Name: _____ **Date:** _____

Answer Key: Why the Ground Isn't as Solid as You Think (7th Grade Quiz)

Students gain a deep understanding of lithospheric dynamics by analyzing seismic data and volcanic chemistry to predict hidden crustal movements.

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1. The 1883 eruption of Krakatoa was significantly more explosive than typical Hawaiian eruptions. Based on the chemical composition of magma, what most likely caused this extreme violence?

Answer: B) High silica content causing trapped gases to build massive pressure

High silica content (characteristic of rhyolitic or andesitic magma) increases viscosity, which traps gas bubbles and leads to explosive pressure releases compared to low-silica, runny basaltic magma.

2. When a dense oceanic plate slides beneath a lighter continental plate, it forms a ____ zone, often resulting in deep-focus earthquakes and volcanic arcs.

Answer: C) subduction

Subduction occurs at convergent boundaries where the more dense plate (usually oceanic) is forced down into the mantle.

3. True or False: Seismic P-waves (primary waves) can travel through both solid rock and liquid magma, while S-waves (secondary waves) cannot travel through liquids.

Answer: A) True

P-waves are longitudinal and can compress any medium, whereas S-waves are transverse and require shear strength, which liquids do not possess.

4. If you are analyzing a seismograph and notice a significant time gap between the arrival of the P-wave and the S-wave, what can you conclude about the earthquake's origin?

Answer: C) The epicenter is a great distance away from your location

Because P-waves travel faster than S-waves, the lead they have over S-waves increases the further they travel from the source.

5. The theoretical 'Supercontinent' that existed 300 million years ago is widely known, but the earlier supercontinent that formed roughly 1 billion years ago is called ____.

Answer: C) Rodinia

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Rodinia is the name of the Neoproterozoic supercontinent that pre-dated Pangea by hundreds of millions of years.

6. True or False: Paleomagnetism provides evidence for seafloor spreading because the iron minerals in new crust align with Earth's switching magnetic poles.

Answer: A) True

Magnetic 'striping' on the ocean floor records the history of Earth's magnetic reversals, proving that new crust is constantly being created and pushed outward.

7. Which of these geological features is a direct result of a 'Hotspot' located in the middle of a moving tectonic plate rather than at a boundary?

Answer: B) The Yellowstone Caldera

Yellowstone is a continental hotspot; while most volcanoes are at boundaries, hotspots occur where a mantle plume melts the plate above it regardless of the boundary location.

8. The physical mechanism that acts as the primary 'engine' for plate movement, involving the cooling and sinking of lithospheric plates, is called ____.

Answer: A) Slab pull

Current geological models suggest slab pull (the weight of the subducting plate pulling the rest of it down) is more influential than ridge push or simple convection.

9. Why does the 'Ring of Fire' experience roughly 90% of the world's earthquakes?

Answer: C) It is surrounded by subduction zones and complex plate interactions

The Pacific basin is rimmed by convergent boundaries where subduction creates massive friction and stress, leading to frequent large-scale seismic events.

10. True or False: The Moment Magnitude Scale is a logarithmic scale, meaning a magnitude 8 earthquake releases roughly 32 times more energy than a magnitude 7.

Answer: A) True

Each whole number increase on the magnitude scale represents about a 10-fold increase in measured amplitude, but approximately 32 times more energy release.