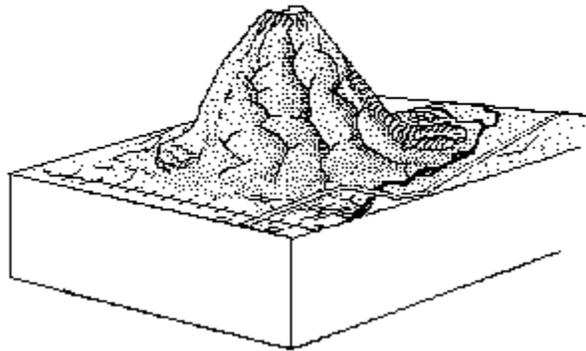


**U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY**



Make Your Own Paper Model of a Volcano

By

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Open-file report 91-115B

Menlo Park, California

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Description

This report contains instructions and a pattern for making a three-dimensional paper model of a volcano. This model is intended to help students and others visualize a stratovolcano (inside and out) and to learn some of the terms used by geologists in describing it. By construction and examining the model, students will obtain a greater appreciation of the relationship between the internal structure of the volcano and its exterior shape and features. This exercise may give the student an insight as to how a stratovolcano is formed. Included in this report are the paper model, instructions for assembly, educators' guide, and a simple description of volcanoes.

The WWW version of this report includes a QuickTime animation of an erupting volcano. This animation was extracted from the HyperCard stack that was included with the diskette version of the original Open-file report, as described in the next paragraph.

Purchasers of the diskette version of this report, which includes all of the text and graphics, can use HyperCard 2.0 software (not supplied) to change the model (by adding geologic patterns, symbols, colors, etc.) or to transfer the model to other graphics software packages. Requirements for the diskette version are: Apple Computer Inc., HyperCard 2.0 software and Apple Macintosh Plus or later computer. The original publication date of this Open-file Report was February 4, 1991. OF 91-115-A, is a paper copy, with 3 pages. OF 91-115-B comes on a Macintosh 3.5 inch diskette. To order either of these versions of this report, contact: U. S. Geological Survey Books and Open-File Reports Sales, P. O. Box 25425, Denver, CO 80225, or call (303) 236-7476.



[QuickTime Volcano Eruption Movie](#)

You will need to download a QuickTime player. Follow instructions on the [Apple Site](#) to obtain the QuickTime player for Apple, Windows 3.1 or Windows 95 computers.

For other platforms, players can be found on WWW sites such as WWW.SHAREWARE.COM or [MTV Online](#).

Educators' Guide

The paper model in this report represents a *stratovolcano*, or *composite volcano*. It is the most common type of volcano on Earth. Scientists classify volcanoes into three main types: cinder cones, shield volcanoes, and stratovolcanoes (composite volcanoes).

Cinder cones are the smallest and have steep sides that are formed largely by the piling up of *ash*, *cinders*, and rocks. All of these materials are called pyroclastic ("fire-broken") and have been explosively erupted from the vent of the volcano. As the material falls back to the ground, it generally piles up to form a symmetrical, steep-sided cone around the vent. Sunset Crater in Arizona and Paricutin in Mexico are well-known examples of cinder cones.

Shield volcanoes are generally not explosive and are built by the accumulation of very fluid *lava* flows that spread out to produce a mountain with broad, gentle slopes. Shield volcanoes are the largest of all volcanoes, up to tens of kilometers across, and thousands of meters high. Kilauea and Mauna Loa Volcanoes in Hawaii are classic examples of active shield volcanoes.

A stratovolcano is built up of lava flows interlayered with pyroclastic material. Scientists believe that the layering represents a history of alternating explosive and quiet eruptions. Young stratovolcanoes are typically steep sided and symmetrically cone shaped. There are several active stratovolcanoes in North America. Since 1960, Mount Saint Helens in Washington has become the most familiar. Other well known stratovolcanoes in the United States include Mount Rainier, Mount Shasta, Mount Mazama (Crater Lake), and Redoubt Volcano in Alaska. Mount Fuji in Japan and Mount Vesuvius in Italy are other famous stratovolcanoes.

Questions for Further Study

1. Name some other stratovolcanoes and their locations around the world.
 2. On the paper model, a small town has been built at the foot of the volcano. This is a common situation around the world. What are some of the problems or hazards the townspeople might have to face living so close to a volcano? Discuss possible solutions to these problems with your class.
 3. What types of rocks are produced by volcanoes? Investigate different volcanic rocks and their origins. Which types of rocks are associated with each of the three types of volcanoes discussed above?
 4. What is another word for the "hole" in the top of the volcano?
 5. Where is the main vent of the paper model volcano? Can you find a second vent drawn on the side of the model volcano?
 6. Why are most volcanoes on Earth cone-shaped?
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Vocabulary

Discuss the meanings and usage of the following words with your class.

ash	cinders	crater	pyroclastic
stratovolcano	cinder cone	composite volcano	lava
shield volcano	vent	volcanic hazard	eruption

Suggested Reading

Crandell, D. R., and Nichols, D. R., 1987, Volcanic Hazards at Mount Shasta, California, U. S. Geological Survey General Interest Publication, 21p.

