the 600 or so active volcanoes around the world. Scientists think that more than 300 of these volcanoes are so active that they should be watched carefully. Not only are active volcanoes a threat, but long-dormant volcanoes can come back to life unexpectedly!

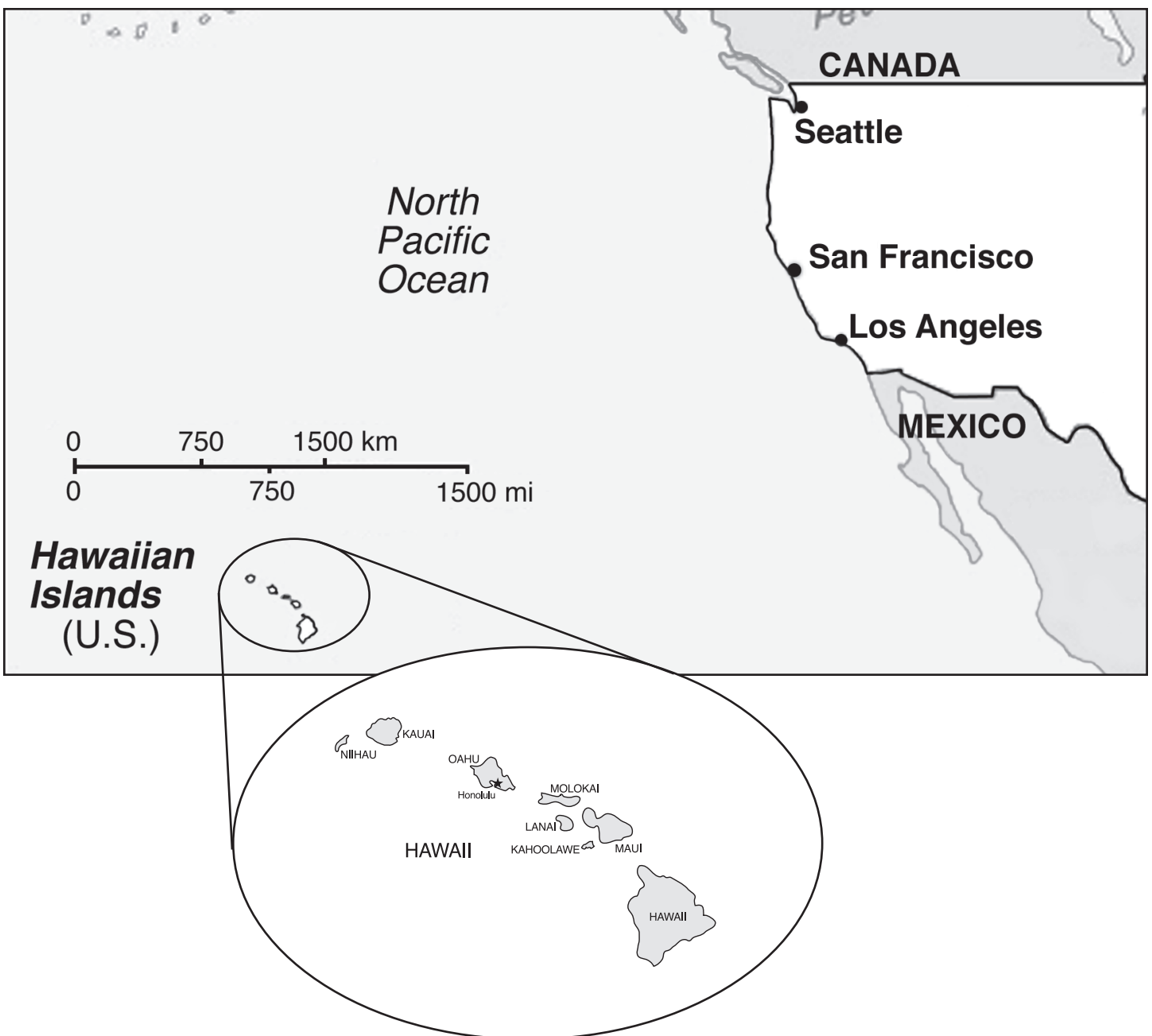


During an eruption, rivers of hot ash and gases can rush down the mountain. These rivers are called **pyroclastic flows**. A column of gases, ash, and rock can rise from a vent or crater forming an **eruption cloud**. Volcanoes are dangerous in many ways, with their poisonous gases, ash falls, flows of molten rock, and fires. The early warnings of volcanologists and other scientists save many people's lives.

