

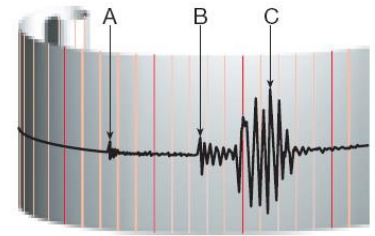
# Ch 8: Study Guide

## Vocabulary

earthquake, p. 218; focus, p. 218; epicenter, p. 219; fault, p. 219; elastic rebound hypothesis, p. 220; aftershock, p. 221; foreshock, p. 221; seismograph, p. 222; seismogram, p. 222; surface wave, p. 223; P wave, p. 223; S wave, p. 223; moment magnitude, p. 227; liquefaction, p. 230; tsunami, p. 230

## Understanding Concepts

Use the diagram below to answer Questions 1 and 2.



1. The diagram shows a typical recording of an earthquake. What is the record called?  
*Seismogram*
2. Identify the waves recorded at A, B, and C on the diagram.  
*A = P Wave, B = S Wave, C = Surface Wave*
3. Does all motion along large faults occur in the form of destructive earthquakes? *No*
4. What type of seismic wave causes the greatest destruction to buildings? *Surface Wave*
5. In addition to the damage caused directly by seismic vibrations, list three other types of destructive events that can be triggered by earthquakes. *Fire, Land slide, Tsunami*
6. Describe the composition and physical properties of the crust. *Crust is thin, rocky, & outer layer of Earth. Continental crust is mainly granite, oceanic crust is mainly basalt*
7. List the major differences between P waves and S waves. *P wave is faster than S wave, P waves push and pull and S waves move side to side (shear movement) S waves can't go thru liquid and gas*
8. What are two factors that can determine the amount of destruction that results from an earthquake?  
*Intensity and duration, nature of the material the structure is made out of, or the design of the building.*

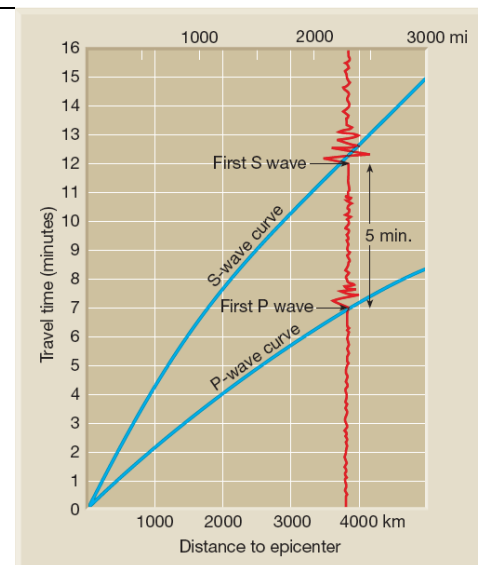
## Critical Thinking

9. **Applying Concepts** Give two reasons why an earthquake with a moderate magnitude might cause more extensive damage than an earthquake with a high magnitude. *Location (populated area), building structure, if it triggers other disasters like land slide or tsunami.*
10. **Comparing and Contrasting** How are the moment magnitude scale and the Richter scale different?  
*Richter scale uses the amplitude (height) of the largest wave on the seismogram. Moment magnitude measures energy released by several factors, amount and size of displacement.*
11. **Inferring** How did scientists determine the structure and composition of Earth's interior? *Seismic waves as they travel through different layers of Earth.*

## Analyzing Data

Use the diagram below to answer Questions 12–14.

12. **Using Graphs** Determine the distance between an earthquake and seismic station if the first S wave arrives three minutes after the first P wave.  
*1500km*
13. **Using Graphs** If a seismic station is 2500 kilometers from the earthquake epicenter, approximately when will the first P wave be received? When will the first S wave be received?  
*P wave = 5 minutes  
S wave = 9 minutes*
14. What is the difference in the travel times of the first P wave and the first S wave if the seismic station is 1000 kilometers from the earthquake epicenter?  
*P Wave = 2 min and S wave = 4 min.  
Earthquake took 2 minutes to go 1000 km.*