Heliker, C., 1990, volcanic and seismic Hazards on the Island of Hawaii: U. S. Geological Survey General Interest Publication, 48p.

Simkin, T., tilling, R. I., Taggart, J. N., Jones, W. J., and Spall, H., compilers, 1989, this Dynamic Planet: World Map of Volcanoes, Earthquakes, and Plate Tectonics: U. S. Geological Survey, Reston, VA, in cooperation with the Smithsonian Institution, Washington, D. C.

Tilling, R. I., 1982, Volcanoes: U. S. Geological Survey General Interest Publication, 45p.

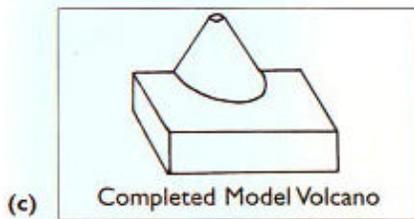
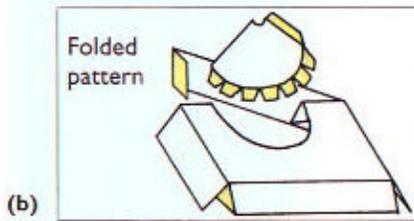
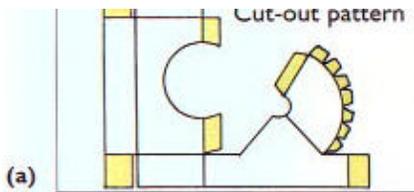
Tilling, R. I., Heliker, C., and Wright, T. L., 1987, Eruptions of Hawaiian volcanoes: Past, Present and Future: U. S. Geological Survey General Interest Publication, 54p.

Tilling, R. I., Topinka, L., and Swanson, D. A., 1984, revised 1990, Eruptions of Mount St. Helens: Past, Present, and Future: U. S. Geological Survey General Interest Publication, 57p.

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Volcano Model



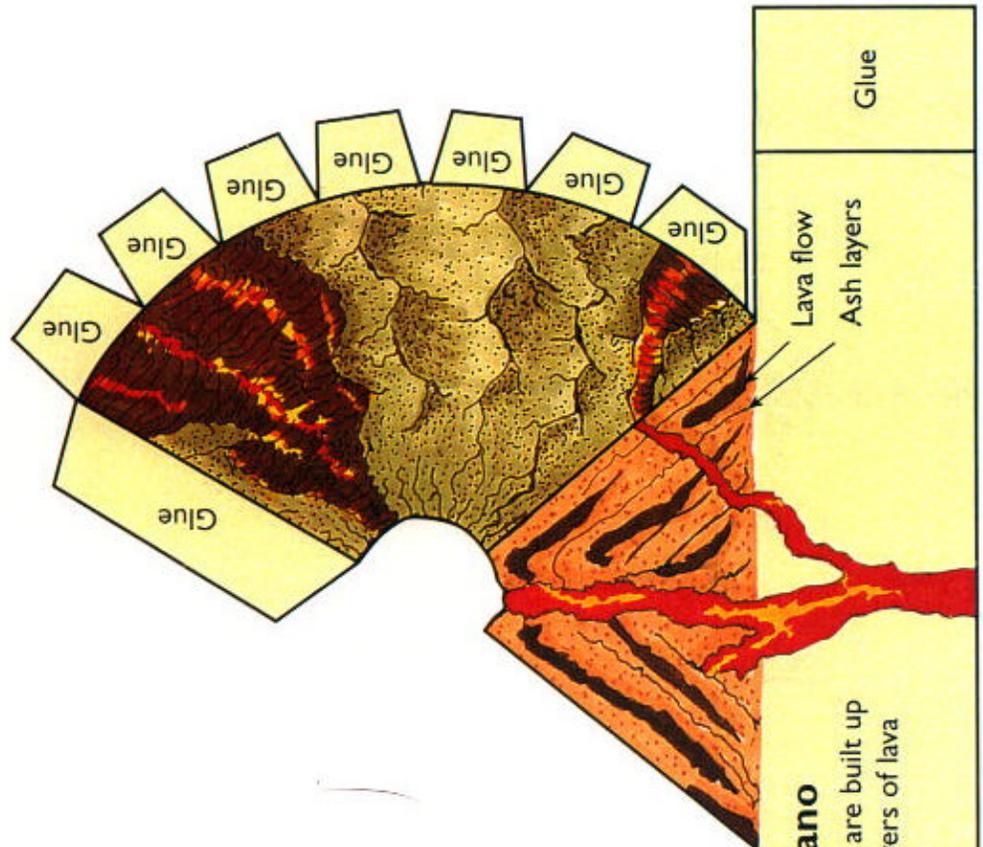
Cut out the paper volcano model by cutting along all its outside edges.

