**Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Period\_\_\_\_\_\_\_Date\_\_\_\_\_\_\_\_\_\_\_\_**

**Geology-Unit 7**

Earth’s Interior and Plate Tectonics

Earth’s Interior

* Earth’s layers are defined by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(what it is made of)
* Three main layers:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* The crust
	+ \_\_\_\_\_\_\_\_\_\_\_\_Layer;\_\_\_\_\_\_\_\_\_\_\_\_ layer;
	+ 2 types of crust:
		- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(very \_\_\_\_\_\_\_\_\_\_, made of \_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_; \_\_\_\_\_\_\_\_\_\_\_\_\_\_thick)
		- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(less \_\_\_\_\_\_\_\_, made of \_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_thick)
* The mantle
	+ Starts \_\_\_\_\_\_\_\_\_\_\_\_km below oceanic crust; \_\_\_\_\_\_\_\_\_\_\_layer
	+ \_\_\_\_\_\_\_\_\_ layer; \_\_\_\_\_\_\_\_\_\_\_\_\_\_thick; over \_\_\_\_\_\_\_\_\_ of Earth’s volume
	+ Dominate rock type in uppermost mantle is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* The core
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_below surface, Made mostly of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ \_\_\_\_\_\_\_\_ of earth’s mass; Very \_\_\_\_\_\_\_\_\_; \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_thick
* Physical Structure of the Earth
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: found in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_; about \_\_\_\_\_\_\_\_\_\_\_ thick; cool, rigid; \_\_\_\_\_\_\_\_\_\_\_\_\_
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: found beneath the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_; to a depth of about \_\_\_\_\_\_\_\_\_\_\_\_; \_\_\_\_\_\_\_, weak layer that is easily \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: middle layer found in \_\_\_\_\_\_\_\_\_\_\_ mantle; \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_km; more rigid layer; rocks are very hot and capable of gradual flow (runs like hot asphalt)
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: found below \_\_\_\_\_\_\_\_\_\_; \_\_\_\_\_\_\_\_\_\_\_ layer; \_\_\_\_\_\_\_\_\_\_\_ thick; convective flow of metallic iron within generates Earth’s \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ field
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_: found at the core of earth; \_\_\_\_\_\_\_\_\_\_; very \_\_\_\_\_\_\_\_\_\_, radius of core is \_\_\_\_\_\_\_\_\_\_\_\_
* Discovering Earth’s Layers
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_: the boundary separating the \_\_\_\_\_\_\_\_\_\_\_ from the \_\_\_\_\_\_\_\_\_\_, discernable by an \_\_\_\_\_\_\_\_\_\_\_\_\_\_ in velocity of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Velocity of seismic waves \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ abruptly below crust

Continental Drift

* In 1915, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ proposed the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ hypothesis
	+ Stated continents had once been joined to form a supercontinent, \_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ Pangaea means\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ Proposed it began to break apart about \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ Evidence for continental drift
		- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_; \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_; \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_; \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Continental Puzzle
	+ Continents \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ like a jigsaw puzzle
* Matching fossils
	+ Includes several \_\_\_\_\_\_\_\_\_\_\_ organisms found on different landmasses
		- Ex. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ found in South American and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Rock Types and Structures
	+ Several \_\_\_\_\_\_\_\_\_\_\_\_\_\_ belts end at one coastline and reappear on a landmass across the ocean
		- Ex. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ found in US and on British Isle and Scandinavia
* Ancient Climate
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ covered large areas of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Hemisphere \_\_\_\_\_\_\_\_\_\_\_ million years ago. Glacial till has been found in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Wegener could not explain why continents moved

Plate Tectonics

Plate Tectonic Theory

* Remember the lithosphere (\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_layer)
* A \_\_\_\_\_\_\_\_\_\_ is one of the numerous rigid sections of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that moves as a unit over the material of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Major Difference from Wegener: continents moved \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Largest plate: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ plate
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the plates are defined by the \_\_\_\_\_\_\_\_\_\_\_\_\_ of a continent
* Plates move very \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, about \_\_\_\_\_\_\_\_\_\_\_\_\_ per year, about the rate of fingernails growing
* Movement is driven by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ distribution of \_\_\_\_\_\_\_\_\_ within the Earth

Types of Plate Boundaries

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Boundary (also called spreading centers)
	+ Two plates move \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ plate margins, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ lithosphere made
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Boundary
	+ Two plates move \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_; \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ plate margins, lithosphere \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Boundary
	+ Margins where two plates \_\_\_\_\_\_\_\_\_\_\_ past each other without the production or destruction of the lithosphere

