

Overview:

Using the “jigsaw method,” students read and share information from a range of nonfiction texts on volcanoes that include: the benefits of volcanoes, the Novarupta eruption and the consequent caldera of Katmai in 1912, a personal account of the ash fall in Kodiak in 1912, and volcanic action and societies of the Aleutian Arc. The jigsaw method is a cooperative learning technique that involves students working together to present and acquire new information.

Targeted Alaska Grade Level Expectations:

Science

- [6] SD2.3 The student demonstrates an understanding of the forces that shape Earth by describing how the surface can change rapidly as a result of geological activities (i.e., earthquakes, tsunamis, volcanoes, floods, landslides, avalanches).
- [5-6] SF1.1-SF3.1 The student demonstrates an understanding of the dynamic relationships among scientific, cultural, social, and personal perspectives by telling a local or traditional story that explains a natural event (e.g., animal adaptation, weather, rapid changes to Earth’s surface) and relating it to a scientific explanation.
- [7] SF1.1-SF3.1 The student demonstrates an understanding of the dynamic relationships among scientific, cultural, social, and personal perspectives by investigating the basis of local knowledge (e.g., describing and predicting weather) and sharing that information.

Reading

- [5-6] 2.4.1 The student restates/summarizes information by restating and summarizing main ideas or events in correct sequence after reading a text (e.g., paraphrasing, constructing a topic outline, using graphic organizers) or identifying accurate restatements and summaries of main ideas or events or generalizations of a text.
- [7-8] 3.3.1 The student restates/summarizes and connects information by restating and summarizing main ideas or events, in correct sequence, after reading a text (e.g., paraphrasing, constructing a topic outline, charting or mapping main ideas or events) or identifying accurate restatements and summaries of main ideas or events or generalizations of a text.

Objectives:

The student will:

- read and share information related to volcanoes; and
- fill in responses to clues based on shared readings.

Materials:

- STUDENT INFORMATION SHEETS: A,B,C and D
- STUDENT WORKSHEET: “Volcano Jigsaw”

Science Basics:

The scientific content of this lesson includes information related to several volcanoes in Alaska, including the Cook Inlet, the Alaska Peninsula, and the Aleutian Chain. The topics include: caldera formation of Katmai and the Novarupta eruption of 1912, benefits of volcanoes, the use of volcanic heat in Unangan society, and historical volcanic events. (NOTE: See student information sheets for more information.)

