

Name: _____ Date: _____

Answer Key: Dare to Map the Deeps? Plate Tectonics Challenge for 11th Grade

Students identify crustal movement patterns and seismic mechanics to reinforce their understanding of Earth's dynamic structural evolution.

1. Which specific layer of the Earth acts as a lubricant, allowing the rigid lithospheric plates to slide above it?

Answer: B) The asthenosphere

The asthenosphere is a semi-fluid, plastic layer of the mantle that provides the mechanical medium for plate movement.

2. True or False: The Wadati-Benioff zone is a planar zone of seismicity corresponding to the down-going slab in a subduction zone.

Answer: A) True

This zone tracks the path of a subducting plate as it descends into the mantle, producing deep-focus earthquakes.

3. The ____ magnitude scale is often preferred by seismologists over the Richter scale for ranking large earthquakes because it measures total energy released.

Answer: C) Moment

The Moment Magnitude Scale (M_w) is more accurate for large-scale events as it accounts for the physical area of the fault rupture.

4. Which of the following volcanic features is formed by highly viscous, silica-rich lava that plugs the vent, leading to explosive pressure buildup?

Answer: C) Lava dome

Lava domes (like those at Mt. St. Helens) form from felsic lava that is too thick to flow far, often causing explosive hazards.

5. True or False: S-waves (secondary waves) can travel through both solid rock and liquid magma.

Answer: B) False

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S-waves are shear waves that cannot travel through liquids, which is how we know the Earth's outer core is liquid.

6. A ____ boundary is a type of plate interaction where crust is neither created nor destroyed, but plates move horizontally past one another.

Answer: A) Transform

Transform boundaries, like the Alpine Fault in New Zealand, involve lateral sliding and high levels of shallow seismic activity.

7. What is the primary driving force behind the movement of tectonic plates?

Answer: C) Mantle convection currents

Convection currents in the mantle transfer heat from the core, driving the motion of the lithosphere.

8. True or False: The 'Ring of Fire' is a direct result of divergent plate boundaries surrounding the Pacific Ocean.

Answer: B) False

The Ring of Fire is primarily a result of convergent boundaries and subduction zones, not divergent boundaries.

9. The process of ____ occurs at mid-ocean ridges, where rising magma cools to form new oceanic lithosphere.

Answer: B) Seafloor spreading

Seafloor spreading, a concept championed by Harry Hess, explains how new crust is added to the ocean floor at divergent zones.

10. Which of these is a secondary effect of an earthquake that involves saturated soil behave like a liquid?

Answer: C) Liquefaction

Liquefaction occurs when seismic shaking causes loose, water-saturated sediment to lose its strength and act as a fluid.