

Pompeii—In the Shadow of Vesuvius

Which ancient city ...

- was destroyed in one day?
- lay buried for centuries?
- is a window on ancient Roman life?

Nearly 2,000 years ago, the city of Pompeii prospered on the fertile slopes near the volcano Vesuvius. About 100 kilometers north of Pompeii was the city of Rome. Rome was the capital of a vast empire that stretched across Europe and around the Mediterranean Sea.

Pompeii was a small but popular trading center and site for luxury Roman villas. When Vesuvius erupted violently in A.D. 79, thousands of Pompeians were caught unawares. Ash, hot gases, and rocks trapped and preserved this ancient city and many of its inhabitants. Today, excavations at Pompeii reveal the daily life of a bustling city at the height of the Roman Empire.

Mathematics: Roman Numerals

The citizens of the Roman Empire wrote numbers differently from the way that you do today. They used a system in which letters represent numbers. The letters are called Roman numerals. You may have seen a clock that has Roman numerals on its face. Some Roman numerals and their values are shown in the table below. Additional numbers were written by stringing the letter symbols together. For example, the number 121 is written CXXI.

Roman Numeral	Value of Symbol
M	1,000
D	500
C	100
L	50
X	10
V	5
I	1

Use Roman numerals to write the values listed below.

1. 1,211 _____ 2. 250 _____
3. 510 _____ 4. 52 _____

Write the values of the Roman numerals listed below.

5. VIII _____ 6. MMC _____
7. DCLII _____ 8. MLX _____

Mathematics: Measuring the Explosiveness of Volcanic Eruptions

Because volcanic eruptions are so dangerous, a way to measure their explosiveness was developed. Volcanic eruptions are given a number from 0 to 8. The higher the number is, the more explosive the eruption. The number is called the VEI, or volcano explosivity index. Each number on the scale represents an eruption that is about 10 times more explosive than the next lower number. The table shows the VEIs for some eruptions.

Explosiveness of Some Volcanic Eruptions

Volcano	Year of Eruption	VEI
Toba, Indonesia	about 74,000 years ago	8
Vesuvius, Italy	A.D. 79	5
Tambora, Indonesia	1815	7
Krakatau, Indonesia	1883	6
Mount Pelée, Martinique	1902	4
Mount St. Helens, United States	1980	5

1. Which eruption was most explosive? How do you know?

2. Which eruption was least explosive?

3. How does the eruption of Vesuvius that destroyed Pompeii compare with the other eruptions?

4. About how many times more explosive was the Tambora eruption of 1815 than the Mount St. Helens eruption of 1980? How do you know?

5. About how many times more explosive was the Toba eruption that occurred about 74,000 years ago than the Mount St. Helens eruption of 1980? Explain.