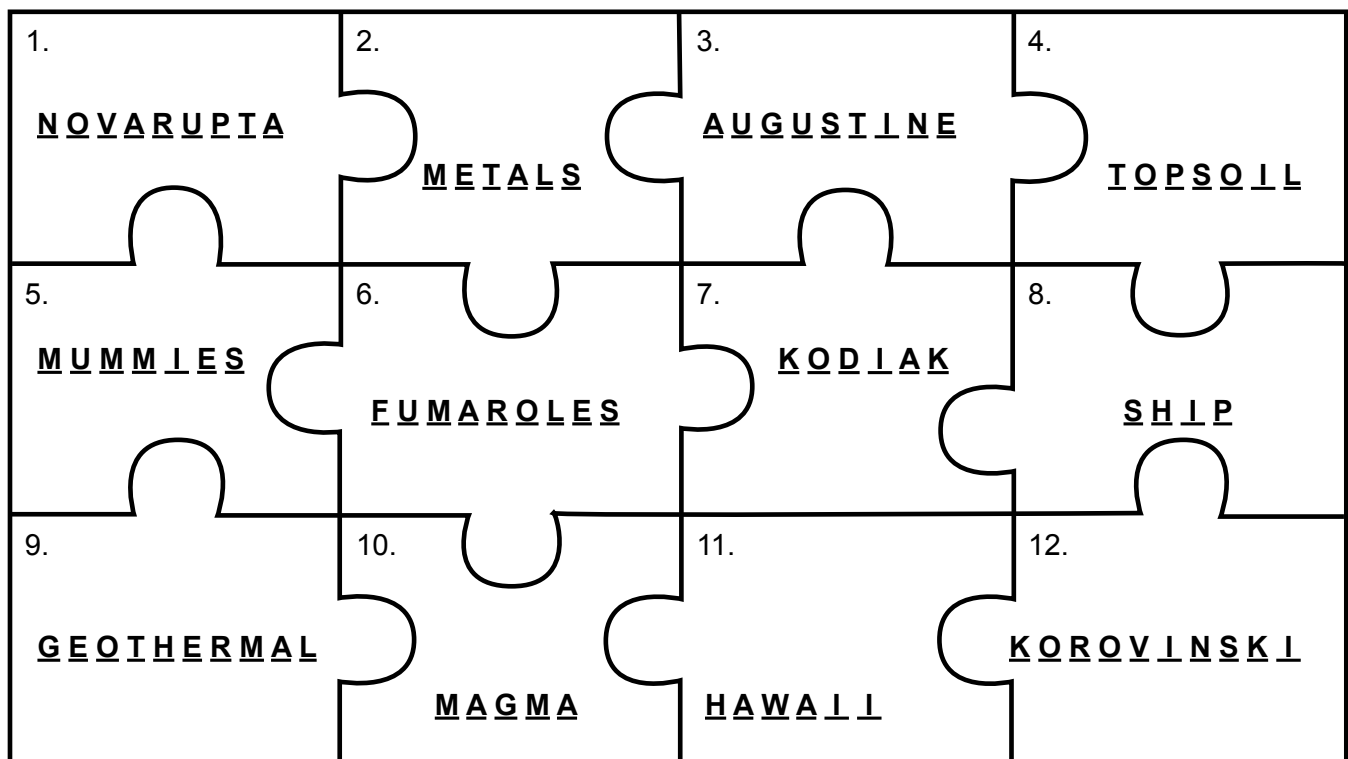
Activity Procedure:

1. Explain students will learn and teach information related to volcanoes.
2. To begin the jigsaw teaching method, divide the class into four “expert” groups. (NOTE: To differentiate instruction, it may be helpful to preview the student information sheets to determine the most appropriate “expert” group for individual students.)
3. Distribute STUDENT INFORMATION SHEETS: “A,” “B,” “C” and “D” so that each member of each group gets the same sheet. Each group will work to become the “experts” of the information on the group’s assigned sheet.
4. Allow time for each expert group to read the information then discuss the information to decide the most important pieces of information for their topics. Explain students will be assessed on the information they teach and learn from their peers. Experts may write notes on the back of their sheet.
5. Divide students into “teaching” groups. Teaching groups consist of four people; each one representing one of the four expert groups. Students take turns sharing their expert topic. Encourage students to discuss, ask questions, and take notes on *all* the topics.
6. After the jigsaw is completed, distribute STUDENT WORKSHEET: “Volcano Jigsaw” for students to complete.

Extension Idea(s):

- Interview family members on stories they have heard about the volcanic ash from Novarupta and Katmai in 1912.
- Read other accounts of the Novarupta/Katmai Ash in Elwani publications by Kodiak High School.

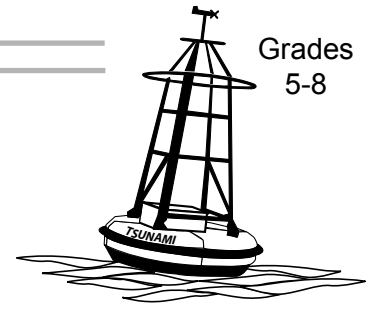
Answers:



Kaba and Katmai _____

Student Information Sheet A

Grades
5-8



In 1976, Mary Ann Wilson and Maria Kreta interviewed Kodiak resident, Katherine “Kaba” Chichenoff, for Elwani, a project of the Kodiak Aleutian Regional High School. Kaba was born in Kodiak in 1897. When she was three years old, her mother died and her father couldn’t take care of her because he was a sea otter hunter. She was raised in an orphanage, which is where she was in 1912. In this story, Katherine describes her story as a girl in the fall out of the Katmai eruption of 1912.



“It was on June sixth, a beautiful day, and I was going to the old Krafts store that was here before the earthquake. I was walking and I looked at a lake, it looked as if raindrops were hitting it. There was a straight line of black up in the sky, and I noticed it getting higher and higher, but I still didn’t think anything about it.

