Warm-Up | Plate Tectonics

Lesson Question

How does the theory of plate tectonics explain the movement of Earth's plates?

Lesson Goals

- **Explain** the theory of plate tectonics.
- **Identify** the major tectonic plates.
- **Distinguish** the three types of plate boundaries.
- **Relate** plate tectonics to the formation of landforms.

Words to Know

Fill in this table as you work through the lesson. You may use the glossary to help you.

divergent boundary	an area where two or more tectonic plates move away from one another
fault	a crack in Earth's crust
lithosphere	a rigid layer composed of the crust and the upper mantle
convergent boundary	an area where two or more tectonic plates move toward one another and collide
convection currents	the movement of fluid caused by differences in temperature
rift valley	an area of low land with steep walls formed at divergent boundaries
subduction	the downward movement of one of Earth's plates beneath another plate

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Words to Know

transform boundary	an area where two plates slide past each other in opposite directions
plate tectonics	the theory that pieces of the lithosphere are constantly moving due to convection currents in Earth's mantle
plate	a puzzle piece–like section of the lithosphere that moves over the asthenosphere carrying pieces of continental and oceanic crust

Continental Drift

Alfred Wegener proposed the theory of continental drift.

- Wegener believed all the continents were once connected as a large [landmass].
- His theory stated that the continents then [drifted] apart over time.

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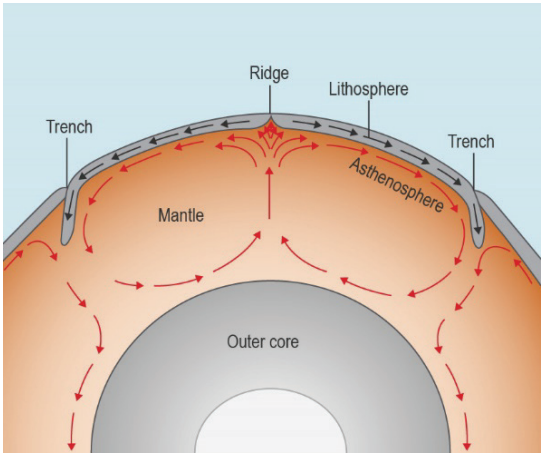
The Theory of Plate Tectonics

Canadian scientist John Tuzo Wilson observed cracks in the continents similar to the ones that already had been discovered on the ocean floor.

- He proposed that the [lithosphere] is broken into sections, called **plates**.
- These plates carry the [continents] and/or parts of the [ocean] floor.
- Wilson combined his observations and ideas with existing theories into the theory of **plate tectonics.**
- This theory states that pieces of Earth's lithosphere are slowly but constantly [moving].

Convection Currents

The motion of **convection currents** in the [mantle] drives plate movement.



- Material near the core becomes hot as heat is transferred from the core toward the [crust].
- Heated material becomes less dense and rises toward the surface. As it gets closer to the surface, it cools.
- As materials cool, they become more dense and sink back toward the core.

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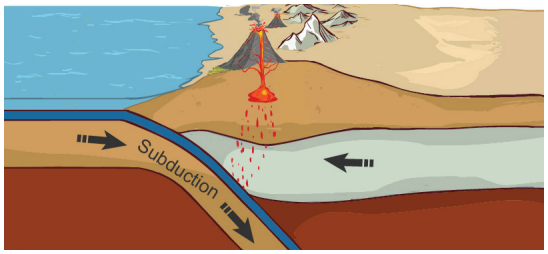
Subduction

Convection currents can lead to **subduction**, the process of one plate sliding [beneath] another.

- [Gravity] pulls the leading edge of one plate down into the [mantle].
- The rest of the plate follows.



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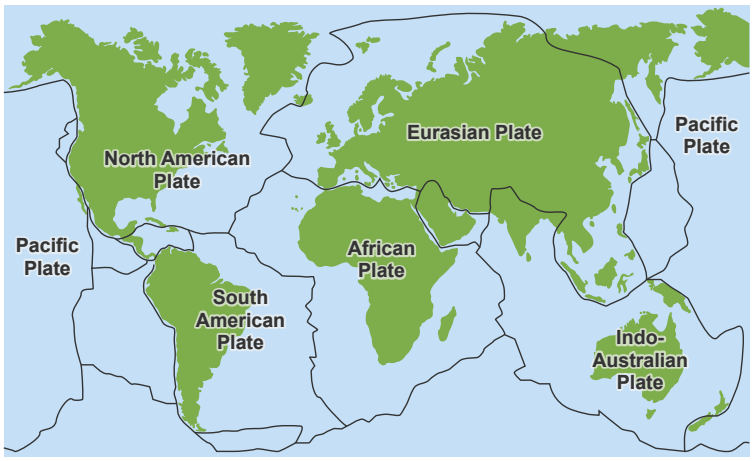
Earth's Lithospheric Plates



