

Section 1 Volcanoes and Earth's Moving Plates

Underlined words and phrases are to be filled in by students on the Note-taking Worksheet.

- A. **Volcano**—opening in Earth that erupts gases, ash, and lava.
- B. Volcanoes can kill people, destroy property, and disrupt the environment.
- Lava and pyroclastic flows can bury cities and towns in their paths. P335
 - Sulfurous gases from volcanoes can create acid rain, which can kill organisms and pollute water.
- C. Volcanoes form when magma flows out of a surface opening called a vent; a steep-walled depression around the vent is called a crater.
- D. Volcanoes often form where plates are moving together or moving apart.
- The Mid-Atlantic Ridge is a divergent plate boundary that forms rifts through which lava can flow.
 - At convergent plate boundaries, volcanoes tend to erupt more violently than they do in other areas.
 - At the boundary between Earth's mantle and core, unusually hot areas form hot spots, such as at the Hawaiian Islands.

DISCUSSION QUESTION:

Where do volcanoes tend to form? *Where plates are moving together (convergent) or moving apart (divergent) or at hot spots*

Section 2 Types of Volcanoes

- A. The amount of water vapor and other gases present is one factor that determines whether a volcanic eruption will be quiet or explosive.
- Gases can be trapped in magma by pressure of surrounding magma and rock; eventually they cause an explosive eruption.
 - Magma at convergent plate boundaries can contain a lot of water vapor that can cause explosive eruptions.
- B. The composition of magma is a second factor affecting the nature of a volcano's eruption.
- ★ 1. Low-silica magma, called basaltic, is fluid and produces a quiet, nonexplosive eruption.
- Pahoehoe lava runs down the side of a volcano. 341
 - Aa lava is a stiff, slow moving lava.
- ✱ 2. High-silica magma called granitic and intermediate silica magma called andesitic produce explosive eruptions.

Content Outline for Teaching (continued)

C. Three types of volcanoes form from the three types of lava.

1. As quiet eruptions of basaltic lava spread out in flat layers, they form a broad volcano with gently sloping sides called a shield volcano. P.344
2. As tephra (bits of rocks or solidified lava) falls to the ground, it forms a steep-sided, loosely packed cinder cone volcano. P.344
3. A composite volcano forms from alternating layers of quiet lava and more explosive tephra.

DISCUSSION QUESTION:

What two factors account for the varying force of volcanic eruptions? *Amount of gas or water vapor present in the magma, and amount of silica in the magma*

Section 3 Igneous Rock Features

A. Many intrusive igneous features form underground and are later exposed.

1. **Batholiths**—rock bodies formed when magma bodies that are being forced upward from inside Earth cool slowly and solidify before reaching the surface
2. **Dike**—magma that hardens after being forced into a crack cutting across rock layers;
sill—magma that hardens after being forced into a crack parallel to rock layers

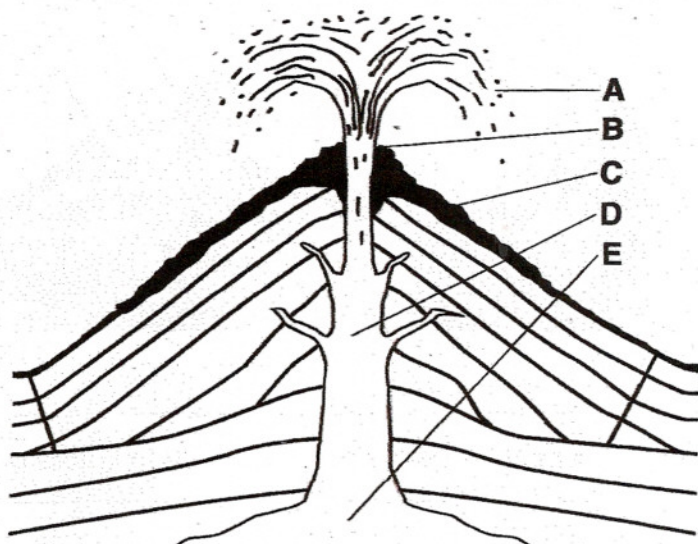
B. A volcanic neck forms when the cone is eroded away, leaving the solid igneous core.