When I came out of the store there was a man who told me that there was going to be ash all over. He said he just finished reading a book about the Pompei Eruption and it was just like that. By this time it was getting darker and darker so I started running home. The ash was coming down all over now.

There was no rumble at first. Then by the time I got home the lightning started, and there was a rumble.

My matron knew what it was. She gathered us all up, and later the priest sent one of his boys over and he said, ‘Papa said for all of you to come to our house.’ So the eight girls and our matron went to the priest’s house, and from there we went to the church.

Later the ship came and took us all on board except for a few men who were left to watch the place. After some time, it seemed so long, they brought us back. The sun had finally come out, and everything was covered with ashes. We saw our beautiful Kodiak covered with 18 inches of ash. We had to wade through it to get to our house.

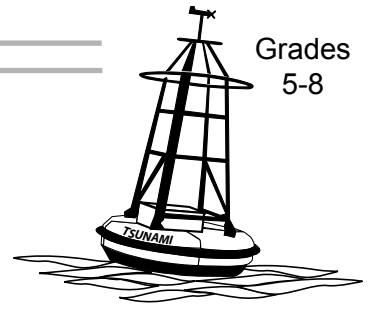
The ash was around for about five years, and you can still dig down under the dark topsoil and see the different colored layers.”

Excerpted with permission from the Kodiak Island Borough School District. Photo by Jacki O’Donnoghue.

The Good of Volcanoes

Student Information Sheet B

Grades
5-8



Volcanoes can produce events that can be very scary but they can be good for us as well. There are many benefits we receive from volcanoes.

Land

Volcanoes build new land. The state of Hawaii is entirely created from volcanic action.

Geothermal Energy

The natural heat below and around volcanoes heats sources of water within Earth. This produces steam, which people use to create electricity to power many devices we use every day.

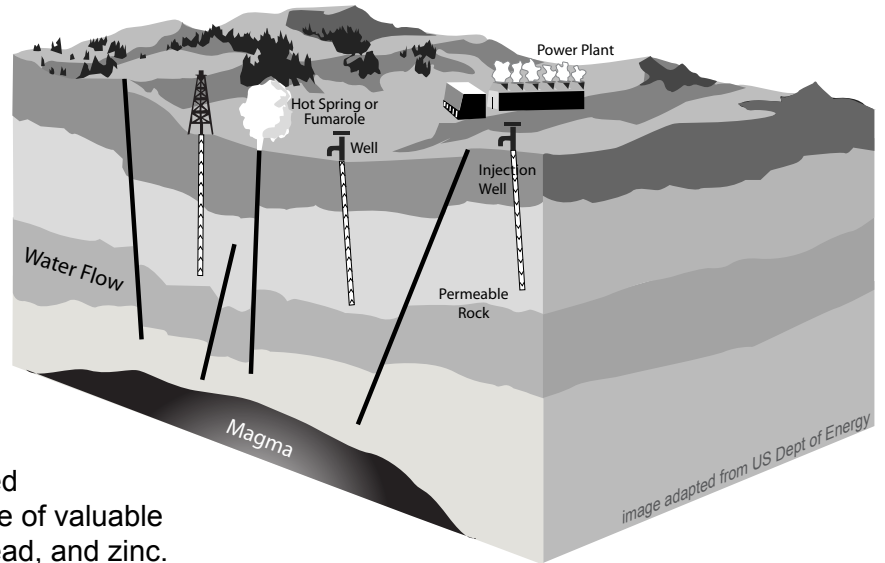
Minerals

Magma, that has cooled and hardened beneath extinct volcanoes, is a source of valuable metals such as gold, silver, copper, lead, and zinc.

Fertile Soil

Volcanic material breaks down into some of the most fertile soils. Many cultures around the world grow crops near volcanoes due to the healthy soil.

