

Structure of the Earth

Chapter 7

The Earth is divided into 3 Main Layers

1. Crust

outermost layer
 1% of the Earth's mass
 thickness varies: 5-100 km

two types:
 oceanic - denser
 continental

Mohorovicic discontinuity-
 separates the crust and the upper mantle.

2. Mantle

largest layer - 67% of Earth's mass
 made of silicon, oxygen, magnesium, iron
 solid and liquid: **plasticlike**

Lithosphere
 made up of the crust and upper mantle
 divided into tectonic plates

Asthenosphere
 plasticlike layer below the lithosphere plates float
 soft solid rock that moves very slowly

Mesosphere
 the lower part of the mantle to the outer core

Gutenberg Discontinuity
 separates the mantle and the core

3. Core

innermost part of the Earth
 33% of the Earth's mass

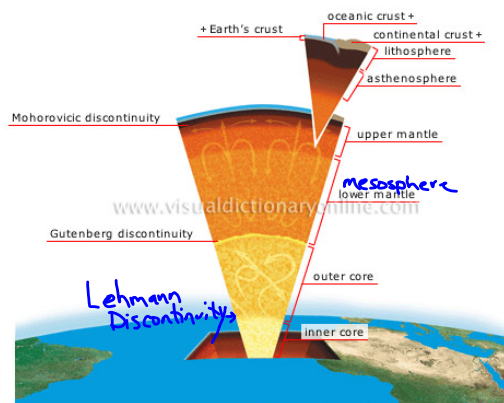
Outer core
 liquid
 made of iron and nickel

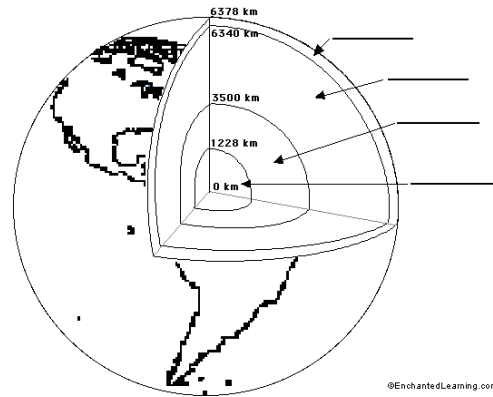
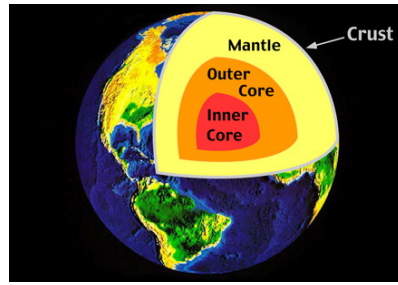
Lehmann Discontinuity
 separates the outer and inner core

Inner Core
 solid: due to the pressure
 very dense iron and nickel

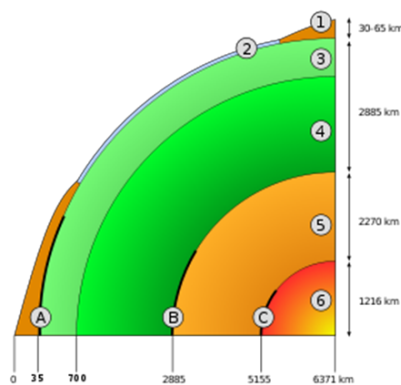
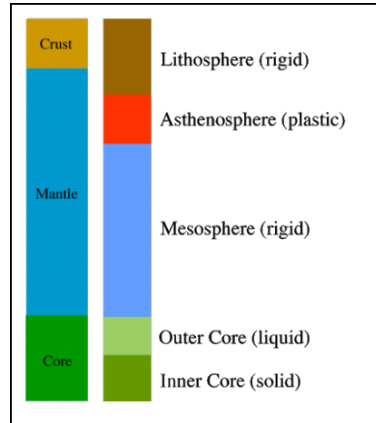
scientists believe that the inner core rotates faster than the rest of the planet

