Name: _____ **Date:** _____

Answer Key: Tectonic Trench Trek: A 4th Grade Shifting Crust Challenge

Solve high-stakes geologic puzzles using data from the Mariana Trench and Iceland's ruptures to master how the Earth's rigid skin moves and melts.

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1. Imagine you are an explorer in a deep-sea submarine in the Pacific Ocean. You find a deep trench where one plate is being pushed under another and melting into the Earth. What is this process called?

Answer: A) Subduction

Subduction occurs at convergent boundaries when a denser plate sinks below a lighter plate, recycling the crust back into the mantle.

2. True or False: The 'Ring of Fire' is a tectonic area where most of the world's most explosive volcanoes are located due to plate collisions.

Answer: A) True

The Ring of Fire is a major area in the basin of the Pacific Ocean where many earthquakes and volcanic eruptions occur because of plate subduction.

3. In Iceland, the North American and Eurasian plates are pulling apart, creating a giant crack. This type of plate movement is known as a _____ boundary.

Answer: C) Divergent

Divergent boundaries occur where plates move away from each other, allowing magma to rise and create new crust.

4. An engineer is building a skyscraper in a city near a transform boundary. Which event is the MOST likely threat the building must be designed to survive?

Answer: B) A powerful earthquake caused by plates sliding

Transform boundaries, such as the San Andreas Fault, are known for horizontal plate movement which releases energy as earthquakes rather than volcanoes.

5. Before an earthquake happens, the rocks along a fault line are under immense pressure and _____, storing energy like a stretched rubber band.

Answer: D) Stress

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Geologic stress builds up as plates try to move. When the rocks finally break or slip, that stored energy is released as an earthquake.

6. True or False: Volcanoes only form on land and never occur on the ocean floor.

Answer: B) False

Many volcanoes, such as those at the Mid-Atlantic Ridge or Emperor Seamounts, are underwater and keep growing until they sometimes form islands.

7. Why do the Appalachian Mountains in the Eastern U.S. look rounded and short, while the Alps in Europe look jagged and tall?

Answer: B) The Appalachians stopped growing long ago and have been eroded

While both were formed by plate collisions, the Appalachians are much older. Erosion from water and wind has smoothed them over millions of years.

8. The hot, semi-liquid layer of the Earth that the tectonic plates float on is called the _____.

Answer: B) Asthenosphere

The asthenosphere is the ductile part of the upper mantle that allows the rigid lithospheric plates to move.

9. If you found a rock sample that was very young and sat right in the middle of a crack on the ocean floor, you would likely be at what feature?

Answer: A) A mid-ocean ridge

At mid-ocean ridges (divergent boundaries), magma rises to create new, young crust as the seafloor spreads apart.

10. True or False: The movement of tectonic plates is so slow that they usually only move about as fast as your fingernails grow.

Answer: A) True

Tectonic plates move at a rate of roughly 1 to 10 centimeters per year, which is a similar speed to human fingernail growth.