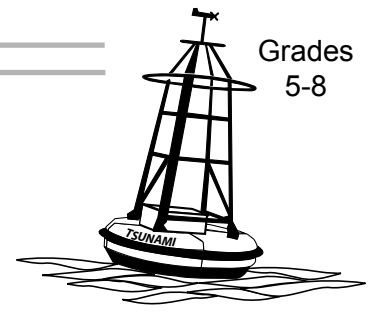
Volcanoes supply many more extras or advantages. Volcanic materials are used in building roads, and cleaning materials. Many people also enjoy mud baths and hot springs near volcanoes. We can also visit volcanoes to explore and learn.



Novarupta and Mt. Katmai

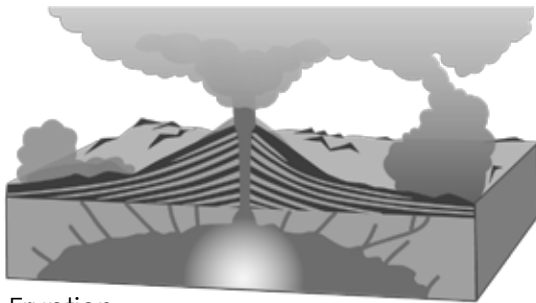
Student Information Sheet C

Grades
5-8

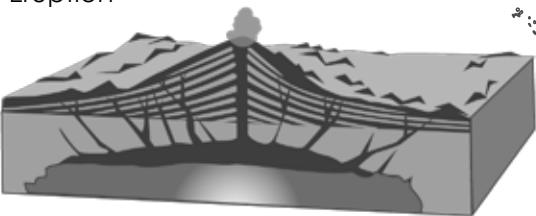


The largest eruption of the last century happened in 1912 at Novarupta volcano, which is located on the Alaska Peninsula. Novarupta and nearby volcano, Trident, drew magma from the magma chamber of Mt. Katmai causing a caldera to form on Mt. Katmai. A caldera forms when a volcano's summit collapses on its empty magma chamber. Ash, ejected from this event, reached areas thousands of miles away. In some areas near the eruption the ash was up to 700 feet deep. The eruption created the Valley of Ten Thousand Smokes, a valley of ash and fumaroles. Fumaroles are volcanic vents that release gases into the atmosphere.

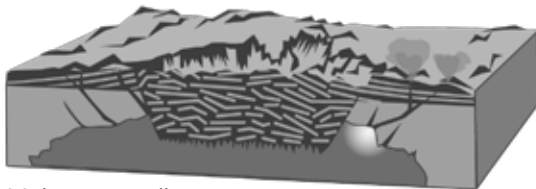
Stages of Caldera Formation



Eruption



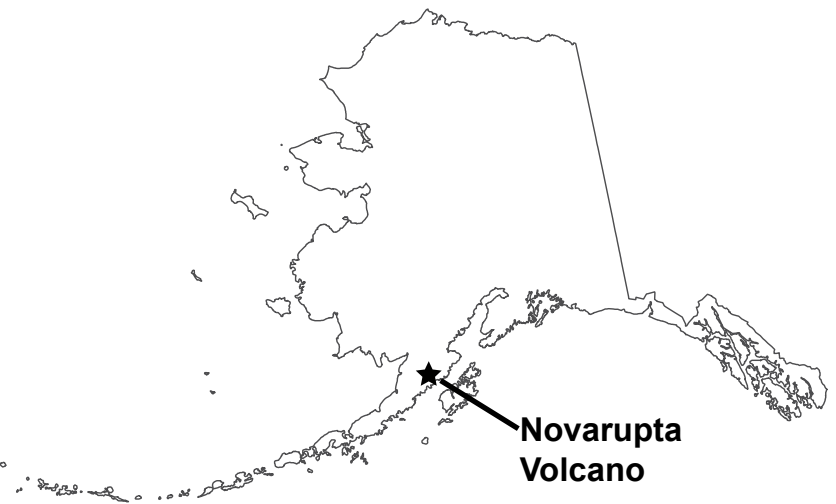
Partially emptied magma chamber



Volcano collapses



Caldera is formed (lake might form)



Novarupta
Volcano

Fumarole



Photo by R.L.Christiansen, courtesy USGS

Sources:

Brantley, 1994, Volcanoes in the United States: USGS General Interest Publication, p.30

