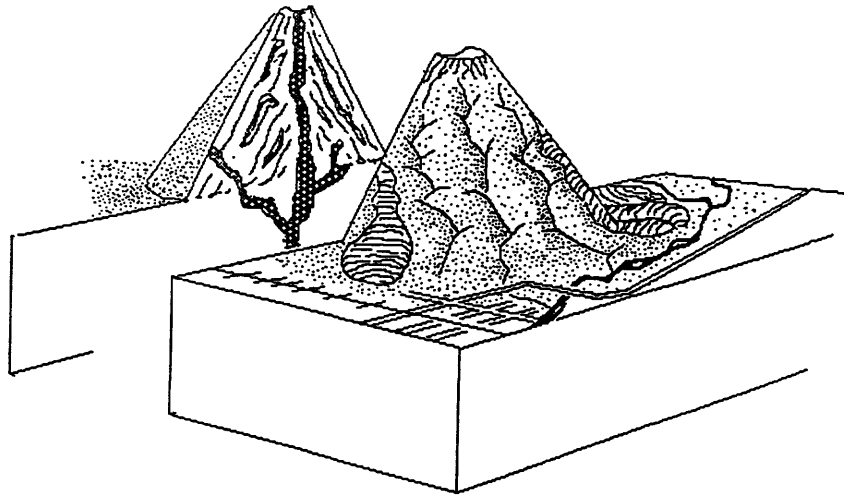


U.S. Department of the Interior
U.S. Geological Survey

MAKE YOUR OWN PAPER MODEL OF A

Volcano



By
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Open-File Report 91-115A

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 to visualize a stratovolcano (inside and out) and to learn some of the terms used by geologists in describing it. By constructing 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.

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™ version 2.0 software, and Apple Macintosh™ Plus, Classic, SE, or II series computer.

The date of this Open File Report is 2/4/91. OF 91-115A, paper copy, 4p. OF 91-115B, 3.5" Macintosh diskette.

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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 are formed largely by the piling up of *ash*, *cinders* and rocks, all of which are called *pyroclastic* ("fire-broken") material, that 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 Parícutin 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 1980 Mount Saint Helens in Washington has become the most familiar. Other well known stratovolcanoes in the United States include Mount Rainier, Mount Shasta, Mt. 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", or vent, 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?

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

ash	composite volcano	lava	shield volcano	vent
cinder cone	crater	pyroclastic	stratovolcano	volcanic hazards
cinders	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.

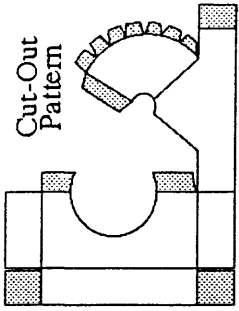
Tilling, R.I., 1982, Volcanoes: U.S. Geological Survey General Interest Publication, 45p.

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.

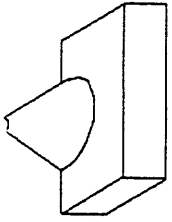
Tilling, R.I., Topinka, L., and Swanson, D.A., 1984, revised 1990, Eruptions of Mount St. Helens: Past, Present, and Future: U.S. Geological Survey General Interest Publication, 57p.

