Earth Science Chapter 9 - Earthquakes - Quiz Questions (#1- #6)

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Q1-1: 1. What is the name of the kind of motion that causes an earthquake? a. Give an everyday example of this kind of motion. b. What three (3) conditions are needed for this motion?	fold	A1-1: The motion is called strike-slip. a) Pulling a sock off of your foot -- or a door stuck in a door jam. b) 3 things needed: friction, two objects in contact, forces that make the objects move.
Q1-2: Lithospheric plates: a. Name the two (2) parts: b. Describe how they are different from each other.	fold	A1-2: Lithospheric plates are made of the crust which is brittle and the upper mantle which is plastic and flows.
Q1-3: What causes lithospheric plates to build up pressure and finally “give” along transform faults?	fold	A1-3: Lithospheric plates are in motion. Therefore, as two plates move in the opposite direction, sometimes the plates get stuck at the crust. Because the upper mantle is flowing, pressure builds. Eventually, the stuck place at the crust "gives" and an earthquake occurs.
Q1-4: What is the difference between the **FOCUS** and the **EPICENTER** of an earthquake?	fold	A1-4: The focus is the point below Earth's surface where a rock breaks and causes an earthquake. An epicenter is a point on the Earth's surface right above the focus of an earthquake.

Q1-5: How is a lithospheric plate like a long line of moving grocery carts?	fold	A1-5: A lithospheric plate moves as a unit like the line of grocery carts. However, parts of the plate are still able to move independently (like the individual carts).
Q1-6: (Definition)-- The polished surfaces of rock which are the result of rock moving against rock along a fault are known as ________________	fold	A1-6: slickensides
Q1-7: Why do some earthquakes occur inside plate boundaries in the interior of a lithospheric plate?	fold	A1-7: Sometimes lithospheric plates have ancient plate boundaries. At these old plate boundaries in the middle of the plates, earthquakes can occur.
Q1-8: Explain why the movement of a plate can be **<u>UNEVEN</u>** along its boundary.	fold	A1-8: The movement of the plate is uneven. Some parts can be stuck at the boundary and then when there is a break at the boundary, the plate moves.
Q1-9: How can one earthquake cause another?	fold	A1-9: If it has been a long time since an earthquake has released built-up potential energy between two plates, then an earthquake occurring in one section of the plate may increase the stress and built-up potential energy in the second section of the same plate. The added stress can trigger another earthquake in

		the second section.
Q1-10: Put these events in order and then **DESCRIBE** each: aftershock, foreshock, and earthquake.	f o l d	A1-10: Foreshock, earthquake, aftershock. Foreshock--small earthquakes that occur before the main event; Earthquake -- the main event; Aftershocks-- tremors that occur after the main event.
Q2-1: What is the difference between "body waves" and "surface waves?"	f o l d	A2-1: Body waves travel through Earth's interior. Surface waves travel on Earth's surface. Body waves can become surface waves when they reach the surface.
Q2-2: Which body wave is fastest & pushes / pulls rock in the direction the wave travels?	f o l d	A2-2: P (primary)
Q2-3: Which seismic wave moves rock in a motion that is perpendicular to the direction of the moving wave?	f o l d	A2-3: S (secondary)

Q2-4: Which type of seismic waves (body … or … surface) tend to cause the most damage during an earthquake?	f o l d	A2-4: Surface waves
Q2-5: List what can happen to a seismic wave as it moves from one material to another as it travels through the Earth.	f o l d	A2-5: Seismic waves can change speed by moving faster in cooler material and slower in hot material, they can also be bent, reflected, or even stopped.
Q2-6: What information is gained about an earthquake from using a seismograph?	f o l d	A2-6: Information gained from a seismograph: what kinds of waves occur, their strength, and the time they arrive at the instrument. A seismograph from one seismic station can be used with other seismographs to find the epicenter of an earthquake.
Q2-7: How would a seismologist use seismographs to study a small part of a fault zone?	f o l d	A2-7: By comparing reading from several seismographs in a small area, seismologists can determine the materials underneath the area, the location of epicenters of local earthquakes, and establish the location of faults by charting locations of several earthquakes
Q2-8: What is measured to determine the location of an EPICENTER?	f o l d	A2-8: The difference in time between the arrival of P and S waves, which indicates the distance of the seismic station to the epicenter. By comparing the distance from an epicenter to three different seismic stations, the location of an epicenter can be found.