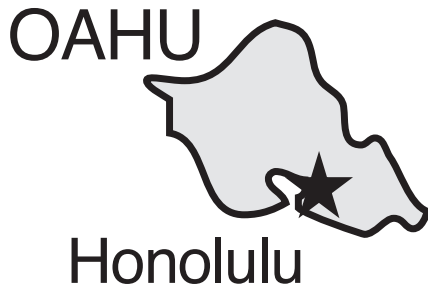
HIGHLIGHTING HAWAII

Hawaii is made up entirely of islands located in the middle of the Pacific Ocean (remember—it is an archipelago!). Honolulu – the capital and largest city – is about 2,400 miles west of San Francisco, California.

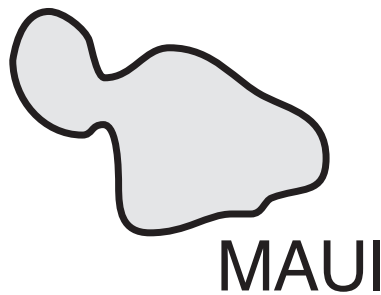
Hawaii is world-famous for its beauty and pleasant climate. It has deep blue seas, brilliant flowers, graceful palm trees, and plunging waterfalls. The friendliness of its people gives Hawaii the nickname of the Aloha State. **Aloha** is the Hawaiian word for love. Approximately one million people live in the state of Hawaii.



The six major islands of Hawaii have many unique features!



Oahu – “The Gathering Place” – Hawaii’s island chiefs used to meet on Oahu, the third-largest Hawaiian island, and that is how it got its name. Almost three-quarters of the people in Hawaii live on Oahu. Honolulu, the capital, is Oahu’s major city. Honolulu is the economic, social, and political center of the Hawaiian Islands. Many tourists visit the beachfront resorts in Waikiki every year. Pearl Harbor, a major World War II site, is a bay on Oahu. Oahu’s rainforests, beaches, and cliffs blend with the sugarcane and pineapple fields to create an island of natural splendor.



Maui – “The Valley Island” – “Maui No Ka Di,” Maui is the best. People use this phrase to describe Hawaii’s second largest island. The town of Lahaina served as Hawaii’s capital in the early 1800s. Agriculture and shipping helped create jobs for people on Maui. Haleakala National Park is home to a large, extinct crater that is 25 square miles and 3,000 feet deep! The island has many tropical forests with waterfalls and natural pools, and a coastal string of beaches and resorts.



Kauai – “The Garden Island” – Kauai is the eastern-most and oldest of the major islands. This island looks like a circle made of volcanic rock. Kauai is very lush and tropical with magnificent gardens and plummeting waterfalls. Nature created a gorgeous island by carving great canyons, valleys, mountains, and sea cliffs from the long extinct volcano called Waialeale. Today, Waialeale’s peak is considered the wettest spot on earth, averaging between 450 and 650 inches of rain annually!

MOLOKAI



Molokai – “The Lonely Island” – Until about 50 years ago Molokai was known as “The Lonely Island” because people who suffered from a deformative disease called leprosy lived there. They were segregated by the natural isolation of the Kalaupapa Peninsula.

LANAI



Lanai – “The Pineapple Island” – Pineapple still grows in abundance on Lanai, the smallest of Hawaii’s main islands. Most of Lanai’s 2,400 people live in the plantation town of Lanai City. Lanai has many forests and beaches. Visitors enjoy snorkeling and scuba diving in some of Hawaii’s clearest water.

HAWAII



Hawaii – “The Big Island” – More than twice as big as all the other islands combined, Hawaii is an island of volcanic drama, great natural diversity, and powerful links to the Polynesian past. The big island’s rebuilt temples provide unique insights into the Hawaii of myth and legend. Its two active volcanoes, Kilauea and Mauna Loa (in Hawaii Volcanoes National Park) are among the safest and most active volcanoes in the world.

Hawaii has so much to offer and explore! The dramatic landscape creates a spectacular backdrop for the human influence of the state, including cattle ranches, sugar plantations, macadamia nut orchards, coffee farms, and tropical flower nurseries.