Actions at Plate Boundaries

Divergent Plate Boundaries

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Oceanic Ridges
	+ Continuous elevated zones on the floor of all major ocean basins. The \_\_\_\_\_\_\_ at the crest of ridges represent \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ plate boundaries
* Rift valleys
	+ \_\_\_\_\_\_\_\_\_\_ faulted structures found along the \_\_\_\_\_\_ of divergent plate boundaries; can develop on \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_
* Seafloor spreading
	+ Produces \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ lithosphere; \_\_\_\_\_\_\_\_\_\_ cm/year
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Rifts
	+ When spreading centers develop within a continent, the landmass may \_\_\_\_\_\_\_\_\_ into \_\_\_\_\_\_\_\_ or more smaller segments, forming a rift
		- Ex. East African rift valley; Rhine Valley in NW Europe

Convergent Boundaries

* As two plates converge, the \_\_\_\_\_\_\_\_\_\_ edge of one is bent \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ allowing it to slide \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the other
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: occurs when one \_\_\_\_\_\_\_\_\_\_\_ plate is forced down into the \_\_\_\_\_\_\_\_\_\_\_\_ beneath a second plate
* Convergent boundaries can form between:
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Oceanic-Continental Collisions
	+ \_\_\_\_\_\_\_\_\_\_\_\_ oceanic slab \_\_\_\_\_\_\_\_\_\_\_\_ into the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ Pockets of magma develop and rise
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ form in part by volcanic activity caused by the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of \_\_\_\_\_\_\_\_\_\_\_\_\_\_ lithosphere \_\_\_\_\_\_\_\_\_\_\_\_ a continent
	+ Ex. Andes, Cascades, Sierra Nevada Mountains
* Oceanic-Oceanic Collisions
	+ Two oceanic slabs \_\_\_\_\_\_\_\_\_\_\_\_\_ and one descends \_\_\_\_\_\_\_\_\_\_\_\_\_\_ the other
	+ Often forms \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ on ocean floor
	+ Volcanic island arcs form as volcanoes emerge from the sea
		- Ex. Aleutian, Mariana, and Tonga Islands
* Continental-Continental Collisions
	+ When \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ plates contain continental material, two \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ collide
	+ Can produce new \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_; Ex. Himalayas

Transform Fault Boundary

* At a transform fault boundary, plates grind past each other \_\_\_\_\_\_\_\_\_\_\_\_\_ destroying lithosphere
* Transform faults:
	+ Most \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ segments of a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ At the time of formation, they roughly \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_the direction of plate movement
	+ They aid in the movement of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ material
	+ Can lead to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
		- Ex. San Andreas Fault of California

Testing Plate Tectonics

Evidence for Plate Tectonics

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ The natural remnant \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in \_\_\_\_\_\_\_\_\_ bodies
	+ This permanent magnetization acquired by rock can be used to determine the location of the magnetic \_\_\_\_\_\_\_\_\_\_\_\_ at the time the rock became magnetized
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: when rocks show the \_\_\_\_\_\_\_\_\_\_\_ magnetism at the present magnetism field
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: when rocks show the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ magnetism at the present magnetism field
* One of the strongest pieces of evidence for seafloor spreading:
	+ Discovery of strips of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_; which lie as \_\_\_\_\_\_\_\_\_\_\_ image across the oceanic ridges
* Earthquake Patterns
	+ Close link between \_\_\_\_\_\_\_\_\_\_\_\_\_ earthquakes and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ Absence of deep-focus earthquakes along the oceanic ridge system was shown to be consistent with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Ocean Drilling:
	+ Data on the edges of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ confirmed what the seafloor spreading hypothesis predicted
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_ oceanic crust is at the ridge \_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_ is at the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Hot spots
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: a concentration of \_\_\_\_\_\_\_\_\_\_\_\_within the \_\_\_\_\_\_\_\_\_\_\_\_\_ capable of producing \_\_­­­­­\_\_\_\_\_\_\_\_\_\_\_\_, which rises to Earth’s surface
	+ The pacific plate moves over a hot spot, producing the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ islands
	+ Hot spot evidence supports that plates \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the Earth’s surface

 Mechanisms of Plate Motion

Causes of Plate Motion

* Scientists generally agree that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ occurring in the mantle is the basic driving force for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* During convection, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ material \_\_\_\_\_\_\_\_\_ and cooler, more dense material \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: the motion of matter resulting from changes in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* The heat is generated by the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of elements like Uranium found in the Earth’s crust and mantle

Slab-Pull and Ridge-Push

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: a mechanism that contributes to plate motion in which \_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_ oceanic crust sinks into the \_\_\_\_\_\_\_\_\_\_\_\_\_ and pulls the trailing \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ along. It is thought to be the primary downward arm of convective flow in the mantle
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: causes \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to slide down the sides of the oceanic ridge under the pull of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. May contribute to plate motion

Mantle Convection

* Mantle \_\_\_\_\_\_\_\_\_\_ are masses of \_\_\_\_\_\_\_\_\_\_\_-than-normal mantle material ascend toward the \_\_\_\_\_\_\_\_\_\_\_\_, where they may lead to \_\_\_\_\_\_\_\_\_\_\_ activity
* The \_\_\_\_\_\_\_\_\_\_\_\_\_\_ distribution of heat within the Earth causes \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ convection in the mantle that ultimately drives plate motion