

Chapter Seven Science: Earth's Moving Crust Study Guide

Lesson One

Geologists-scientists who study Earth

Crust-Solid, outer surface of Earth

Original Horizontality-rocks forming in flat, horizontal layers

Pangaea-The huge super continent that was believed to exist before the continents separated

Continental Drift-Hypothesis that the continents were one large land mass and that over time the lands drifted apart to their present locations.

Sea-floor Spreading-new crust material is forming at the ridges, as it forms, it spreads apart the old sea floor on both sides of the ridges.

-Occurs when magma is pushed up through cracks, cools, and hardens into new solid rock along the ridges and pushes older rock material farther away along the sea floor.

Magma-hot melted rock

Evidence of Sea-Floor Spreading

-rocks that make up the continents are much older than rocks of the ocean floor

-most ocean floor rocks are volcanic

-the youngest ocean floor rocks are found at the mid-ocean ridges

-on either side of the ridge, the ocean floor rocks get older toward the continents

Plate Tectonics-describes Earth's crust as broken into pieces, or plates. Each plate includes material from mantle. Plates slide on the lower portion of mantle.

Mantle-Layer below the crust

Divergent Boundaries-places where plates move apart (Mid-Atlantic Ridge is located on one)

-Location where sea-floor spreading is taking place

Convergent Boundaries-places where plates collide

-When there is a continent on both of the colliding plates, the collision can cause rocks to crumple which builds up mountains (example-Himalaya Mountains)

If an ocean plate collides with a plate containing a continent; the ocean plate will slide beneath the other forming volcanoes

If two ocean plates collide the result can be undersea volcanoes or deep undersea valleys

Transform Faults-when plates slide past each other

narrow -as plates slide and grind there are earthquakes and as rocks break off they pile up and form ridges and valleys

Subduction-when one plate slides under another

Convection Current

-Older rock is destroyed by subduction in trenches

-New rock is forming in the mid-ocean ridges

-effects of this cycle-melted rock from beneath the sea floor can rise up to produce a string of volcanic mountains. They can rise up above the sea floor and result in a string

of islands called an island arc.

Lesson Two

How Earthquakes Happen

- caused by something happening in the crust
- usually happen along plate boundaries
- plates may collide, slide past each other, or pull apart
- when plates move great forces are exerted on the rocks of the crust
- at first rocks bend and stretch
- at some point they can no longer do this and they break creating a fault
- broken sides of a fault may scrape past each other
- earthquakes happen when there is a sudden movement

Faults-huge cracks in the crust

Focus-point where the earthquake starts, where the rocks begin to slide past each other

Epicenter-point directly above the focus where people first feel the shaking of the earthquake

Aftershocks-smaller shakes occurring after the initial shock

Types of Waves

- Primary Waves (P waves)-accordion style motion in which rock material squeezes together and spreads apart repeatedly. Produces seismic waves that move in the same direction that the rock is shaking. They are the fastest seismic waves and arrive first
- Secondary Waves-similar to the twanging of a ruler being held off the edge of a desk. Rocks produce seismic waves that move in a different direction from the vibration. Travel slower and second to arrive.
- Surface Waves-surface heaves up and down like an ocean wave, or swaying from side to side

are

Seismograph-machine used to study waves and patterns of waves as they arrive

Tsunamis-huge ocean waves that reach a shoreline and can rise more than 15 meters and destroy everything in their path

- can move at speeds of 900 km per hour (560 miles per hour)

Magnitude-the amount of energy released by an earthquake

Charles Richter-1935, devised a scale for comparing the energy of earthquakes

- Rates from 1 to 10 according to the magnitude
- Each increase of 1 on the scale means an increase of about 30 times the energy released
- Measures energy

Mercalli Scale-another scale used to describe earthquakes

- based on the amount of damage done at a given location
- measures effects

Preparing for Earthquakes

- Buildings are built to sway rather than fall in earthquakes up to a magnitude 8.3
- Highways may have special support structures that contain vertical rods wrapped with spiral steel rods
- Newer, flexible materials are used to have a better chance of bending rather than breaking

Lesson Three

Vent-central opening

Lava- once magma comes out of the vent

Crater- top of a volcano that is a cuplike hollow around the vent

Volcanoes occur in belts

- One belt is located in the Pacific Ocean and is called the Ring of Fire
- Another runs along the Mediterranean Sea through Iran and then continues through Indonesia and the Pacific
- Over 80% of land volcanoes occur in these two belts
- Most are along plate boundaries

Rift Volcanoes- volcanoes that form where plates are moving apart leaving gaps at the edges of the spreading plates

- some are located in Iceland and in Africa's Great Rift Valley
- most rift volcanoes are located deep underwater along mid-ocean ridges

Hot Spot- a very hot part of mantle

- Hawaiian Islands are believed to be over a hot spot which causes large amounts of volcanic activity even though they are in the middle of a plate.

Types of Volcanoes

- Cinder-cone Volcano- when hot rocks fall to the ground and build up a steep-sided cone
- Shield Volcano- when lava spreads out and hardens into a wide, flat mound
- Composite Volcano- a volcano that has both cinder-cone and shield eruptions

in Dormant- Volcanoes that have been active but that stop erupting. It not presently erupting but has erupted recorded history.

Extinct Volcanoes- Volcano that has not erupted in recorded history

Dike- Forms when magma hardens in a vertical crack

Sill- Formed when magma hardens between horizontal layers of rock

Laccolith- shaped like a dome and forms when magma pushed into a sill is thick and doesn't spread out

Dome Mountains- form when magma pushes upward and raises overlying rock layers; dome mountains are broad, circular mountains formed from uplifted rock layers

- Examples include the Black Hills of South Dakota and the Henry Mountains of Utah

Batholiths- largest and deepest underground formations; are huge and irregularly shaped

Geyser- an opening in the ground through which hot water and steam erupt periodically

Hot Springs- an opening in the ground where hot water and gasses escape

Geothermal Energy- heat from below Earth's surface

- 1965 first geothermal plant was built in Healdsburg, California