Fold the pattern as shown in the diagrams above, so the printed side faces outward.

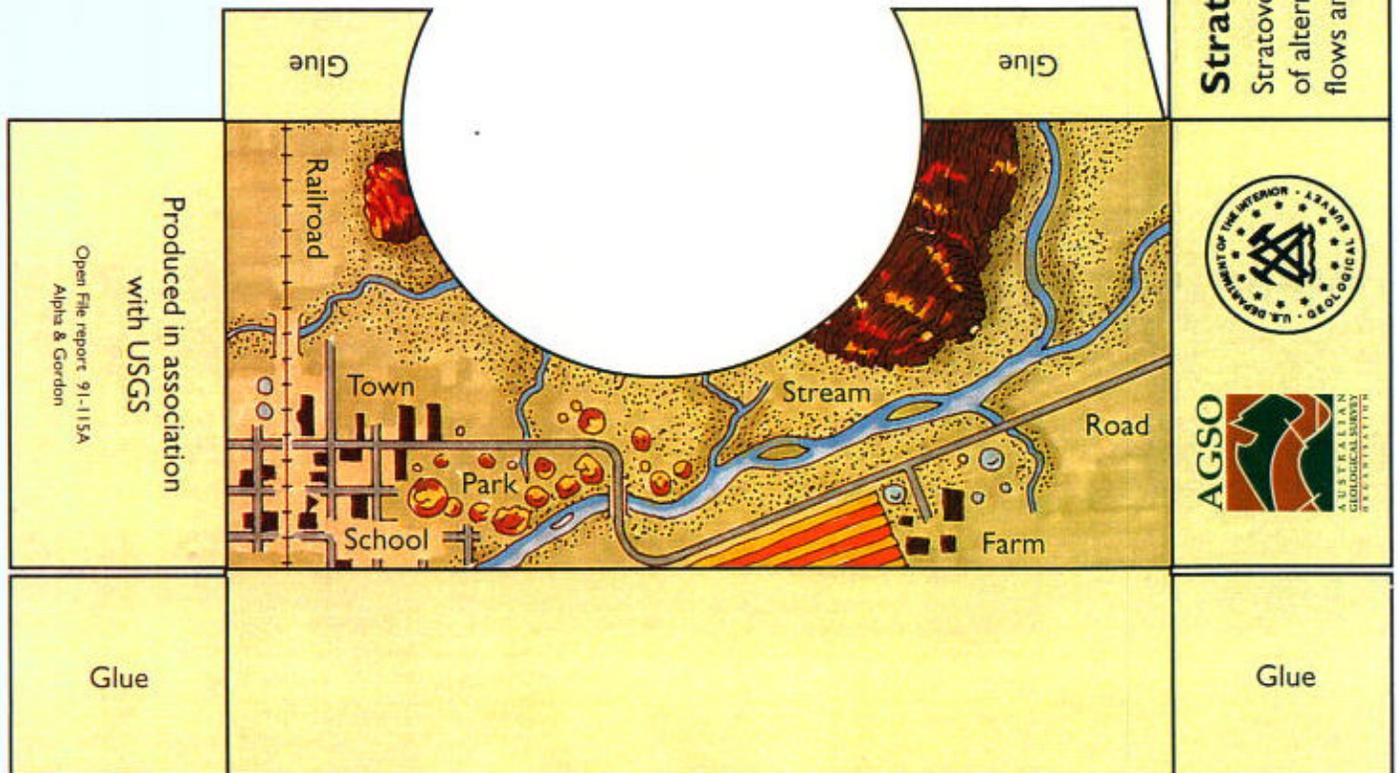
Try the pieces for fit before applying glue or tape.

Glue or tape the tabs as indicated.

Your completed model should look like drawing (c).



Stratovolcano
Stratovolcanoes are built up of alternating layers of lava flows and ash.