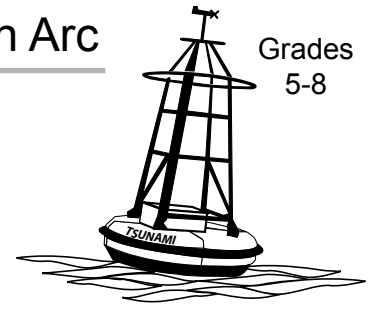
USGS. Description: 1912 Eruption of Novarupta, Alaska http://vulcan.wr.usgs.gov/Volcanoes/Alaska/description_1912_eruption_novarupta.html

U. S. National Park Service Website, Geology Fieldnotes - Katmai National Park and Preserve, Alaska, April 2000

Volcanoes and the Native People of the Aleutian Arc

Student Information Sheet D

Grades
5-8



The Alutiit

The Alutiit people of the mainland have a history of living among volcanoes. The island of Augustine volcano was the site of a legendary confrontation between two shaman. One shaman, of the Alaska Peninsula, challenged a well-known Koniag shaman named Abshala. They met on the island of Augustine volcano where Abshala was said to defeat the enemy shaman by overwhelming him with a display of rockets.

More recently, Novarupta volcano erupted on June 1912. This volcano is located on the Alaska Peninsula across the Shelikoff Strait from Kodiak Island. The Alutiit people, who lived by volcanoes, knew from traditional stories what was happening and what to do. They began gathering water to have a fresh supply, but as the ash became more intense, they realized they had to leave. The people of the village of Katmai left their home aboard the Coast Guard Cutter *Manning*. Captain K.W. Perry brought the villagers to Afognak and Kodiak for a short time and eventually brought them to the site where Perryville is located. Perryville is named after Captain Perry.

The Unangan

The Aleutian Islands are riddled with volcanoes and the Unangan lived among them. Volcanoes can be a source of danger, but in one way, the ancient Unangan used the volcanoes to their advantage before Western contact. Mummification is a process of preserving the dead that has been accomplished in dry areas of the world, like Egypt and Chile. The Unangan learned how to mummify their dead even in a rainy, moist climate. After preparing the bodies, the Unangan placed the mummies in warm caves that were dry from volcanic heat escaping through cracks in Earth. This dry environment preserved the mummies for many, many years.

These volcanoes also showed a more frightening side. Scientists are able to tell the history of an area by examining underground layers. This technique revealed that Unangan people lived in the village of Korovinski on Atka Island two thousand years ago. About five hundred years ago, eight inches of volcanic ash formed a layer. There is no sign of humans living in Korovinski at that time. However, people did return. In the early 1800s the Russian and Unangan people who lived there abandoned Korovinski because nearby volcanoes ejected more and more ash. These people moved to the village of Atka.

In 1817, while residents of the village of Egorkovskoe on Umnak Island were hunting in the Pribilofs, an eruption of Okmok Volcano destroyed the community. When they returned, they lived on the Inanudak Isthmus, eventually settling in Nikolski in 1830.

Sources:

Alaska Volcano Observatory <http://www.avo.alaska.edu>

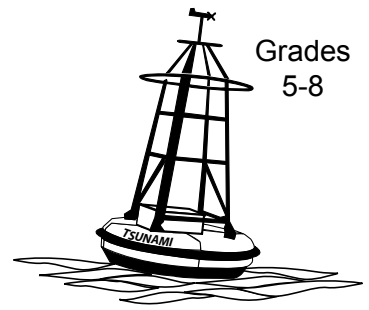
Langdon, S. (1993). The native people of Alaska. Anchorage, AK: Greatland Graphics.