Volcano Pattern

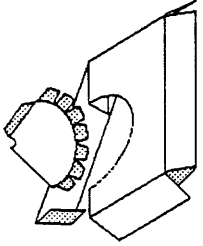
Constructing Your Paper Volcano



Cut-Out Pattern

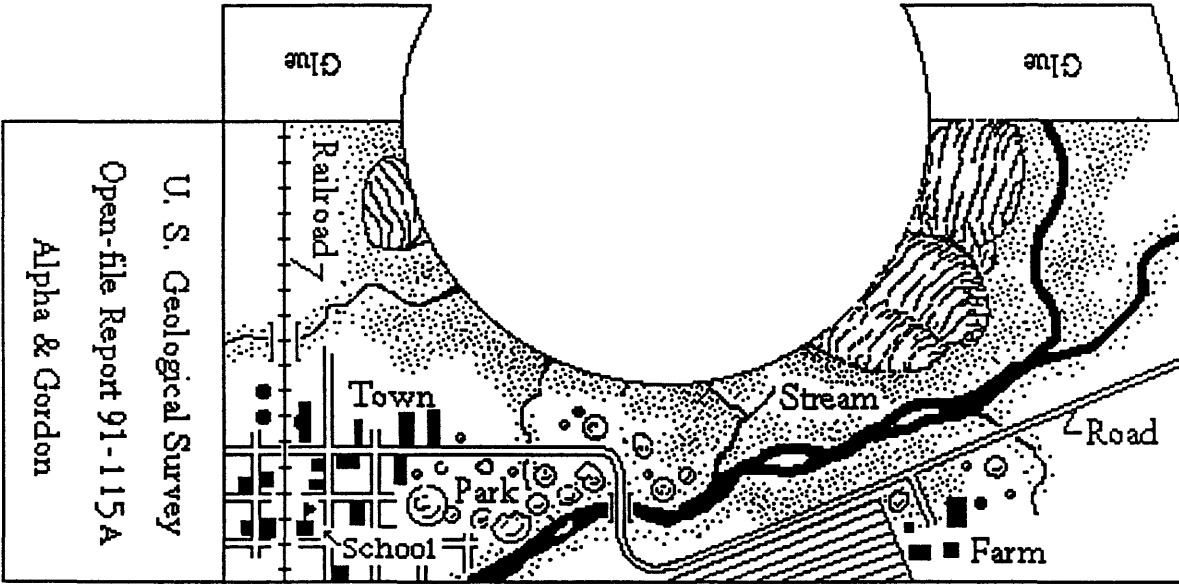


Completed Model Volcano



Folded pattern

If you want to color the model, do so before you cut it out. 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 the drawing on the front cover of this report.

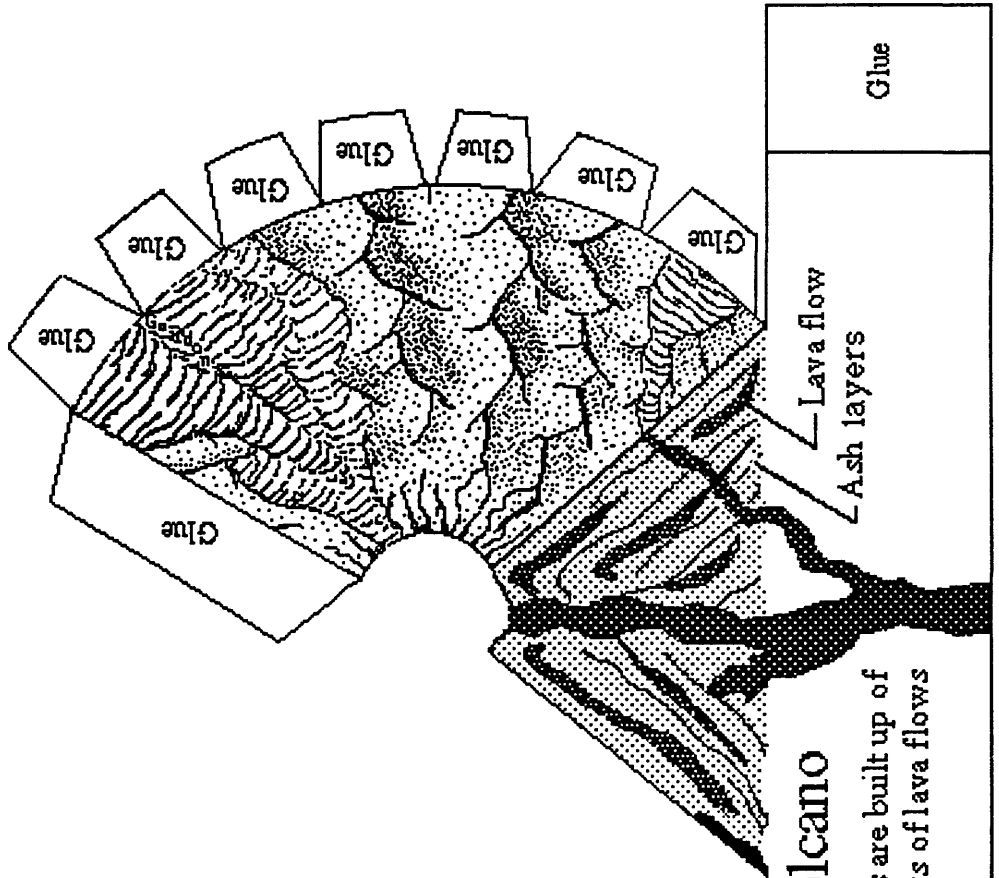


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Alpha & Gordon



Stratovolcano

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



Glue

Lava flow
Ash layers

Glue