Name: _____ **Date:** _____

Answer Key: When the Crust Fails: A 7th Grade Tectonic Forensics Quiz

Can you predict the unseen forces shaping our world? Analyze complex seismic data and evaluate the mechanics behind Earth's most violent geological shifts.

---

1. A geologist finds a sequence of rock layers where the oldest ocean floor is located furthest from a central underwater ridge. What does this spatial arrangement evaluate to in terms of seafloor dynamics?

Answer: C) New crust is being created at the ridge and pushing older crust away.

This demonstrates seafloor spreading at divergent boundaries; newer magma cools at the ridge, displacing older material toward the continents.

2. At a convergent boundary where an oceanic plate meets a continental plate, the _____ is the process where the denser plate sinks into the mantle.

Answer: B) Subduction

Subduction occurs because oceanic basalt is denser than continental granite, causing the oceanic lithosphere to descend into the asthenosphere.

3. Seismic P-waves (Primary waves) can travel through both solid and liquid layers of Earth's interior, whereas S-waves (Secondary waves) cannot travel through liquids.

Answer: A) True

P-waves are longitudinal and can move through all states of matter, while S-waves are transverse and require shear strength, which liquids lack.

4. If you are analyzing a region with deep-focus earthquakes (over 300km deep), which tectonic setting are you most likely investigating?

Answer: C) A subduction zone within a Wadati-Benioff zone

Deep-focus earthquakes occur only where a cold, brittle slab of lithosphere is forced deep into the mantle along a subducting boundary.

5. Viscosity determines how explosive a volcanic eruption will be. A volcano with _____ silica content in its magma is generally the most dangerous.

Name: _____ **Date:** _____

Answer: B) High

High silica content increases magma viscosity (thickness), which traps gases and leads to high-pressure, explosive eruptions.

6. The Modified Mercalli Intensity scale is the most accurate way for scientists to measure the total energy released by an earthquake's magnitude.

Answer: B) False

The Mercalli scale measures observed damage/effects, whereas the Moment Magnitude Scale is used by scientists to quantify the actual energy released.

7. Which of these features is a direct result of 'slab pull' and 'ridge push' mechanisms acting on the Philippine Plate?

Answer: A) The formation of the Mariana Trench

Slab pull is the primary driver of plate motion at subduction zones, creating deep oceanic trenches like the Mariana Trench.

8. When monitoring a volcano, scientists detect a 'harmonic tremor.' This specific type of seismic activity usually indicates _____.

Answer: C) Magma moving toward the surface

Harmonic tremors are continuous seismic signals caused by the movement of underground magma, often serving as a precursor to an eruption.

9. Compare a Stratovolcano (Composite) to a Shield volcano. Why does a Stratovolcano have much steeper slopes?

Answer: C) It is built from alternating layers of pyroclastic flow and high-viscosity lava.

Stratovolcanoes are 'composite' because they are made of layers of ash and thick lava that cools quickly, building height rather than width.

10. A transform plate boundary is characterized by the creation of new lithosphere through volcanic activity.

Answer: B) False

Name: _____ Date: _____

Transform boundaries are conservative; crust is neither created nor destroyed, as plates slide horizontally past one another.