# What Causes Earthquakes and Volcanoes?

Chapter 7 Lesson 2
Part 2

ByDesign Science, Level 4
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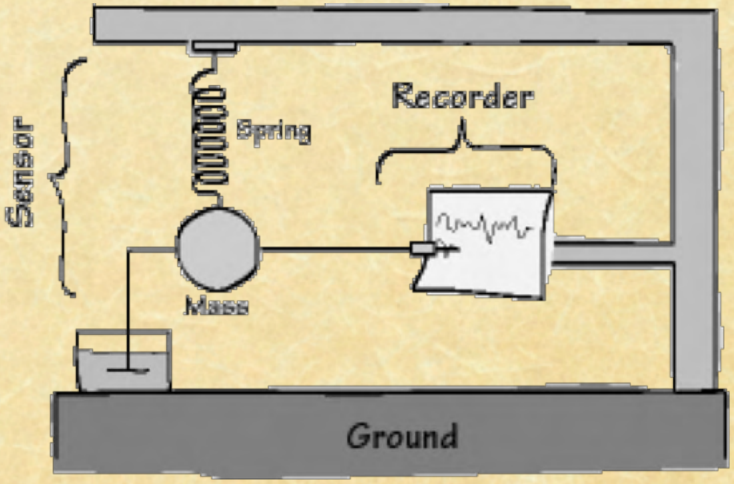
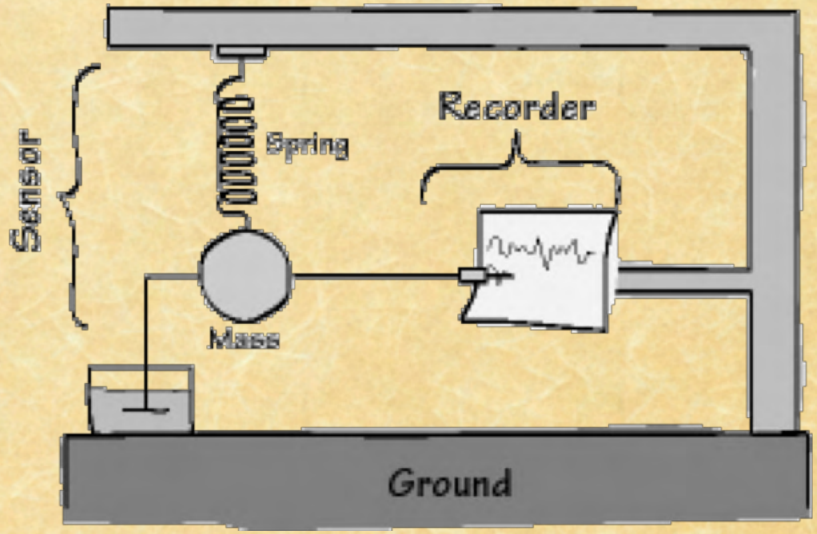
# Earthquake Damage

- Scientists use seismometers to record movement in Earth's crust.
- A seismometer uses a pen that can draw a line on paper tape.
- When Earth's surface shakes, the pen shakes and draws a jagged line.



# Earthquake Damage

- Scientists use this line to help determine how strong an earthquake was.
- Scientists currently do not have technology that enables them to predict an earthquake.



# Earthquake Damage

- Earthquakes can have dangerous effects.
- Rocks and soil on the side of a mountain can be shaken loose and tumble downward, causing a *landslide*.

- Earthquakes that occur underwater can transfer energy to the water. This can cause a *tsunami*, which is a wave that can quickly travel over long distances through water.

# Earthquake Damage

- Along a coast, a tsunami can make waves that are more the 108 feet tall!
- More than 15,800 people died as a result of a tsunami and earthquake in Japan in 2011.

# Earthquake Damage

# Earthquake Damage

- The Richter scale and the Mercalli Intensity scale are used to describe an earthquake's size and strength.

- The Richter scale is based on information gathered by a seismometer.

