

Alaska Volcanoes Guidebook for Teachers

By Jennifer N. Adleman

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Conversion Factors

Inch/Pound to SI

| Multiply | By | To obtain |
|----------------------|--------|---------------------------|
| inch (in.) | 2.54 | centimeter (cm) |
| inch (in.) | 25.4 | millimeter (mm) |
| foot (ft) | 0.3048 | meter (m) |
| mile (mi) | 1.609 | kilometer (km) |
| mile per hour (mi/h) | 1.609 | kilometer per hour (km/h) |

SI to Inch/Pound

| Multiply | By | To obtain |
|-------------------------------------|---------|--------------------------------|
| centimeter (cm) | 0.3937 | inch (in.) |
| centimeter per year (cm/yr) | 0.3937 | inch (in/yr) |
| cubic kilometer (km ³) | 0.2399 | cubic mile (mi ³) |
| kilometer (km) | 0.6214 | mile (mi) |
| kilometer (km) | 0.5400 | mile, nautical (nmi) |
| kilometer per hour (km/h) | 0.6214 | mile per hour (mi/h) |
| liter (L) | 0.2642 | gallon (gal) |
| liter (L) | 61.02 | cubic inch (in ³) |
| millimeter (mm) | 0.03937 | inch (in.) |
| millimeter per year (mm/yr) | 0.03937 | inch per year (in/yr) |
| meter (m) | 3.281 | foot (ft) |
| square kilometer (km ²) | 0.3861 | square mile (mi ²) |

Temperature in degrees Celsius (°C) may be converted to degrees Fahrenheit (°F) as follows:

$$^{\circ}\text{F} = (1.8 \times ^{\circ}\text{C}) + 32.$$

Temperature in degrees Fahrenheit (°F) may be converted to degrees Celsius (°C) as follows:

$$^{\circ}\text{C} = (^{\circ}\text{F} - 32) / 1.8.$$

Alaska Volcanoes Guidebook for Teachers

By Jennifer N. Adleman¹

Introduction

Alaska's volcanoes, like its abundant glaciers, charismatic wildlife, and wild expanses inspire and ignite scientific curiosity and generate an ever-growing source of questions for students in Alaska and throughout the world. Alaska is home to more than 140 volcanoes, which have been active over the last 2 million years. About 90 of these volcanoes have been active within the last 10,000 years and more than 50 of these have been active since about 1700. The volcanoes in Alaska make up well over three-quarters of volcanoes in the United States that have erupted in the last 200 years. In fact, Alaska's volcanoes erupt so frequently that it is almost guaranteed that an Alaskan will experience a volcanic eruption in his or her lifetime, and it is likely they will experience more than one. It is hard to imagine a better place for students to explore active volcanism and to understand volcanic hazards, phenomena, and global impacts.

Previously developed teachers' guidebooks with an emphasis on the volcanoes in Hawaii Volcanoes National Park (Mattox, 1994) and Mount Rainier National Park in the Cascade Range (Driedger and others, 2005) provide place-based resources and activities for use in other volcanic regions in the United States. Along the lines of this tradition, this guidebook serves to provide locally relevant and useful resources and activities for the exploration of numerous and truly unique volcanic landscapes in Alaska. This guidebook provides supplemental teaching materials to be used by Alaskan students who will be inspired to become educated and prepared for inevitable future volcanic activity in Alaska. The lessons and activities in this guidebook are meant to supplement and enhance existing science content already being taught in grade levels 6–12. Correlations with Alaska State Science Standards and Grade Level Expectations adopted by the Alaska State Department of Education and Early Development (2006) for grades six through eleven are listed at the beginning of each activity. A complete explanation, including the format of the Alaska State Science Standards and Grade Level Expectations, is available at the beginning of each grade link at <http://www.eed.state.ak.us/tls/assessment/GLEHome.html>.

¹Currently with Alaska Division of Economic Development, 550 W 7th Ave, Ste 1770 Anchorage, AK 99501-3569

Organization

Chapters

This guidebook consists of seven topical chapters placed in recommended order of use. Each chapter begins with a list of recommended resources followed by three or four activities associated with the chapter topic. These activities are sequentially arranged to provide appropriate background materials and experiences that allow students an opportunity to build upon their understanding of the content as they explore new information. Most of the activities include worksheets for distribution and use in your classroom, or that can act as a guide from which to generate class discussion. All of the figures used in the activities are available on an accompanying digital presentation for classroom use.

Educators can use this guidebook to augment existing curriculum focused on Earth science processes, including those with an emphasis on natural hazards, earthquakes, volcanoes, and plate tectonics. These inquiry-based, hands-on, and place-based activities allow educators to use appropriately Alaska's dynamic environment to illustrate scientific concepts and content emphasized in the State's secondary-level science standards. The final activity prioritizes materials from the guidebook and recommends additional dynamic internet resources available in the event of heightened volcanic activity or volcanic eruption(s) in Alaska.

Activities

Each activity includes all or some of these sections:

- Activity title
- Grade level
- Setting
- Time (estimate)
- Vocabulary (where appropriate)
- Correlations to Alaska State Science Standards (where appropriate)
- Overview of the goals of the exercise
- Background
- Objectives (for students)
- Materials
- Procedures (for teachers and students)
- Extension (extra activities)
- References (where appropriate)
- Glossary (where appropriate)
- Student worksheets (where appropriate)
- Worksheet keys (where appropriate)

References Cited

- Alaska State Department of Education and Early Development, 2006, Standards and grade level expectations, March 2006: State of Alaska website, accessed October 2009 at <http://www.eed.state.ak.us/tls/assessment/GLEHome.html>.
- Driedger, C.L., Doherty, Anne, and Dixon, Cheryll, 2005, Living with a volcano in your backyard—An educator's guide with emphasis on Mount Rainier: U.S. Geological Survey General Interest Product 19; produced in cooperation with the National Park Service, available at <http://vulcan.wr.usgs.gov/Outreach/Publications/GIP19/>.
- Mattox, S.R., 1994, A teachers' guide to the geology of Hawaiian Volcanoes National Park: Hawaii Natural History Association.