Geology Jeopardy Matching

Earthquakes

10 What is the name for an area around the Pacific Ocean where there are many subduction zones on the edges of the continents?	**10** "Ring of Fire"

20 Put the locations in order of less likely to more likely that an earthquake will occur. A. In the middle of a tectonic plate far from any hotspots or plate boundaries B. On the boundary between two converging tectonic plates. C. In the middle of a tectonic plate near a hotspot D. On the boundary of two diverging tectonic plates	**20** A, D, C, B

30 Which three of the following locations are likely to have an earthquake occur? A. Deep in the Earth's crust in a subduction zone. B. In the middle of a tectonic plate far from any hotspots or plate boundaries C. In a subduction zone near the surface. D. Along a transform plate boundary E. Ohio	**30** A, C, D

40 Explain the geologic process that results in volcanoes forming in the Pacific Northwest? (use "oceanic plate," "continental plate" & "subduction" in your answer).	**40** The oceanic plate moves under the continental plate in a process called subduction. When the oceanic plate dives deep enough, it causes magma to come up to the surface and form volcanoes like Mt. Rainier and Mt. Baker.

50 How could pumping water deep into Earth cause earthquakes?	**50** Pushing on fault lines and making them move.

Scientific Inquiry

10 Question: How does underground oil drilling affect the number of earthquakes along fault lines in Italy? Identify the missing part(s) of this conclusion: The deeper the drilling and the more oil drilling that happens, the more earthquakes. Breaking up parts of the Earth's crust, particularly in regions close to fault lines, can cause tectonic plates to move, resulting in earthquakes.	**10** Explanation: The deeper the drilling and the more oil drilling that happens, the more earthquakes. In Italy in 2012, there were many new oil drilling operations underway and two earthquakes happened in rapid succession. This was 2 more earthquakes than before. Breaking up parts of the Earth's crust, particularly in regions close to fault lines, can contribute to tectonic plates to moving, resulting in earthquakes.

20 In a study asking this, "How does the depth of oil drilling affect the magnitude of earthquakes?" What is the independent variable?	**10** Depth of drilling

30 In a study asking this, "How does the depth of oil drilling affect the magnitude of earthquakes?" What is the dependent variable?	**30** Magnitude of earthquakes

40 In a study asking this, "How does the depth of oil drilling affect the magnitude of earthquakes?" What is a controlled variable?	**40** Oil drilling

50 Write a scientific conclusion: How does the depth of oil drilling affect the magnitude of earthquakes? <u>Depth of Drilling | Earthquake Magnitude</u> 100 meters deep | 0.8 average magnitude 500 meters deep | 2.1 average magnitude 900 meters deep | 3.4 average magnitude	**50** The deeper the oil drilling, the stronger the earthquakes. For wells 100 meters deep had average 0.8 earthquakes, the wells 500 meters deep had average 2.1 earthquakes, and the wells 900 meters deep had average 3.4 earthquakes. A reduction of 400 meters depth led to a reduction of 1.3 magnitude. Drilling down deeper has the potential to make more cracks in Earth's crust and cause more instability, thus leading to stronger earthquakes.

Geologic Processes

10 What are the different rock types, and how is each made?	**10** Sedimentary=compacting into layers, metamorphic=changed by heat and pressure, igneous=volcanic/crystallized magma

20 Give two examples of how one rock type can change to another rock type.	**20** Sedimentary gets mashed by tectonic plates and becomes metamorphic; metamorphic gets pushed deep down into Earth and melts to form magma, which crystallizes into igneous.

30 Explain each of these types of tectonic activity. A. Divergent plate boundary B. Convergent plate boundary C. Transform plate boundary D. Hotspot	**30** A. Plates move away from each other B. Plates move toward each other C. Plates slide past each other D. One plate moves over an area where magma is pushing up

40 What is evidence for the theory that earthquakes and volcanoes are the results of tectonic plate interactions?	**40** Faults and volcanoes are often found at tectonic plate boundaries.

50 Explain what happens in a subduction zone, including at least 3 catastrophic events that can result.	**50** A thin, dense plate (usually oceanic) dives under a thick, buoyant plate (usually continental). Earthquakes and tsunamis can happen. The oceanic plate diving causes magma to rise up creating volcanoes on the continent.

Volcanoes

10 Which is more likely to erupt, a volcano that has erupted 12 times in the past 4,000 years, or one that erupted once in that same time frame?	**10** The one that erupted 12 times.

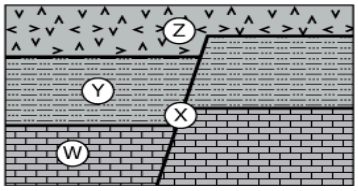
20 Put the locations in order of less likely to more likely that a volcano will occur. A. In the middle of a tectonic plate far from any hotspots or plate boundaries B. Near a subduction zone between two converging tectonic plates. C. In the middle of a tectonic plate right above a hotspot D. On the boundary of two diverging tectonic plates	**20** A, D, B, C

30 Using the following letters, what describes Hawaii? A. In the middle of a tectonic plate far from any hotspots or plate boundaries B. Near a subduction zone between two converging tectonic plates. C. In the middle of a tectonic plate right above a hotspot D. On the boundary of two diverging tectonic plates	**30** C

40 Using the following letters, what describes Mt. Rainier? A. In the middle of a tectonic plate far from any hotspots or plate boundaries B. Near a subduction zone between two converging tectonic plates. C. In the middle of a tectonic plate right above a hotspot D. On the boundary of two diverging tectonic plates	**40** B

50 How is the shape of a volcano determined by the viscosity of the lava?	**50** Viscous=cone, non-viscous=shield(flatter)

Miscellaneous

10 Rock layers W, Y and Z and fault X are shown. The rock layers and the fault were formed at different times. Put them in order of formation from oldest to youngest.  	**10** WYXZ

20 Match the part of the rock cycle with the geologic process. 1. Sedimentary □ Metamorphic 2. Igneous □ Sediments 3. Magma □ Igneous 4. Metamorphic □ Magma	A. Weathering B. Heat & pressure C. Crystallization D. Melting	**20** 1-B 2-A 3-C 4-D

30 Which of the following three items are evidence that support the theory of plate tectonics? A. The seafloor is spreading apart and new seafloor is forming where it is spreading. B. Continental ice sheets advanced and melted (retreated) many times in the past. C. There are mountain ranges are on all continents. D. Evidence of fossils from the same organisms are found on continents an ocean apart. E. The shape of continents like South America and Africa seemed to fit together.	**30** A, D, E

40 Explain the geologic process that results in new seafloor crust forming? (use "convection currents," "divergent boundary" & "spreading" in your answer).	**40** Convection currents from the mantle cause two plates to move away from each other, which is a divergent boundary. This spreading allows magma to come up to the crust and crystallize into new seafloor rock.

50 What are ways that humans cause earthquakes?	**50** Pumping water underground during the process of “fracking,” which is used to extract natural gas for energy use.