Q2-9: At least how many data stations are needed to find the epicenter of an earthquake?	fold	A2-9: 3
Q2-10: S-waves from a quake arrive at a seismic station 40 seconds after the arrival of P-waves. How far away is the EPICENTER?	fold	A2-10: 340 km
Q2-11: The distance scale on a map is 1 cm = 10 km. The distance from a seismic station to the epicenter of an earthquake is 50 km. To locate the epicenter, what would be the radius of the circle that is drawn around this station on the map?	fold	A2-11: 5 cm
Q3-1: What two (2) measurements are taken <u>during</u> and <u>after</u> an earthquake?	fold	A3-1: The energy released and the damage caused.
Q3-2: Compare and contrast the three (3) earthquake measuring scales discussed in this section: a. The Richter Scale: b. The Moment Magnitude Scale: c. The Mercalli Intensity Scale:	fold	A3-2: Richter Scale: according to size of seismic waves recorded on a seismograph. Each number change = 10 times increase in wave energy; Moment Magnitude scale also rates the total energy released by an earthquake. Numbers on this scale combine energy ratings & descriptions of rock movement; The Mercalli Intensity scale has 12 categories which rate the damage suffered by buildings, the ground, and people. Because damage can be different from place to place, a single

		earthquake may have different Mercalli numbers in different locations.
Q3-3: On the Richter Scale how many times stronger is a 3.0 magnitude earthquake compared to a 2.0 magnitude earthquake?	f o l d	A3-3: Ten times stronger
Q3-4: A friend tells you that he once experienced an earthquake and saw books and other objects falling off a bookcase. a. What was the magnitude on the Mercalli Intensity Scale? b. What was the magnitude on the Richter Scale?	f o l d	A3-4: a. VI Strong; b. 5
Q3-5: The largest earthquake ever recorded occurred in Chile. Why are earthquakes to be expected in Chile? Explain your answer.	f o l d	A3-5: There is a large and active convergent boundary very close to Chile involving the Nazca and South American plates. As they come together, there is energy built up along their convergent boundary that periodically is released.
Q3-6: How can the same earthquake have different Mercalli Intensity scale ratings in different locations?	f o l d	A3-6: The intensity and damage of an earthquake reduces as the distance from its epicenter increases. Two locations that are not the same distance from the epicenter of an earthquake will not feel the same intensity, and experience different effects from the same earthquake.

Q3-7: Why don’t earthquakes follow plate boundary lines exactly?	fold	A3-7: Because plate boundaries tend to be zones of seismic activity.
Q3-8: Future earthquakes will probably occur near the San Andreas Fault because the fault is “active.” What does it mean to say that a fault is “active?”	fold	A3-8: The plates involved are still moving and coming into contact with each other. This would build up energy over time that is periodically released in the form of earthquakes.
Q4-1: What is the translation for the Japanese word ... "tsunami?"		A4-1: Harbor wave
Q4-2: Why are tsunamis barely noticeable out in the ocean, but develop into huge waves when they reach the shore?		A4-2: In the ocean, tsunami waves have a long wave length, often hundreds of kilometers between wave crests. Sea levels might change only 12 inches under a ship. When the waves reach shore, the wave length bunches up and rises -- sometimes over 100 meters in height.
Q4-3: Why is it NOT correct to refer to a tsunami as a "tidal wave?"		A4-3: High and low tides are created by the moon's gravity. Tsunamis are not caused by the moon and are not related to gravitational pull. Tsunamis are not "TIDES."

Q4-4: How are tsunamis generated?			A4-4: When the sea floor abruptly deforms (moves) and displaces the overlying water -- a tsunami is created.
Q4-5: How fast can a tsunami wave travel? How far can tsunamis travel?			A4-5: A tsunami wave can travel up to 500 miles per hour. A tsunami wave can travel thousands of miles across the open ocean.
Q4-6: Can a tsunami be generated by a landslide? -- either underwater or at the sea shore?			A4-6: Yes!
Q4-7: What is "drawback?"			A4-7: If the first part of the tsunami that reaches shore is a "trough," water along the coast will recede dramatically, exposing normally submerged areas. This "drawback" will fool people because soon the actual wave will come speeding into the harbor area.
Q4-8: Describe the Pacific Tsunami Warning System. What is a DART buoy?			A4-8: The Pacific Tsunami Warning System uses buoys to monitor seismic activity and passing tsunami waves. DART buoys relay seismic signals and wave height data to yield tsunami warnings.

Q4-9: If a Japanese city built a 4.5 meter high tsunami wall along their harbor, would this be sufficient protection against future tsunamis? (Why or why not?)		A4-9: NO. 4.5 meters is only 15 feet. A tsunami can reach heights of 100 feet or more.
Q5-1: (Definition)-- The place on the Earth's surface above where rock breaks during an earthquake.	f o l d	A5-1: epicenter
Q5-2: (Definition)-- Stick-slip motion between lithospheric plates.	f o l d	A5-2: earthquake
Q5-3: (Definition)-- The point below the epicenter.	f o l d	A5-3: focus
Q5-4: (Definition)-- Where rocks break and there is movement.	f o l d	A5-4: fault