- Mercalli Intensity ratings are based on actual visible effects.

# Earthquake Damage

- The smallest earthquakes that people can feel have a magnitude between 2.5 and 3.0 on the Richter scale.
- Earthquakes with a magnitude of 7.0 or greater on the Richter scale are considered to be major earthquakes.

# Earthquake Damage

# Volcanoes

- Like earthquakes, volcanoes can be very dangerous.
- A *volcano* is an opening in Earth's crust where magma rises or is pushed to the surface.

- You have learned that when volcanoes erupt, molten rock called lava flows out of them.
- Magma is molten rock below Earth's surface.
- **Lava** is molten rock on Earth's surface.

# Volcanoes

- Lava is not the only material produced by a volcanic eruption.
- Volcanoes also spew out ash, rock, water vapor, and other gases.

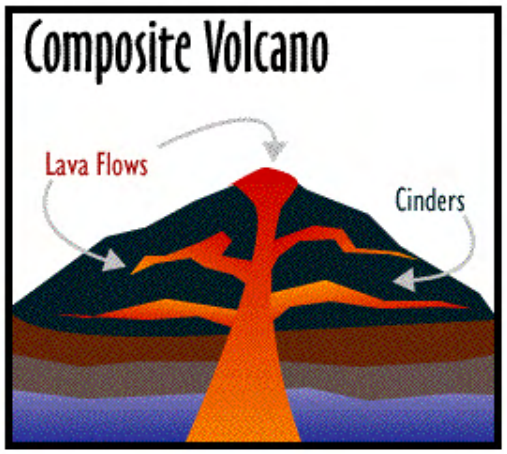
- These materials can shoot high into the air and can be carried by wind around the world.

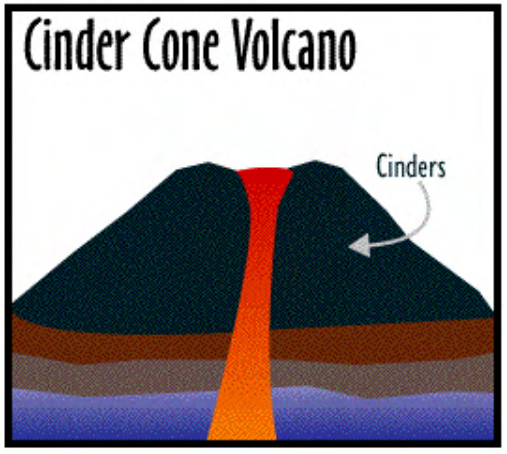
# Volcanoes

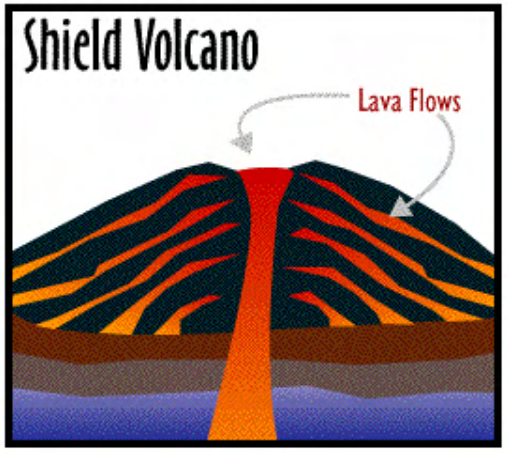
- A volcano that can erupt at any time is an *active volcano*.
- A volcano that has not erupted in many years but could still erupt is a *dormant volcano*.
- A volcano that has not erupted in a very long time and is not expected to erupt again is an *extinct volcano*.
- It can be difficult to tell the difference between a dormant volcano and an extinct one.

# Volcanic Eruptions

- Volcanoes come in many forms.
- The size, shape, and type of eruption depend on where and how the volcano formed, as well as the type of rock that makes up the lava.



