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Science Bowl

25 Earth Science Toss-ups and Bonuses

1. Toss-up: ERSC: Multiple Choice: What is the name of a dip-slip fault with a dip less than 45 degrees where the hanging wall block moves up relative to the footwall block?

W. Normal Fault

X. Reverse Fault

Y. Thrust Fault

Z. Transform Fault

ANSWER: Y

Bonus: ERSC: Multiple Choice: What is the name of a central block that exists between normal faults at divergent plate boundaries and drops as the plates separate due to tensile forces?

W. horst

X. fault scarp

Y. detachment

Z. graben

ANSWER: Z

1. Toss-up: ERSC: Short Answer: What is the name of a rock fracture in which no apparent displacement has occurred?

ANSWER: Joint

Bonus: ERSC: Multiple Choice: What is the name geologists term to a crustal fragment that has a geologic history distinct from that of adjoining crustal fragments due to crustal block accretion?

W. Terrane

X. Pluton

Y. Accretionary Wedge

Z. Shields

ANSWER: W

1. Toss-up: ERSC: Multiple Choice: What is the name of hot, desiccating winds that exist in southern California and originate on the western side of the Rockies?

W. Chinook

X. Santa Ana

Y. Country Breeze

Z. Mountain Breeze

ANSWER: X

Bonus: ERSC: Short Answer: What is the name of an instrument that is most commonly used to determine wind direction? This instrument always points into the wind and indicates wind direction on a dial, either by points of the compass or by a scale of 0° to 360°.

ANSWER: Wind Vane

1. Toss-up: ERSC: Multiple Choice: Most of the erosion of a stream channel carrying fine sediment occurs on the outside of the meander, where velocity and turbulence are greatest. What in the name given to the outside of a meander, which is a zone of active erosion?

W. Cut Bank

X. Point Bar

Y. Stream Valley

Z. Zone of Erosion

ANSWER: W

Bonus: ERSC: Short Answer: What is the name of a landscape that to a large extent has been shaped by the dissolving power of ground water, such as caves and basins?

ANSWER: Karst Topography

1. Toss-up: ERSC: Short Answer: As magma cools, certain minerals crystallize first, at relatively high temperatures, followed by minerals which crystallize at low temperatures. What is the name of a diagram which shows the melting point of minerals and their crystallization temperatures? ANSWER: Bowen’s Reaction Series

Bonus: ERSC: Multiple Choice: Which of the following minerals does not crystallize in the last stage of crystallization in Bowen’s Reaction Series?

W. Potassium Feldspar

X. Muscovite Mica

Y. Biotite Mica

Z. Quartz

ANSWER: Y

1. Toss-up: ERSC: Multiple Choice: What era is called the age of flowering plants, where angiosperms replaced other gymnosperms as the dominant plant type?

W. Cenozoic

X. Mesozoic

Y. Paleozoic

Z. Tertiary

ANSWER: W

Bonus: ERSC: Multiple Choice: During what period in the Paleozoic era did a group of fishes called the lobe-finned fish, the ancestors to reptiles, begin to adapt to terrestrial environments by acquiring air sacks and moving into freshwater tidal flats or small ponds near the ocean?

W. Mississippian

X. Pennsylvanian

Y. Silurian

Z. Devonian

ANSWER: Z

1. Toss-up: ERSC: Multiple Choice: What is the name given to the temperature decrease in the troposphere as one gains altitude?

W. Tropocline

X. Tropopause

Y. Environmental Lapse Rate

Z. Tropospheric Temperature Gradient

ANSWER: Y

Bonus: ERSC: Short Answer: What is the name of the hygrometer that measures humidity through two thermometers mounted side by side? One thermometer, the dry-bulb, gives the current air temperature, while the other, wet-bulb, thermometer has a muslin wick tied around the end.

ANSWER: Psychrometer

1. Toss-up: ERSC: Multiple Choice: In a classification system based on water depth, what is the name of open ocean of any depth, which is divided into photic and aphotic zones?

W. Neritic Zone

X. Oceanic Zone

Y. Pelagic Zone

Z. Abyssal Zone

ANSWER: Y

Bonus: ERSC: Multiple Choice: Which of the following bodies of water will most likely have a steep pyncocline from the depths of 400 to around 1000 meters?

W. Baltic Sea

X. Mediterranean Sea

Y. Dead Sea

Z. Caribbean Sea

ANSWER: W

1. Toss-up: ERSC: Multiple Choice: What is the name of a theory of raindrop formation in warm clouds above 0 C in which large cloud droplets collide and join together with smaller droplets to form a raindrop? Opposite electrical charges may bind the cloud droplets together.

W. Bergeron Process

X. Collision-Coalescence Process

Y. Geostrophic Process

Z. Rain Formation Process

ANSWER: X

Bonus: ERSC: Short Answer: What is the name of a high-pressure center characterized by a clockwise flow of air in the Northern Hemisphere?

ANSWER: Anticyclone

1. Toss-up: ERSC: Multiple Choice: What is the name of a pass between mountain valleys where the headwalls of two cirques intersect?

W. Col

X. Glacial Pass

Y. Graben

Z. Horst

ANSWER: W

Bonus: ERSC: Multiple Choice: In which of the following ecosystems is the Gross Primary Productivity, in W/m2, the highest?

