

## PERFORM THE TASK

*How do volcanoes affect people and environments?*

**You will read:**

- ▶ **THREE INFORMATIONAL ARTICLES**  
*How Many Active Volcanoes Are There?*  
*Volcanic Soils*  
*On the Slopes of Mauna Loa, Hawaii Island*

**You will write:**

- ▶ **AN INFORMATIVE ESSAY**  
*How do volcanoes affect people and environments?*

## Part 1: Read Sources

### Source 1: Informational Article

# How Many Active Volcanoes Are There?

by Tom Simkin and Lee Siebert, Smithsonian Institution, Global Volcanism Program

**AS YOU READ** Identify terms and ideas that you might be able to use in your essay. For example, “active” volcanoes are likely to be a topic in these essays.

#### NOTES

The answer to this common question depends upon the use of the word “active.” At least 20 volcanoes will probably be erupting as you read these words (Italy’s Stromboli, for example, has been erupting for more than a thousand years). Roughly 60 erupted each year through the 1990s; 154 in the full decade of 1990–1999; about 550 have had historically documented eruptions. Some 1300 (and perhaps more than 1500) have erupted in the Holocene (the past 10,000 years), and some estimates of young seafloor volcanoes exceed a million. Because dormant intervals between major eruptions at a single volcano may last hundreds to thousands of years, dwarfing the relatively short historical record in many regions, it is misleading to restrict usage of “active volcano” to recorded human memories: we prefer to add another identifying word (e.g.<sup>1</sup> “historically active” or “Holocene volcano”).

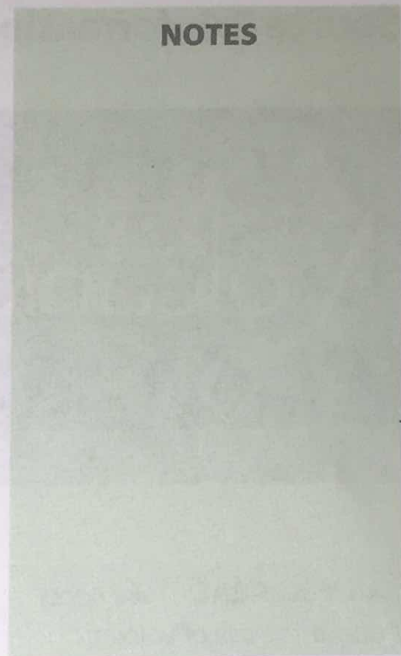
The definition of “volcano” is as important in answering the number question as the definition of “active.” Usage has varied widely, with “volcano” applied to individual vents, measured in meters, through volcanic edifices<sup>1</sup> measured in tens of kilometers, to volcanic fields measured in hundreds of kilometers. We have tended toward the broader definition

<sup>1</sup> **edifice:** cone-shaped structure at a volcano’s top

<sup>2</sup> **e.g.:** *exempli gratia*, Latin for “for example”

in our compilations, allowing the record of a single large plumbing system<sup>3</sup> to be viewed as a whole, but this approach often requires careful work in field and laboratory to establish the integrity of a group's common magmatic<sup>4</sup> link. The problem is particularly difficult in Iceland, where eruptions separated by many tens of kilometers along a single rift may share the same magmatic system. A "volcanic field," such as Mexico's Michoacán-Guanajuato field (comprising nearly 1,400 cinder cones<sup>5</sup>, maars<sup>6</sup>, and shield volcanoes<sup>7</sup> derived from a single magmatic system, dotting a 200 x 250 km area) may be counted the same as a single volcanic edifice. Perhaps the most honest answer to the number question is that we do not really have an accurate count of the world's volcanoes, but that there are at least a thousand identified magma systems<sup>8</sup>—on land alone—likely to erupt in the future.

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### How many active volcanoes known?

Erupting now:	perhaps 20
Each year:	50-70
Each decade:	about 160
Historical eruptions:	about 550
Known Holocene eruptions (last 10,000 years):	about 1300
Known (and possible) Holocene eruptions:	about 1500



Note that these figures do *not* include the large number of eruptions (and undescribed volcanoes) on the deep sea floor.

- <sup>3</sup> **single large plumbing system:** underground chambers of liquid magma that run beneath volcanoes in a series of "pipes"
- <sup>4</sup> **magmatic:** made of molten rock found under the earth's crust
- <sup>5</sup> **cinder cone:** the simplest type of volcano, created when particles and blobs of congealed lava explode from one vent. Cinder cones have a circular or oval cone around their vent.
- <sup>6</sup> **maar:** depressed crater caused by an eruption during which ground water makes contact with lava or magma, resulting in an explosion. The explosion makes a hole in the ground, which is the maar crater.
- <sup>7</sup> **shield volcano:** large volcanoes that are built almost completely from lava. They are named for their sloping sides, which resemble a warrior's shield.
- <sup>8</sup> **magma system:** the underground system of "pipes" through which magma flows

### Close Read

What is the best answer to the title's question? Cite textual evidence in your response.

## Source 2: Informational Article

# Volcanic Soils

by Russell McDonough

**AS YOU READ** Take notes about the use of volcanic soils.

### NOTES

Volcanic eruptions produce deposits of rock and ash in the surrounding area. These deposits are rich in minerals, but the minerals are not immediately available to plants. Depending on the location of the volcano, it can take thousands of years of weathering for the ash and rock deposits to form a rich soil. When they do become soils, they are often among the richest soils on Earth.