1. **Caldera**—large depression formed when the top of a volcano collapses
2. Weathering and erosion wear down surface rock and expose igneous rock features.

DISCUSSION QUESTION:

How do a dike and a sill differ? *A dike forms from magma that hardens after being forced into a crack cutting **across** rock layers; a sill forms from magma that hardens after being forced into a crack **parallel** to rock layers.*

1. Use the diagram to identify the parts of a volcano.



- A ash, gas, tephra
B crater
C lava
D vent
E magma chamber

SECTION

2

Reinforcement

Types of Volcanoes

Directions: Identify each form of volcano and then fill in the chart with the appropriate information about each form.

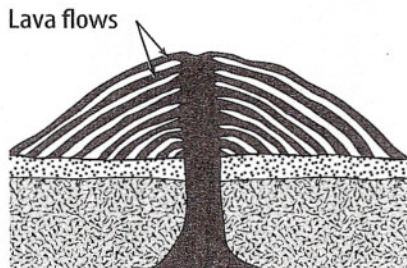


Figure 1

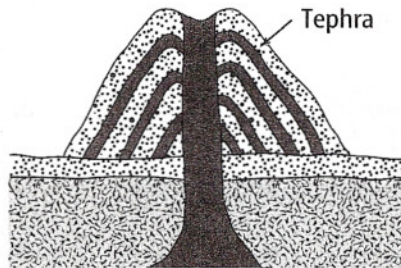


Figure 2

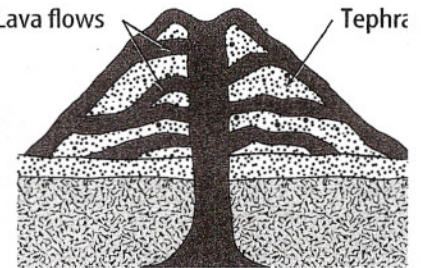


Figure 3

Form of volcano	Type of magma	Shape of volcano	Materials in volcano
1. Shield	basaltic	broad	lava
2. Cinder-conc	granitic Andestic	Steep	tephra
3. Composite	granitic Andestic basaltic	steep	lava tephra

Directions: Answer the following questions on the lines provided.

4. What is the relationship between the amount of gases in magma and the explosiveness of a volcanic eruption?

if gas release out of magma as it approaches the surface, the lava flows out slowly in a quiet eruption. If not released as approaching surface pressure build up violent explosion.

5. What is the relationship between the silica content of magma and the explosiveness of a volcanic eruption?

basaltic - low silica - flows quietly
 grantic - high silica - thick, build up, violent pressure.
 Andestic - Med silica - more violent than basaltic but less than granitic.