speed = lap the Earth's surface once every 400 years



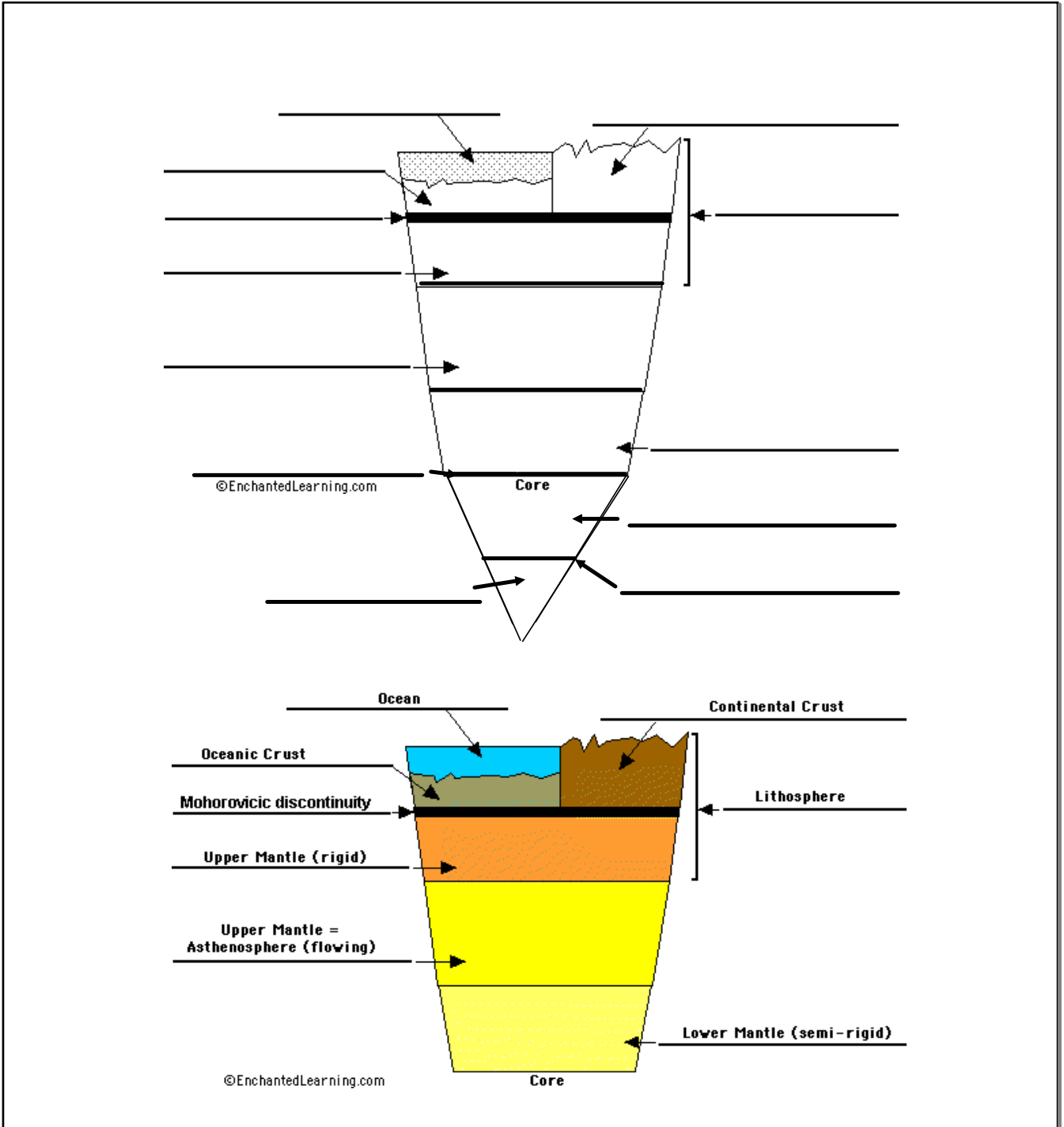


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- | | | |
|------------------------------|----------------------|------------------|
| A. Mohorovicic Discontinuity | 1. Continental Crust | 2. Oceanic Crust |
| B. Gutenberg Discontinuity | 3. Asthenosphere | 4. Mesosphere |
| C. Lehmann Discontinuity | 5. Outer Core | 6. Inner Core |

Jan 6-11:17 AM



Section 2 - Restless Continents

Objectives

Describe Wegener's hypothesis of continental drift.

Explain how sea-floor spreading provides a way for continents to move.

Describe how new oceanic lithosphere forms at mid-ocean ridges.

Explain how magnetic reversals provide evidence for sea-floor spreading.

Continental Drift

Wegener's theory of the movement of the continents

Pangaea

"All Earth"

Wegener's theory of **one supercontinent**

Surrounded by one sea called **Panthalassa = all sea**

Pangaea - puzzle

Broke into two parts

Laurasia

Gondwana

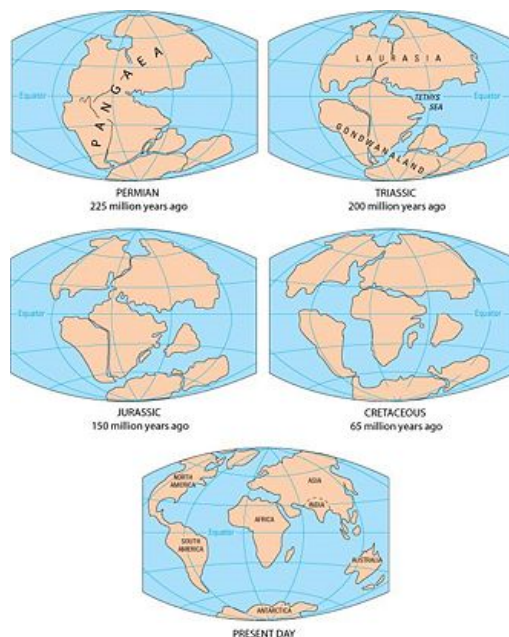


Plate Tectonics

theory of how continents move

7 major plates

Evidence that supports Wegener Theory

1. Fossils

2. Puzzle

3. Sea-Floor Spreading

deepest known place on Earth = 11,033 m below sea level and 2,500 m long = Mariana Trench