Q5-5: (Definition)-- Seismic waves that travel at the surface.	fold	A5-5: surface waves
Q5-6: (Definition)-- Seismic waves that travel through the planet.	fold	A5-6: body waves
Q5-7: (Definition)-- Name of instrument used to record seismic waves.	fold	A5-7: seismograph
Q5-8: (Definition)-- Scale in which each number change means a10-fold increase in seismic wave energy.	fold	A5-8: Richter Scale
Q5-9: (Definition)-- Scale in which eyewitness accounts of earthquake damage are incorporated into this earthquake measurement scale.	fold	A5-9: Mercalli Intensity Scale

Q5-10: (Definition)-- Scale which rates the total energy of an earthquake.	fold	A5-10: Moment Magnitude Scale
Q5-11: Define the word "friction."	fold	A5-11: The resistance that results from the relative motion of two objects that rub against each other.
Q5-12: What is a "slickenside?"	fold	A5-12: A surface of exposed rock that resembles a polished finish. It is the result of two large masses of rock moving against each other with enough force to smooth out the rock surface.
Q5-13: When two plates slide past each other, what happens to the crusts of these plates? What happens to the upper mantle parts of these plates?	fold	A5-13: They stick together until the potential energy exceeds the strength of the rock, at which point it breaks and an earthquake occurs. The upper mantle, which is plastic, continues to flow underneath.

Q5-14: Describe surface waves and how they affect an area that is experiencing an earthquake.	fold	A5-14: They travel slower than body waves, but cause the most damage. They can move up and down, almost like an ocean wave and side to side, often causing buildings to collapse.
Q5-15: If each Richter value represents seismic waves 10 times greater than the one before, then how much larger are the waves of an earthquake with a magnitude of 6 versus a magnitude of 3?	fold	A5-15: 1,000 times greater
Q5-16: If P-waves travel at 7 km/s and S waves travel at 3.6 km/s, how much faster are P-waves?	fold	A5-16: About twice as fast
Q6-1: (Definition)-- Movement of Earth's crust resulting from the building up of stored energy between 2 stuck lithospheric plates.	fold	A6-1: earthquake
Q6-2: (Definition)-- The point below Earth's surface where a rock breaks and causes an earthquake.	fold	A6-2: focus

Q6-3: (Definition)-- A region on Earth's surface that is split into two pieces.	fold	A6-3: fault
Q6-4: (Definition)-- A point on Earth's surface right above the focus of an earthquake.	fold	A6-4: epicenter
Q6-5: (Definition)-- Able to change shape without breaking.	fold	A6-5: plastic
Q6-6: (Definition)-- Stored energy -- energy built up but not yet used or released.	fold	A6-6: potential energy
Q6-7: (Definition)-- A motion which occurs when two surfaces are touching and stuck together and then suddenly release with a jolt.	fold	A6-7: stick-slip motion

Q6-8: (Definition)-- A surface of exposed rock that resembles a polished finish. It is the result of two large masses of rock moving against each other with enough force to smooth out the rock surface.	fold	A6-8: slickensides
Q6-9: (Definition)-- Small bursts of shaking that may precede an earthquake.	fold	A6-9: foreshocks
Q6-10: (Definition)-- Small tremors that follow an earthquake.	fold	A6-10: aftershocks
Q6-11: (Definition)-- Seismic waves that travel through the interior of Earth.	fold	A6-11: body waves
Q6-12: (Definition)-- Body waves that reach and travel along Earth's surface.	fold	A6-12: surface waves

Q6-13: (Definition)-- A scientist who records and interprets seismic waves.	fold	A6-13: seismologist
Q6-14: (Definition)-- An instrument that shows the kinds of waves that occur, their strength, and the time they arrive at the instrument.	fold	A6-14: seismograph
Q6-15: (Definition)-- A scale that rates earthquakes according to the size of the seismic waves recorded on a seismograph.	fold	A6-15: Richter Scale
Q6-16: (Definition)-- A scale that rates the total energy released by an earthquake. Numbers on the scale combine energy ratings and rock movement.	fold	A6-16: Moment Magnitude Scale
Q6-17: (Definition)-- A scale that rates the damage suffered by buildings, the ground, and people during an earthquake.	fold	A6-17: Mercalli Intensity Scale

Q6-18: (Definition)-- Faults at transform boundaries tend to have many branching faults. Thus is encompasses an entire area.	f o l d	A6-18: earthquake zone
Q6-19: (Definition)-- Ocean waves that can travel thousands of miles from an underwater earthquake site.	f o l d	A6-19: tsunami
Q6-20: Chinese philosopher who created the first earthquake recording instrument in 132 AD.	f o l d	A6-20: Chang Heng & his seismoscope
Q6-21: (Definition)-- Where water enters the spaces between dirt and sand particles in man-made land, and then the "soil" behaves like a liquid and will not support buildings.	f o l d	A6-21: liquefaction