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Alpha & Gordon



Glue

Glue

Print this

Volcano pattern



use Tall Adjusted

Glue

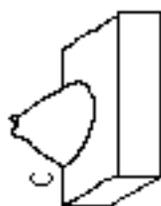
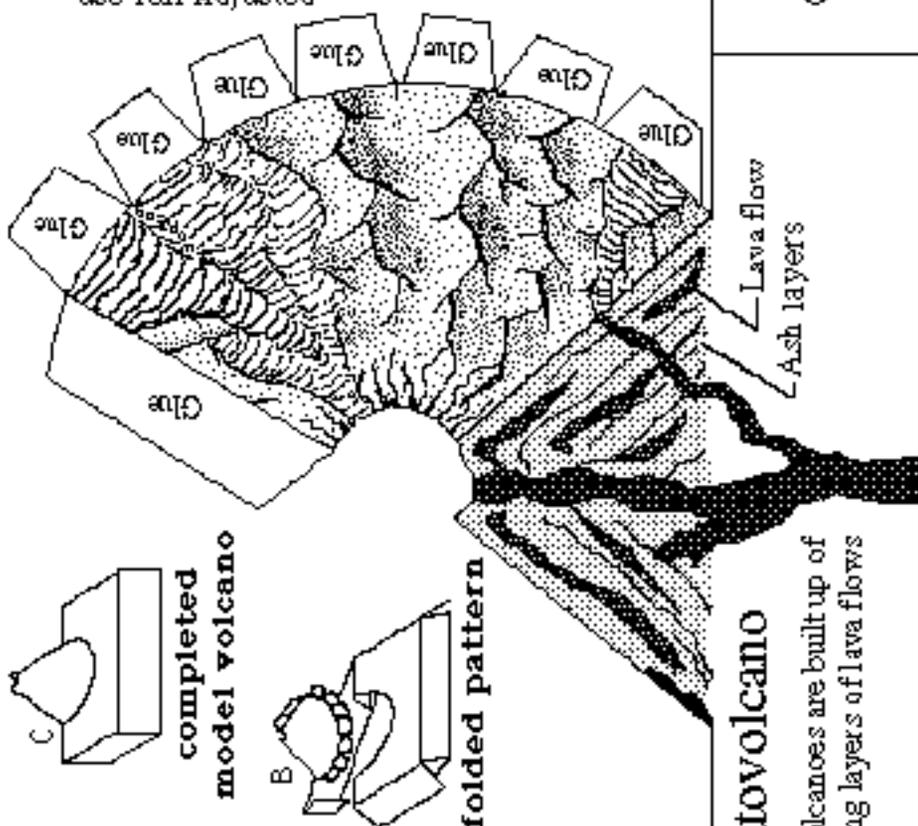
Lava flow
Ash layers

Stratovolcano

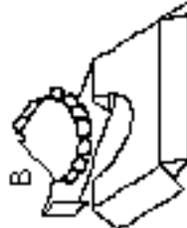
Stratovolcanoes are built up of alternating layers of lava flows and ash.

Glue

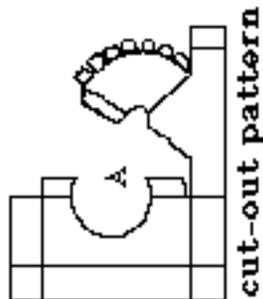
If you want to color the model, do so before you cut it out. Cut out the paper volcano pattern by cutting along all its outside edges. Fold the pattern as shown in the diagrams, so the printed side faces outward. Try the pieces for fit before applying glue or tape. Glue or tape the tabs indicated. Your completed model should look like the drawing on the front cover of this report.



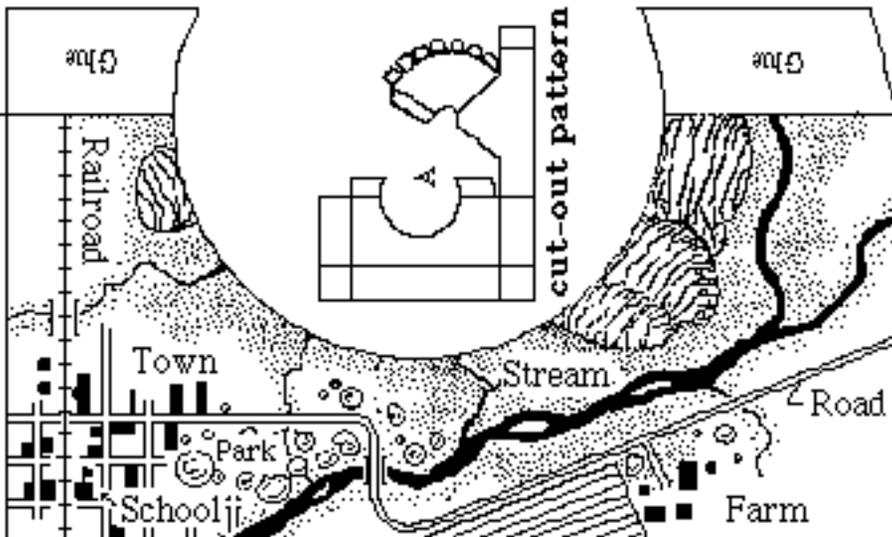
completed model volcano



folded pattern



cut-out pattern



Glue

Glue

Glue

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