4. Glacier

5. Rock

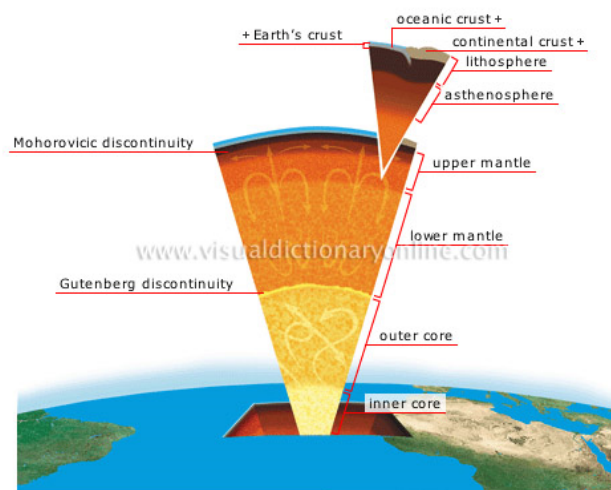
6. Magnetic Reversals

Review Questions

1. What is the difference between Continental Drift and Plate Tectonics?
2. Name the Supercontinent.
3. Name the "One Ocean".
4. List 5 forms of evidence that support Continental Drift.
5. Who developed the Theory of Continental Drift?
6. What were the two pieces that the plates broke into?
7. What is the layer of the Earth that allows the plates to float on it?
8. Draw a diagram of the all the layers of the Earth.

Answers

1. Continental Drift is the belief that the plates move and Plate Tectonics is how they move.
2. Pangaea
3. Panthalassa
4. Puzzles pieces
Fossils
Sea-Floor Spreading
Magnetic Reversals
Glaciers
Rocks
5. Alfred Wegener
6. Northern - Laurasia
Southern - Gondwana
7. Asthenosphere
- 8.



Section 3 - The Theory of Plate Tectonics

Plate Tectonics

The theory that explains how pieces of the Earth's crust move and change shape.

What happens when plates move?

- causes tectonic activities
- earthquakes
- volcanoes
- mountain building
- glacier

Boundary

Where tectonic plates touch.

3 Types of Boundaries

1. Divergent Boundary

plates move apart and magma rises to fill gap
Mid-Atlantic Ridge

2. Convergent Boundary

2 plates collide

3 Types of Convergent Boundaries

a. Continental - Continental

Buckle and thicken which pushes the crust upward

b. Continental - Oceanic

Oceanic plate sinks into the lithosphere - **Subduction Zone**

c. Oceanic - Oceanic

One plate will sink under the other

3. Transform Boundary

plates slide past one another horizontally - strike slip fault
causes earthquakes

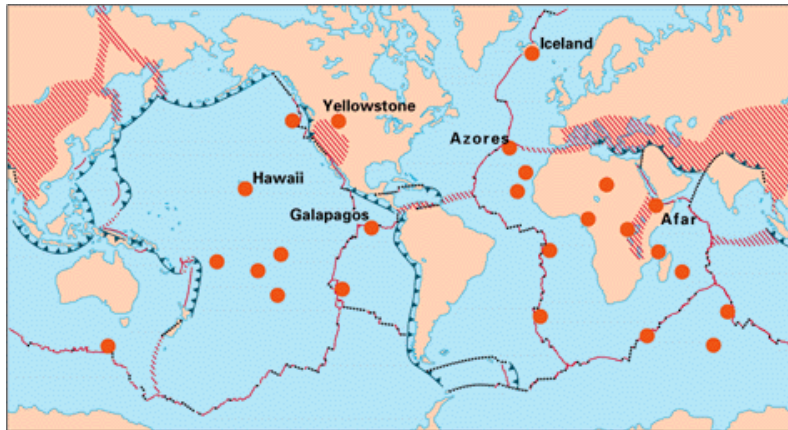
What is behind all this?

