

Earth Systems: Plate Tectonics & Crustal Boundaries



Use the matching sheet ID when checking answers.

Part A: Multiple Choice. Analyze tectonic mechanisms and geological evidence below.

1. What is the primary heat-transfer mechanism within Earth's semi-molten mantle that drives the slow motion of tectonic plates?

Answer: B. Convection currents caused by heat from Earth's core

Unequal heating deep within Earth creates slow-churning convection currents in the plastic asthenosphere that drag the overlying lithospheric plates.

2. At a convergent boundary where a dense oceanic plate collides with a less dense continental plate, which geological feature is typically formed?

Answer: B. A deep-sea trench and a volcanic mountain arc on land

Because oceanic crust is denser, it subducts beneath the continental plate into the mantle, carving a deep ocean trench and generating magma for volcanic mountain ranges (like the Andes or Cascades).

3. The San Andreas Fault in California represents which type of tectonic plate boundary?

Answer: A. Transform boundary where two plates grind horizontally past each other

The San Andreas Fault is a classic continental transform boundary where the Pacific Plate and North American Plate shear horizontally past one another.

Part B: Tectonic Boundary Classification. Categorize each geological description into the appropriate plate boundary type.

Sort these items: Subduction zone, volcanic island arcs, and deep oceanic trenches; Mid-Atlantic Ridge and African Rift Valley (crust is created); Himalayan mountain range formed by two colliding continental plates; San Andreas Fault: horizontal shearing with shallow earthquakes and no volcanism; Seafloor spreading where magma wells up and solidifies into new basalt; Plates slide laterally past each other without creating or destroying crust

Convergent Boundary	Divergent Boundary	Transform Boundary
Subduction zone, volcanic island arcs, and deep oceanic trenches; Himalayan mountain range formed by two colliding continental plates	Mid-Atlantic Ridge and African Rift Valley (crust is created); Seafloor spreading where magma wells up and solidifies into new basalt	San Andreas Fault: horizontal shearing with shallow earthquakes and no volcanism; Plates slide laterally past each other without creating or destroying crust