The rate at which volcanic loam is formed often depends on geographical factors. In Hawaii, for example, weathering from  
10 wind and rain occurs quickly because of the tropical climate. Hawaii's lush vegetation is due to the rapid formation of soil from volcanic deposits. Ash also contributes to soil formation. However, smaller particles of ash—often less than a millimeter in diameter—are more quickly embedded in the existing soil and more quickly broken down into nutrients. These smaller particles of ash are usually found farther from the volcano than larger particles.

Once volcanic deposits have been broken down, they enrich the soil both by adding important nutrients for plants and  
20 by providing excellent drainage. The extent to which these deposits enrich the soil is well-illustrated in Italy. The soil in southern Italy is generally quite poor except for the area around Naples. This region includes Mount Vesuvius, which experienced two major eruptions more than 10,000 years ago.

This area has been intensively cultivated for crops for over 2,000 years. The soil is so rich that farmers often plant different crops intermingled with each other to maximize the use of every square inch available.

In addition to enriching soil nutrients, volcanic deposits  
30 improve soil in other ways. By improving moisture retention, they make soil easier to till for farming. Also, volcanic soils are good for pasture growth because of how well they hold water for plants. The North Island of New Zealand, which is rich in volcanic loam, has a large and prosperous dairy industry that depends on the verdant pasturelands of the island.



A stamp printed in 1996 shows Pukekura Park Gardens in New Plymouth, a major regional city on the North Island of New Zealand. New Plymouth is known for having rich volcanic soil and lush gardens. The stamp shows a still-active volcano in the background, Mt. Taranaki.

## NOTES

### Close Read

Why is it important to know that the soil in southern Italy is unusually poor? Cite text evidence in your response.

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## Source 3: Informational Article

# On the Slopes of Mauna Loa, Hawaii Island

**AS YOU READ** Underline key ideas and evidence that you might use in your essay.

### NOTES

- Highway 11 is the route a traveler would normally follow from the Kona (west side) direction and driving towards the Hawaii Volcanoes National Park. The western slopes from Manuka State Park to the entrance to the Kahuku section of the Hawaii Volcanoes National Park feature a forest reserve and broad vistas with sweeping views of the ocean and mountain. This section includes landscape passing over relatively new lava so the traveler can experience transitions from substantially untouched to well vegetated volcanic terrain and rain forest.
- 10 The southern slopes from Kahuku to the county park at Honuapo Bay include the green segment that winds into the Waiohinu Valley then down towards the ocean, with a panorama that may extend to a distant view of the Kilauea volcano. The eastern slopes cover the area from Honuapo to the main entrance to the Hawaii Volcanoes National park and offer long, sweeping green views towards the Mauna Loa summit as well as the spectacular and unusual Ninole Hills. The road rises from sea level to over 4,000 feet and is partly within the boundary of the Hawaii Volcanoes National Park. The Kau
- 20 Scenic Byway offers by far the longest stretches of unspoiled natural scenery to be found anywhere in the inhabited Hawaiian Islands.

### Discuss and Decide

What is the effect of volcanoes on Mauna Loa? Cite textual evidence in your response.

# Respond to Questions on Step 3 Sources

The following questions will help you think about the sources you've read. Use your notes and refer to the sources as you answer the questions. Your answers to will help you write your essay.

1 Why is volcanic soil important to those in the region around Naples?

- a. It is the only place scientists can study volcanic ash.
- b. It makes rich soil that is used to grow many plants.
- c. It provides pastureland that supports a dairy industry.
- d. It makes the area unappealing to tourists.

2 Which words best support your answer to Question 1?

- a. "... weathering from wind and rain occurs quickly because of the tropical climate."
- b. "... prosperous dairy industry that depends on the verdant pasturelands ..."
- c. "... farmers often plant different crops ..."
- d. "... minerals are not immediately available to plants."

3 Which of the following is *not* included in a definition of a volcano?

- a. individual vents
- b. magma systems
- c. volcanic edifices
- d. volcanic fields

4 **Prose Constructed-Response** According to "On the Slopes of Mauna Loa, Hawaii Island," how can volcanic eruptions improve the natural landscape? Use details from at least two sources in your response.

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# Part 2: Write

## ASSIGNMENT

You have read information about volcanoes. Write an informative essay examining how volcanoes affect people and environments. Include evidence from what you have read.

## Plan

Use the graphic organizer to help you outline the structure of your informative essay.

**Introduction and Cause**

**Effect and Supporting Details**

**Effect and Supporting Details**

**Effect and Supporting Details**

**Conclusion**

## Draft



Use your notes and completed graphic organizer to write a first draft of your essay.

## Revise and Edit



Look back over your essay and compare it to the Evaluation Criteria. Revise your essay and edit it to correct spelling, grammar, and punctuation errors.

## Evaluation Criteria

Your teacher will be looking for:

### 1. *Statement of purpose*

- ▶ Is it clear what cause you are discussing, as well as its effects?
- ▶ Did you support the points with evidence?

### 2. *Organization*

- ▶ Are the sections of your essay organized in a logical way?
- ▶ Is there a smooth flow from beginning to end?
- ▶ Is there a clear conclusion that supports the thesis?
- ▶ Did you stay on topic?

### 3. *Elaboration of evidence*

- ▶ Is the evidence relevant to the topic?
- ▶ Is there enough evidence?

### 4. *Conventions*

- ▶ Did you follow the rules of grammar usage as well as punctuation, capitalization, and spelling?