Convection current






cycle of heating, rising, cooling and sinking - page 204

Tectonic Plates

Pieces of the lithosphere that move on top of the asthenosphere



EXPLANATION

- | | |
|--|--|
| <p> Divergent plate boundaries—
Where new crust is generated
as the plates pull away from
each other.</p> <p> Convergent plate boundaries—
Where crust is consumed in the
Earth's interior as one plate
dives under another.</p> | <p> Transform plate boundaries—
Where crust is neither produced
nor destroyed as plates slide
horizontally past each other.</p> <p> Plate boundary zones—Broad
belts in which deformation is
diffuse and boundaries are not
well defined.</p> <p> Selected prominent hotspots</p> |
|--|--|

Section 4 - Shaping of the Earth's crust

Deformation

process by which the rock changes due to stress

Types of stress

1. Compression

occurs when an object is squeezed
occurs at **convergent boundaries**

2. Tension

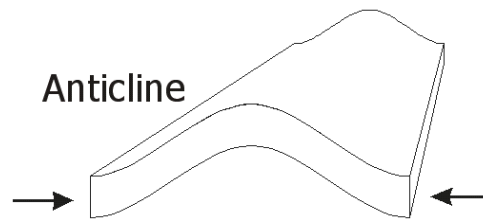
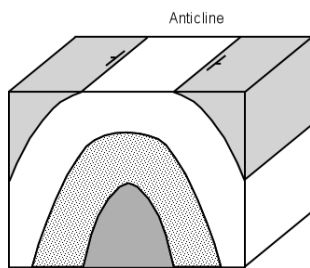
occurs when forces are stretched
occurs at **divergent boundaries**

Folding

bending of rock layers

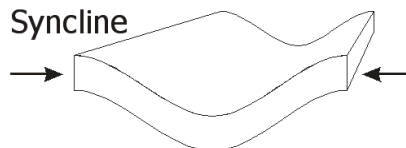
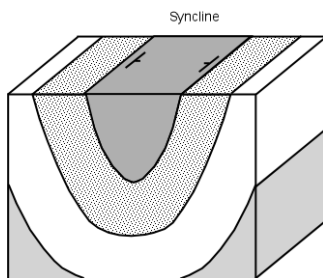
1. Anticlines

upward arching folds



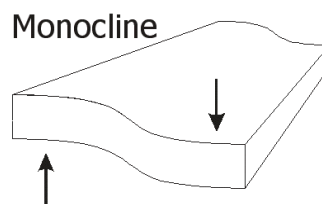
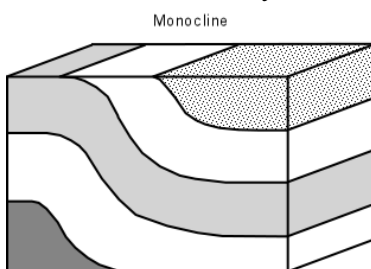
2. Synclines

downward, trough-like folds



3. Monocline

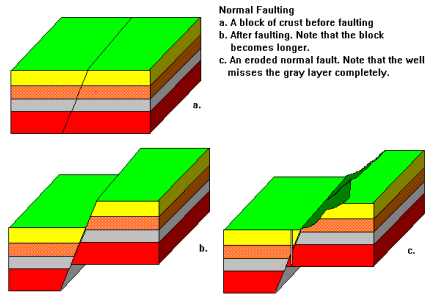
rock layers fold so both ends are horizontal



Section 4 - Fault

Normal Faults

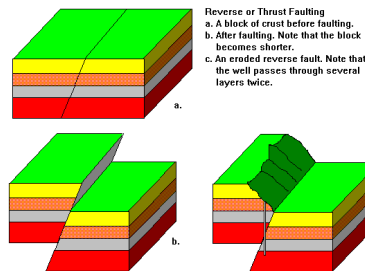
hanging wall moves downward according to the footwall caused by tension



Reverse Faults/Thrust Fault

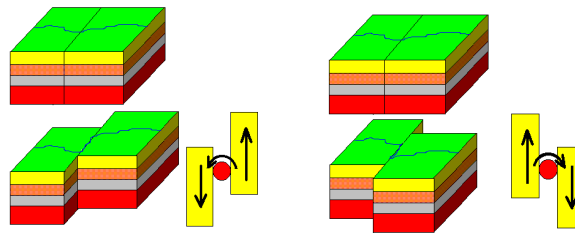
hanging wall moves upward according to the footwall caused by compression

thrust hanging wall may actually go over the footwall



Strike-slip Faults/Lateral Faults

move in opposition to each other
 shearing forces help push rocks in opposite directions



Mountains

Folded mountains

form at convergent boundaries
 highest mountain
 sides squeezed together and push upward



Fault-Block mountains

form at divergent boundaries
 caused by rock dropping down according to the pulling apart of the rock



Volcanic mountains

form at convergent boundaries
 near subduction zones



Uplift

Rising of Earth's crust to higher elevations

Subsidence

Sinking of Earth's crust to lower elevations

Rift Zone

Cracks in the Earth's crust due to uplift and subsidence