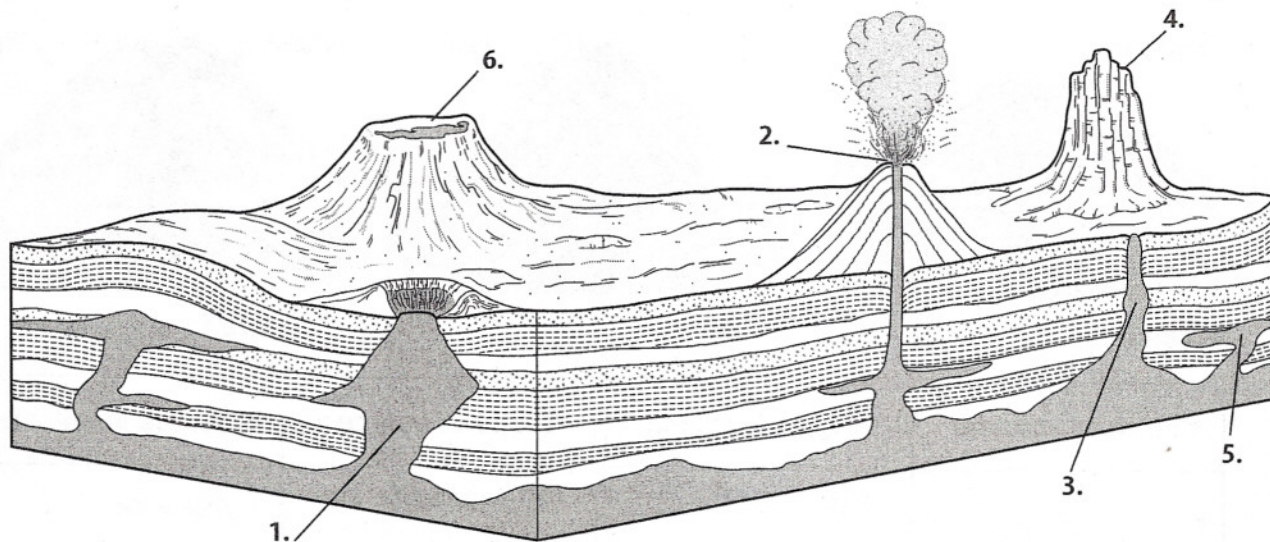
SECTION

3

Reinforcement

Igneous Rock Features

Directions: Identify each volcanic feature shown in the figure. Describe how it is formed.



1. Batholith

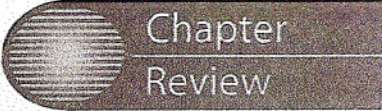
2. Cinder-cone volcano

3. Dike

4. Volcano neck

5. Sill

6. Caldera


 Chapter
Review

Volcanoes

Part A. Vocabulary Review

Directions: Match the descriptions in Column I with their terms in Column II. Write the letter of the correct term or phrase in the blank at the left.

Column I

- J 1. ash and cinders blown violently out of volcanoes
- A 2. largest intrusive igneous rock body
- D 3. volcano formed from alternating layers of lava and tephra
- F 4. magma hardened in a vertical crack
- M 5. mountain that forms from layers of lava and ash
- K 6. opening through which magma flows out on Earth's surface
- I 7. magma hardened in a horizontal crack
- L 8. solid magma core exposed when volcano cone erodes away
- G 9. hot area in Earth's mantle that melts rock into magma
- C 10. steep-sided volcano made of tephra
- B 11. large opening caused by the collapse of the top of a volcano
- H 12. basaltic volcano with gently sloping sides
- E 13. opening at the top of a volcano's vent

Column II

- a. batholith
- b. caldera
- c. cinder cone
- d. composite volcano
- e. crater
- f. dike
- g. hot spot
- h. shield volcano
- i. sill
- j. tephra
- k. vent
- l. volcanic neck
- m. volcano

Directions: Find the mistakes in the statements below. Rewrite each statement correctly on the lines provided.

14. After many thousands, or even millions of years, magma reaches Earth's surface and flows out through an opening called a ~~crater~~.

vent

15. Rock melts at ~~calderas~~ and then is forced toward the crust as magma.

hot spots

16. When tephra falls to the ground, it forms a steep-sided, very ~~hard~~-packed, cinder cone volcano.

loosely

Chapter Review (continued)

Part B. Concept Review

Directions: Choose the correct category from the list for each igneous rock feature. Each category will be used more than once. Write the letter of the correct category or categories in the space beside each igneous rock feature.

Igneous Rock Feature

- A 1. batholith
 A 2. dike
 A 3. sill
 B 4. volcanic neck
 C 5. caldera

Category

- a. formed when magma solidifies underground
b. formed from erosion
c. formed when an action changes the top of a volcano

Directions: Answer the questions on the lines provided.

6. What are two important factors that affect the explosiveness of a volcanic eruption?

① amount of water vapor & gases
 ② amount of silica

7. What kind of volcanic eruption occurs when basaltic magma is present? Why?

Quiet - silica poor - fluid allows gases to escape.

8. What kind of volcanic eruption occurs when granitic magma is present? Why?

Violent - silica rich - magma is thick & traps gases causing explosive eruptions

9. Why are volcanoes dangerous to people?

Flowing lava will destroy everything in its path. Volcanic ash will collapse buildings, block roads, force people to abandon their homes & cause lung disease.