- The major plates on Earth include the following: the North American Plate, the South American Plate, the African Plate, the [Eurasian] Plate, the [Indo-Australian] Plate, and the [Pacific] Plate.
- The plates on Earth are constantly moving at a rate of about [2.5] centimeters per year.

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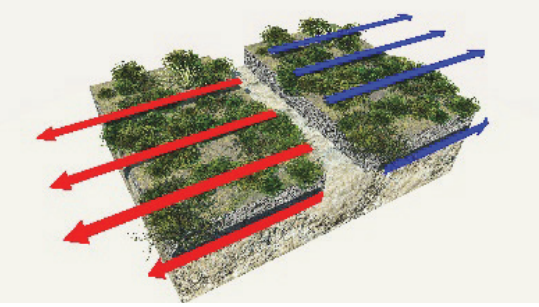
Plate Boundaries

Plate boundaries are areas where the edges of Earth's plates meet.

- They extend deep into the lithosphere.
- Faults form along these boundaries.

Divergent Boundaries

A **divergent boundary** occurs when plates move apart from one another.



Divergent boundaries can occur in oceans and on land.



Divergent boundaries can form mid-ocean ridges and rift valleys.

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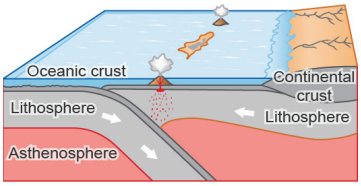
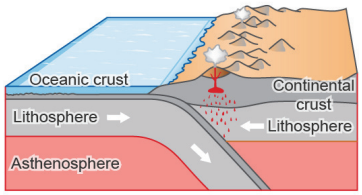
Convergent Boundaries

A **convergent boundary** occurs where two plates move [toward] each other.



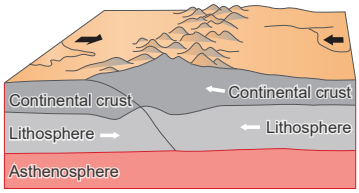
Oceanic-oceanic

- Creates [island] chains



Oceanic-continental

- Creates [volcanoes]

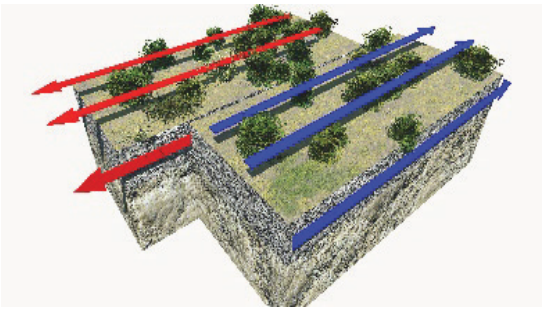


Continental-continental

- Creates [mountains]

Transform Boundary

A **transform boundary** occurs where plates slip past each other in [opposite] directions.



[Crust] is neither created nor destroyed.



[Earthquakes] often occur along transform boundaries.

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Summary | Plate Tectonics

Lesson Question

How does the theory of plate tectonics explain the movement of Earth's plates?

Answer

(Sample answer) According to the theory of plate tectonics, convection currents cause movement in the lithosphere, which results in the segmentation into various parts called plates.

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Review: Key Concepts

The theory of plate tectonics states that pieces of Earth's

[lithosphere] are slowly but constantly moving.

- This movement is driven by convection currents.

Earth's major tectonic plates include the:

- Eurasian Plate.
- African Plate.
- Indo-Australian Plate.
- North American Plate.
- South American Plate.
- Pacific Plate.

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Review: Key Concepts

There are three types of plate boundaries, and each creates different landforms.

Divergent	Convergent	Transform
Boundaries	**Boundaries**	**Boundaries**

• Plates move away from each other.
  • Create mid-ocean ridges and rift valleys
	• Plates collide with each other.
	  • Form volcanoes, islands, and mountains
		• Plates move past each other in opposite directions.
		  • Cause earthquakes

Use this space to write any questions or thoughts about this lesson.

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