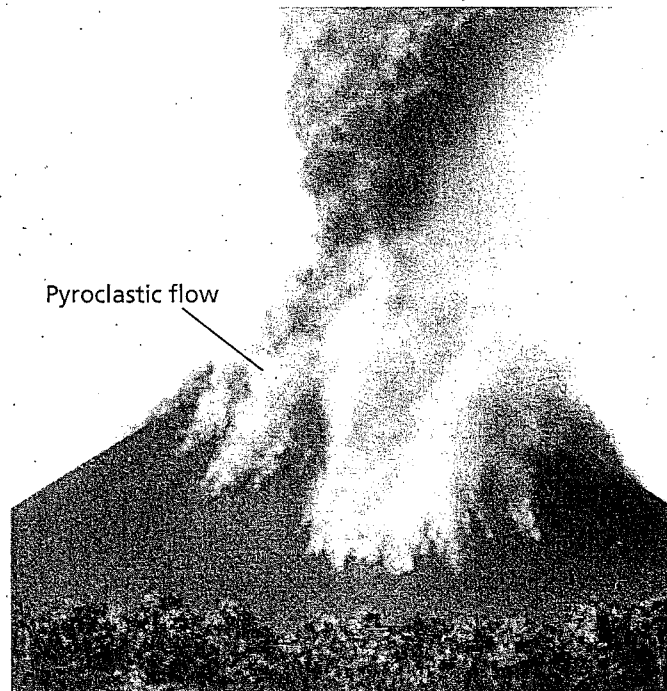
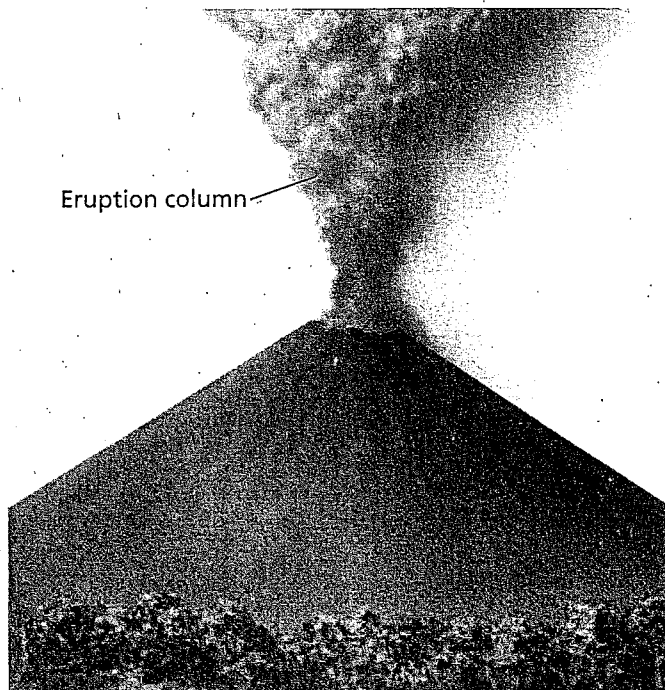
Science: Formation of a Pyroclastic Flow

Mount Vesuvius had erupted in the past, but laid dormant for hundreds of years. Then, around noon on August 24, A.D. 79, the volcano suddenly exploded. Volcanic ash and gases shot 27 kilometers into the air. During the rest of the day and into the night, 3 meters of ash blanketed Pompeii. But the destruction wasn't over. Around midnight, a deadly pyroclastic flow poured over the entire area, trapping about 2,000 Pompeians who had not yet escaped. Afterward, an additional 3 meters of volcanic debris rained down on Pompeii. This layer of material sealed the city, preserving it nearly intact for centuries.

A pyroclastic flow is a flow of hot gas, ash, and pumice that moves rapidly down the side of a volcano. Most of the people who died in Pompeii were killed by pyroclastic flows. The steps on this page show how the pyroclastic flows that destroyed Pompeii formed.

During an explosive eruption like the one that destroyed Pompeii, hot gas, ash, and pumice are propelled high into the air. The column of hot gas, ash, and pumice is called an eruption column. The force of the eruption often is strong enough to cause the eruption column to move straight up. Eventually, the ash and pumice fall back to the ground.

Sometimes, the amount of ash and pumice in the lower part of the eruption column is very high. When this occurs, the lower part of the eruption column can become too dense to rise. Hot gas, ash, and pumice flow sideways down the mountain as a pyroclastic flow. At night, hot pyroclastic flows often appear to glow. That is why they sometimes are called "glowing avalanches."



Science: Formation of a Pyroclastic Flow *(continued)*

Use the information and figures on the previous page to help you answer the questions below. Write your answers in the spaces provided.

1. What is an eruption column?

2. Why do eruption columns often shoot straight up into the air?

3. Why might part of an eruption column collapse to form a pyroclastic flow?

4. Why are pyroclastic flows sometimes called "glowing avalanches"?

5. Pyroclastic flows killed about 2,000 people in Pompeii. Why do you think pyroclastic flows are so dangerous?