# Volcanic Eruptions

- Volcanic eruptions can change Earth's surface.
- Lava can destroy or cover landforms and vegetation.
- Also, when lava cools and hardens, it forms new rock that builds up the volcano and creates new crust.

# Volcanic Eruptions

- After an eruption, the land around a volcano may be bare and covered with new rock and ash.
- The ash may be several feet deep in some places.
- In time, new soil will form. The soil that forms from volcanic ash has a lot of nutrients and is very good for growing crops.
- Surviving plants may recover, or newer plant communities may take hold.

# Volcanic Eruptions

# Types of Volcanoes

## Shield Volcano

- Lava flows very slowly from a shield volcano, and the eruptions are not explosive.
- This type of volcano is usually very board and has sides that are not very steep.
- Hawaii is made of several shield volcanoes.

# Types of Volcanoes
## Cinder Cone Volcanoes

- Lava explodes into the air from a cinder cone volcano.
- The lava cools quickly in the air and falls to the ground as small rock pieces.
- These pieces of rock form a mountain.
- Cinder cone volcanoes are shaped like a cone steep sides.

# Types of Volcanoes

## Composite Volcano

- A composite volcano is made of layers of rock and ash.
- Lava hardens and forms a layer of rock.
- This process repeats over and over again with each eruption.
- Mount St. Helens is a famous composite volcano.

# Review

1. What are the layers of the earth, starting from the top and going inwards?
   - Crust, mantle, outer core, inner core
2. Is the inner core a liquid or solid?
   - Solid
3. Is the outer core a liquid or a solid?
   - Liquid
4. What is the thickest layer of the Earth?
   - Mantle
5. What is the thinnest layer of the Earth?
   - crust

# Review

6. What is the main reason Earth has layers?
   - Density
7. What are plate tectonic?
   - Earth's crust broken into several large slabs of rock
8. About how many major plate tectonics are identified today?
   - 8
9. When are many earthquakes and volcano eruptions most like to occur?
   - when plates move

# Review

10. What are the different type of plate tectonic movements?
    - they collide with each other,
    - They move away from each other,
    - They slide past each other.
11. What are the different types of crust?
    - oceanic and continental crust

# Review

12. What happens when continental crust collides with oceanic crust?
    - Oceanic crust is pushed under the continental crust and a volcano is formed

13. What happens when continental crust collides with continental crust?
    - they both are pushed upward into a mountain

14. What happens when oceanic crust is pulled away from oceanic crust?
    - magma rises to the surface and forms new crust

# Review

15. How are volcano hot spots formed?
    - When magma pushes through thin crust
16. What is an earthquake?
    - a vibration of Earth's crust that causes the land to shake
17. What is a fault?
    - crack or break in the crust where the land moves
18. What is the focus?
    - location underground where an earthquake begins
19. What is the epicenter?
    - where the effects of the earthquake are usually the greatest

# Review

20. What is a seismometer?
    - device used to measure the size of an earthquake
21. What is a landslide?
    - when rocks and soil tumble down the side of a mountain
22. What can earthquakes underwater cause?
    - tsunami
23. What is a tsunami?
    - a large wave that can quickly travel over long distances through water

# Review

24. What is the Richter's Scale based on?
    - information gathered by a seismometer

25. What are the Mercalli Intensity ratings based on?
    - actual visible effects of an earthquake

26. What is a volcano?
    - an opening in Earth's curst where magma rises or is pushed to the surface

27. What is the difference between magma and lava?
    - magma is molten rock below Earth's surface and lava is molten rock above the Earth's surface

# Review

28. What is erupted from a volcano during an eruption?
    - lava, ash, rock, water vapor, and other gases

29. What is an active volcano?
    - volcano that can erupt at any time

30. What is a dormant volcano?
    - volcano that has not erupted in many years but could still erupt

31. What is an extinct volcano?
    - volcano that has not erupted in a very long time and is not expected to erupt again

# Review

32. What are the types of volcanoes?
    - shield volcano, cinder cone volcano, composite volcano