Earth Science: Benchmark 2 Sample Questions

Standard 3.0 – Students know plate tectonics operating over geologic time has changed the patterns of land, sea, and mountains on Earth's surface.

3.b (6 questions on benchmark) know principal structures that form at 3 different plate boundaries.

1) How do deep-ocean trenches form?
   a) erosion from turbidity currents
   b) earthquake activity under the ocean floor
   c) subduction of one plate beneath another
   d) seafloor spreading
2) What kind of plate boundary forms where ocean meets land?
   a) divergent boundary
   b) transform fault boundary
   c) oceanic-continental convergent boundary
   d) oceanic-oceanic convergent boundary
3) What kind of plate boundary forms when 2 plates meet under the ocean?
   a) divergent boundary
   b) transform fault boundary
   c) oceanic-continental convergent boundary
   d) oceanic-oceanic convergent boundary
4) What kind of plate boundary forms when 2 large plates of land collide?
   a) divergent boundary
   b) transform fault boundary
   c) oceanic-continental convergent boundary
   d) continental-continental convergent boundary
5) What landforms are created at oceanic-continental convergence boundaries?
   a) volcanic island arcs
   b) continental volcanic arcs
   c) rift valleys
   d) tall mountains like Mt. Everest
6) What landforms are created at oceanic-oceanic convergence boundaries?
   a) volcanic island arcs
   b) continental volcanic arcs
   c) rift valleys
   d) tall mountains like Mt. Everest
7) What landforms are created at continental-continental convergence boundaries?
   a) volcanic island arcs
   b) continental volcanic arcs
   c) rift valleys
   d) tall mountains like Mt. Everest
8) What landforms are created at divergent boundaries?
   a) volcanic island arcs
   b) continental volcanic arcs
   c) rift valleys
   d) tall mountains like Mt. Everest

3.c (3 questions on benchmark) know how to explain the properties of rocks based on physical and chemical conditions under which they formed, including tectonic processes.

1) What effect can increasing temperature and pressure have existing minerals?
   a) new minerals may precipitate out
   b) atoms my rearrange into new minerals
   c) mineral my become organic
   d) mineral may dissolve
2) What type of rock forms from cooling magma?
   a) igneous b) metamorphic c) sedimentary d) petrified
3) What type of rock forms from a change in the chemical composition of a rock?
   a) igneous b) metamorphic c) sedimentary d) petrified
4) What type of rock forms from the deposition of sediment?
   a) igneous b) metamorphic c) sedimentary d) petrified
5) What is true of <u>intrusive</u> igneous rocks?
   a) form from cooling magma
   b) form on Earth's surface
   c) form when magma (under surface) hardens
   d) can be easily observed
6) Igneous rocks are classified by
   a) size and shape
   b) color and how fast they cool
   c) texture and crystal arrangement
   d) texture and composition

3.d (4 questions on benchmark) know why and how earthquakes occur and the scales used to measure their intensity and magnitude.

1) What causes an earthquake?
   a) the buildup of layers of sediment
   b) the elastic rebound of rock that has slipped along a fault
   c) strong foreshocks and and aftershocks
   d) any movement along a fault plane
2) Which type of seismic wave shakes the rock at right angles to the direction of travel?
   a) P Waves b) S waves c) Surface waves d) compression waves
3) Which type of seismic wave moves in the same plane as the direction of travel?
   a) P waves b) S waves c) Surface waves d) C waves
4) Which type of earthquake <u>wave</u> would cause the most damage near the epicenter?
   a) P waves b) S waves c) Surface waves d) C waves
5) The amount of shaking at a given location based on the amount of damage is called
   a) amplitude b) moment magnitude c) Richter scale d) intensity
6) Earthquake magnitude is
   a) the depth of the earthquake's epicenter
   b) the Mercalli value of damage near the epicenter
   c) the amount of energy released at the focus
   d) the amount of shaking

3.e (7 questions on benchmark) know two kinds of volcanoes, one with violent eruptions producing steep slopes and the other with voluminous lava flows producing gentle slopes.