Pullar, G. (2004). Afognak Village History, Chapter 2: The Katmai Eruption. http://afognak.org/education/history_chapter2.php

Name: _____

Student Worksheet

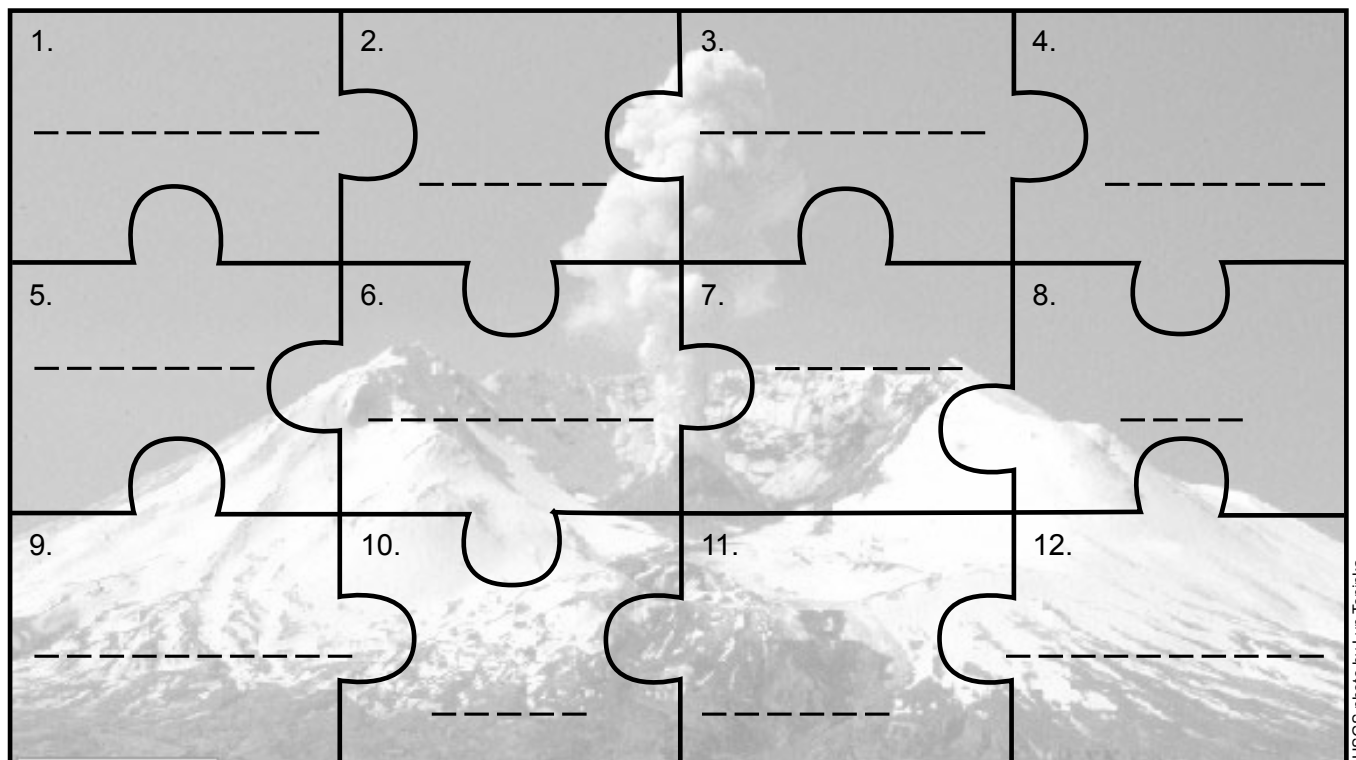
Volcano Jigsaw



Directions: Use the clues to fill in the blanks on the puzzle pieces.

Clues:

1. The largest eruption of the last century.
2. These are valuable and found in magma that has cooled and hardened beneath extinct volcanoes.
3. A volcanic island where two shamans were said to battle.
4. You can dig below this layer on Kodiak Island to find ash.
5. These were preserved well in the Aleutians with the aid of volcanic heat escaping through cracks into caves.
6. These, along with ash, were found along the Valley of Ten Thousand Smokes.
7. This place was buried under 18 inches of ash in 1912.
8. People boarded this to get away from ash in the 1912 eruption.
9. This type of energy is often located near volcanoes and used to generate electricity.
10. This substance was emptied from the chamber below Mt. Katmai causing the formation of a caldera.
11. This state is entirely made of volcanic action.
12. Eight inches of ash form a layer beneath this abandoned Unangan village.



USGS photo by Lyn Topinka