## Concepts in Action

15. **Applying Concepts** Why is the moment magnitude the most commonly used scale by scientists for measuring earthquakes? *More accurate, the only scale that measures the energy released by the earthquake.*
16. **Classifying** In what major earthquake zone would an earthquake in Indonesia be located? *Ring of Fire*
17. **Hypothesizing** You are on a large ocean research ship. You have generated seismic waves by causing an explosion on a platform towed behind the ship. What seismic waves will be recorded by a seismograph located on the ocean floor beneath the ship? Explain your answer. *Surface wave only. P and S waves travel through the earth, the earthquake created was on the surface.*

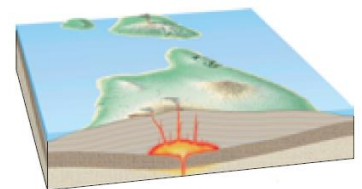
# Ch 10: Study Guide

## Vocabulary

viscosity, p. 281; vent, p. 281; pyroclastic material, p. 283; volcano, p. 283; crater, p. 283; shield volcano, p. 284; cinder cone, p. 284; composite cone, p. 285; caldera, p. 287; pluton, p. 289; sill, p. 289; laccolith, p. 290; dike, p. 290; batholith, p. 290; geothermal gradient, p. 291;

## Understanding Concepts

- Describe the Ring of Fire. *Around the Pacific Ocean.*
  - The Hawaiian Islands and Yellowstone National Park are associated with which of the three zones of volcanism? *Hot Spot, Intraplate volcanism*
  - What is the chain of volcanoes called that forms at a convergent boundary between a subducting oceanic plate and a continental plate? What type of volcano commonly forms?  
*Continental volcanic arc, composite volcano*
  - Explain how most magma is theorized to originate.  
*Melting of rock in the crust and upper mantle.*
- Use the diagram below to answer Questions 5 and 6
- Identify the type of volcano shown in the diagram. *Shield*
  - What types of eruptions are commonly associated with this type of volcano? *Quiet eruptions of basaltic lava.*
  - How do hot spots form? *A plume of extra hot mantle rises to the surface.*
  - How are pyroclastic materials classified? *Size and shape.*
  - What is viscosity and how does it affect volcanic eruptions? *Viscosity (stickiness) is the resistance to flow. The more viscous the magma the more violent the eruption.*
  - Give an example of each of the three types of volcanoes. *Cinder cone = sunset crater in Arizona, Composite = Mt. St. Helens in Washington, Shield = Kilauea in Hawaii*
  - How do dikes form? *Magma cools in a fracture vertical*



## Critical Thinking

- Inferring** Why is a volcano fed by a highly viscous magma likely to be a greater threat to people than a volcano fed by very fluid magma? *Has more gas trapped in the magma, that will explode out.*
- Drawing Conclusions** Why are cinder cones usually small? *Don't erupt that often*

## Analyzing Data

Use the data table below to answer Questions 14–15.

- Interpreting Data** What volcanic eruption listed in the data table produced the most pyroclastic material?  
*Toba*
- Calculating** The volume of material ejected by the eruption of Tambora in 1815 was how many times larger than the volume of material ejected in 1883 by the eruption of Krakatau?  
*7 Times greater*

Notable Volcanic Eruptions			
Volcano	Date	Volume Ejected	Height of Plume
Toba	74,000 years ago	2800 km <sup>3</sup>	50–80 km
Vesuvius	A.D. 79	4 km <sup>3</sup>	32 km
Tambora	1815	150 km <sup>3</sup>	44 km
Krakatau	1883	21 km <sup>3</sup>	36 km
Mount St. Helens	1980	1 km <sup>3</sup>	19 km
Mount Pinatubo	1991	5 km <sup>3</sup>	35 km

## Concepts in Action

- Hypothesizing** Large volcanic eruptions eject large amounts of gas, dust, and ash into the atmosphere. This volcanic material can affect the world's climate by blocking incoming solar radiation. An eruption from what type of volcano is most likely to cause global climate changes? Explain your answer.  
*Composite volcano is more explosive and will put more material into the air.*
- Classifying** On the side of a composite cone you see a large area where there are no trees and the ground surface looks disturbed. What possible volcanic feature or event could have caused this?  
*Lava flow, mud flow (lahar)*
- Applying Concepts** Would you be safer from a violent, explosive eruption while vacationing in Arizona near a cinder cone or while skiing in the Andes Mountains of South America? Explain. *Safer by a cinder cone, Andes mountains are composite volcanoes which will explode more often and more violent.*