Earth Science

Earthquakes

Volcanoes

Layers of the Earth

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Layers of the Earth
The Crust

The crust of the Earth is the outer layer

- Composed mainly of rock
- 25 miles deep under the continents (thinnest layer of the Earth)
The Crust

• The crust is broken into large pieces that move slowly.
  – These are called plates.
  – These plates move because of temperature differences inside the Earth.
  – http://safeshare.tv/w/ezHiPpXRhb
The Crust

- The plates can push against each other, move away from each other or move past each other.
  - Volcanoes, earthquakes, and mountains form along the plate boundaries.
Convergent Boundaries

- **CONVERGE** = to come together
- Convergent Boundaries – when two plates come together and push against each other, they form mountains!
- [http://sepuplhs.org/middle/iaes/students/simulations/SEPUP_Plate_simulation.swf](http://sepuplhs.org/middle/iaes/students/simulations/SEPUP_Plate_simulation.swf)
Divergent Boundaries

• DIVERGE = to move apart
• Divergent boundaries - when two plates move apart. This mostly happens in oceans, and they form volcanoes.
• http://sepuplhs.org/middle/iaes/students/simulations/SEPUP_Plate_simulation.swf
Transform Boundaries

- Transform Boundaries – when two plates slide past each other
- A large amount of energy is built up as boundaries slide past each other, and this often causes earthquakes
- [http://sepuplhs.org/middle/iaes/students/simulations/SEPUP_Plate_simulation.swf](http://sepuplhs.org/middle/iaes/students/simulations/SEPUP_Plate_simulation.swf)
The Mantle

- The mantle is the Earth’s middle layer
  - VERY hot and under great pressure
  - Made of solid rock and melted rock
  - 1,789 miles thick
The Core

- The core is the hottest part of the Earth
  - It is composed of hot solid nickel and iron
Crust

Mantle

Outer Core

Inner Core
The Earth’s Layers are like an...
Structure of the Earth

http://safeshare.tv/w/qhMpgkxknR

Extra Links
http://www.brainpop.com/science/earthsystem/earthsstructure/

http://www.brainpop.com/science/earthsystem/platetectonics/
Earthquakes and Volcanoes
Earthquakes

- We know that the Earth has about 20 plates that move toward, past, or against each other.
Earthquakes

- We know that the Earth has about 20 plates that move toward, past, or against each other.

Convergent Boundaries form: mountains

Divergent Boundaries form: volcanoes

Transform Boundaries form: earthquakes
Earthquakes

- When the plates slide past each other, huge rocks that form at their edges shift with great force, which creates a crack in the Earth’s crust.
- An earthquake is caused by a break in the rock that makes up Earth’s crust. This is called a fault.
- [http://www.iknowthat.com/mhscience/Earthquakes/Fixed.htm](http://www.iknowthat.com/mhscience/Earthquakes/Fixed.htm)
Earthquake Activity

Earthquakes are both destructive and constructive!
Earthquakes are **Constructive:**

A fault line in the Earth’s crust can be the location of a new landform.

An earthquake can push one side up causing a fault scarp.
Earthquake Activity

When an earthquake shifts the rock at a fault, a section of land can be moved several feet up, or a mountain range can be raised a few inches.
Changes Caused by Earthquakes

- Earthquakes occur when the Earth’s crust shifts at a fault
  - Pieces of one side of a fault can be pushed up in relation to land on the other side
  - The faults form large trenches and cliffs on the Earth
Earthquakes

• http://www.pbs.org/wnet/savageearth/animations/earthquakes/index.html
• http://www.brainpop.com/science/earthsystem/earthquakes/
Volcanoes

- In the Earth’s mantle, there are pockets of hot, liquid-like rocks and gases called **magma**.
- As heat and pressure builds up in these pockets (chambers) the gases expand.
Volcanoes

• The increasing pressure forces the magma up the volcano’s pipe and out the opening of the volcano (crater).

• Once the magma reaches the surface of the Earth it is called lava.

• Once all the pressure is released, the volcano stops erupting.

Volcanic Activity

Volcanoes are both constructive and destructive forces that change the Earth’s surface.
Constructive

They can “add to” the landforms of mountain ranges and...
Volcanic Activity

create islands in the middle of the ocean.
This volcano has been erupting continuously since January 1983. Lava is pouring down the edge of the island and into the ocean, becoming solid rock.
Hawaii’s Kilauea Volcano

• This “new land” has been growing and extending the edge the Hawaiian Islands and into the ocean each year.
Effects of Volcanoes and Earthquakes

• Scientists cannot control volcanic eruptions and earthquakes
  – However, they can warn people when they believe they are most likely to occur
Predicting Earthquakes and Volcanoes

• Devices called seismographs can detect vibrations during an earthquake.
  – Seismologists study seismic waves
  – The record made by a seismograph is called a seismogram

• http://www.teachersdomain.org/resource/ess05.sci.ess.earthsys.seismograph/

• http://www.scholastic.com/browse/article.jsp?id=4892
Using Science and Technology to Keep People Safe

• Seismographs also help scientists predict when tsunamis and volcanoes will occur

• **Tsunami** – a huge wave caused by an earthquake under the ocean
  
  • Seismographs watch for underwater earthquakes to predict when one will occur

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