1) The major factors that determine whether a volcano erupts explosively or quietly are
   a) magma composition, height of volcano and magma temperature
   b) magma composition, magma temperature and amount of dissolved gasses
   c) magma color, magma composition and magma temperature
   d) magma composition, magma temperature and time of year
2) Which best describes a "Shield" volcano?
   a) they are typical symmetrical cones that erupt violently
   b) they erupt fluid lava to form gentle slopes
   c) they have steep sides composed of cinders
   d) they are small cones made of cinder
3) Which best describes a "Composite cone" volcano?
   a) they are typical symmetrical cones that erupt violently
   b) they erupt fluid lava to form gentle slopes
   c) they have steep sides composed of cinders
   d) they are small cones made of cinder
4) Mount Shasta is the largest composite cone in the Cascade Range. What potential danger would this volcano pose if it erupted?
   a) pyroclastic flows
   b) ashes
   c) hot gases
   d) all of the above
5) What determines the shape of a volcanic cone?
   a) the rock on which the volcano forms
   b) the material ejected by the volcano
   c) the size of the opening from which the lava flows
   d) the length of the central vent
6) Where would a continental volcanic arc form?
   a) along a divergent boundary
   b) along an oceanic-continental plate boundary
   c) along an oceanic-oceanic plate boundary
   d) along a continental-continental plate boundary
7) Where would a volcanic island arc form?
   a) along a divergent boundary
   b) along an oceanic-continental plate boundary
   c) along an oceanic-oceanic plate boundary
   d) along a continental-continental plate boundary
8) The Hawaiian Islands are forming as a result of
   a) Pacific Plate moving over a mantle plume (hot spot)
   b) convergence of 2 continental plates
   c) convergence between a continental and an oceanic plate
   d) divergence along a mid-ocean ridge

Standard 9.0 – Students know the geology of California underlies the state's wealth of natural resources as well as its natural hazards.

9.a (6 questions on benchmark) know the resources of major economic importance in California and their relation to California's geology.

1) Why does much of the gold mined in California form placer deposits?
   a) Gold is precipitated from the water in river beds
   b) Gold is a soft mineral with metallic luster
   c) Gold usually forms in hydrothermal vein deposits
   d) Gold is a dense mineral that settles quickly from moving water
2) Which economic minerals contribute most to California's economy?
   a) gold and silver
   b) cement
   c) sand and gravel
   d) boron minerals
3) Boron minerals are evaporites. In which region of California do these minerals form?
   a) Klamath Mountains
   b) Basin and Range
   c) Central Valley
   d) Mojave Desert
4) How did the gold and silver mined in California form?
   a) evaporation in the Mojave Desert
   b) result of mountain building processes
   c) from organic matter under the ocean floor
   d) result of chemical weathering
5) Why is California the leading state in the production of geothermal energy?
   a) California has few other energy resources
   b) California's climate is relatively mild
   c) California has 2 major deserts – the Mojave and the Colorado
   d) California is located along an active plate margin
6) How are most of California's freshwater needs met?
   a) ground water
   b) desalinated ocean water
   c) snowmelt in northern part of the state
   d) precipitation in the southern part of the state
7) How do most people in southern California get their freshwater?
   a) water projects that transport water from the north
   b) direct precipitation
   c) ground water
   d) desalinating water from the Pacific Ocean
8) How is most fresh water in California used?
   a) industry
   b) residential neighborhoods and businesses
   c) recreation and wildlife
   d) agriculture

9.b (6 questions on benchmark) know the principal natural hazards in different California regions, and the geological basis of those hazards.

1) Which of the following natural hazards is ***least*** likely to be triggered by an earthquake?
   a) landslide
   b) tsunami
   c) liquifaction
   d) regional flooding
2) What causes flooding in much of California?
   a) mudflows and landslides
   b) seismic shaking near dams
   c) earthquake-generated tsunami
   d) too much precipitation falling over a short period of time
3) What natural hazards are associated with the Long Valley caldera in California's Mammoth Mountains?
   a) flooding and landslides
   b) carbon dioxide and volcanism
   c) liquifaction and tsunami
   d) mudflows and forest fires
4) Which area would be ***most*** at risk of liquifaction?
   a) a building in a river valley
   b) a shack in the mountains
   c) a house build on rock
   d) a house in the desert
5) Why would the area along the Napa River have a high risk for liquifaction?
   a) It is an area of steep slopes
   b) It recieves more rainfall than surrounding areas
   c) It is affected by high tides
   d) The soil in the area is water-soaked