W. Ocean

X. Tropical Rainforest

Y. Tundra

Z. Estuary

ANSWER: Z

1. Toss-up: ERSC: Short Answer: Volcanism associated with convergent plate boundaries may develop where slabs of oceanic lithosphere are subducted under continental lithosphere to produce what volcanic formation?

ANSWER: Continental Volcanic Arc

Bonus: ERSC: Multiple Choice: The eruption of this volcano, near Chiapas, Mexico, in 1982 indicated that its cooling effect on the global mean temperature was greater than that of Mt. St. Helens, although it was much less explosive. Name this volcano.

W. Mount Pinatubo

X. Mount Hood

Y. Mount Pelee

Z. Mount Chichón

ANSWER: Z

1. Toss-up: ERSC: Multiple Choice: During the Devonian, this group of fishes began to adapt to terrestrial environments, with sacks that could be filled with air to supplement their breathing through gills.

W. armor-plated fishes

X. lobe-finned fishes

Y. amphibians

Z. bony fishes

ANSWER: X

Bonus: ERSC: Short Answer: A recent hypothesis for the Great Permian Extinction results from the production of this gas by anaerobic bacteria in anoxic environments, due to large volcanic events warming the ocean surface and reducing the solubility of oxygen in ocean water. Name this gas.

ANSWER: H2S

1. Toss-up: ERSC: Multiple Choice: As a tool for presenting the general world pattern of climates, this system of classification has been the best-known and most used system for decades. It consists of five principal groups, each indicated by a capital letter A, B, C, D, or E.

W. Climate Classification

X. Wegner Classification

Y. Köppen Classification

Z. Dry-Wet Classification

ANSWER: Y

Bonus: ERSC: Multiple Choice: What type of climate in the Koppen system would be categorized by severe winters, the average temperature of the coldest month being below -3 °C, and the warmest monthly mean exceeding 10 °C?

W. A type Climate

X. B Type Climate

Y. C Type Climate

Z. D Type Climate

ANSWER: Z

1. Toss-up: ERSC: Short Answer: In Central North America, masses of warm and cold air collide, producing a front. Here the cooler, denser air acts as a barrier over which the warmer, less dense air rises. What is the process called?

ANSWER: Frontal Wedging

Bonus: ERSC: Short Answer: The Great Basin of the Western United States, the Gobi Desert of Mongolia, the Takla Makan of China, and the Patagonia Desert of Argentina are examples of this kind of desert, and show the power

ANSWER: Rain Shadow Desert

1. Toss-up: ERSC: Multiple Choice: What structure, similar to a sill, is formed when viscous magma is intruded between sedimentary layers in a near-surface environment, collecting as a lens-shaped mass that arches the overlying strata upward, creating a dome-shaped budge?

W. Batholith

X. Sill

Y. Dike

Z. Laccolith

ANSWER: Z

Bonus: ERSC: Short Answer: Half Dome in Yosemite National Park, California, is part of what igneous superstructure that composes the core of the Sierra Nevada mountain system?

ANSWER: Batholith

1. Toss-up: ERSC: Multiple Choice: What are the names of steep-sided hills composed of sand and gravel and originate when glacial meltwater washes sediment into openings and depressions in the stagnant wasting terminus of a glacier?

W. Eskers

X. Drumlins

Y. Kames

Z. Kettles

ANSWER: Y

Bonus: ERSC: Short Answer: What is the name of the area of a glacier where all the snow from the previous winter melts along with some glacial ice and there is a net loss to the glacier?

ANSWER: Zone of Wastage

1. Toss-up: ERSC: Multiple Choice: What is the name of the type of sand dune that forms scalloped rows of sand oriented at right angles to the wind? These types of dunes are found in the gypsum dunes at White Sands National Monument in New Mexico.

W. Barchanoid

X. Barchan

Y. Transverse

Z. Longitudinal

ANSWER: W

Bonus: ERSC: Short Answer: What is the type of dune that is most likely to form when vegetation partially covers the land?

ANSWER: Parabolic Dunes

1. Toss-up: ERSC: Short Answer: What is the name of the process that occurs at a depth of roughly 100 in the Mantle where the mantle is sufficiently hot that the introduction of water leads to some melting?

ANSWER: Partial Melting

Bonus: ERSC: Short Answer: To attempt to add credibility to his plate-tectonics argument, Alfred Wegner cited several documented cases of fossil organisms that were found on different landmasses despite the unlikely possibility that their living forms could have crossed the ocean. What is the name of the explanation scientists at the time used to justify this observation that included large land bridges across the ocean?

ANSWER: isthmian links

1. Toss-up: ERSC: Multiple Choice: Which of the following mineral is responsible for much of the enrichment of ores due to weathering underground due to its content of sulfur, which dissolves to for sulfuric acid, a powerful chemical weathering agent?

W. Chalcopyrite

X. Pyrite

Y. Cinnabar

Z. Galena

ANSWER: X

Bonus: ERSC: Multiple Choice: Which of the following minerals is not found in solution after the chemical weathering of amphiboles by carbonic acid?

W. Potassium Ion

X. Silica

Y. Calcium Ion

Z. Magnesium Ion

ANSWER: W

1. Toss-up: ERSC: Short Answer: What is the name of the soils that occupy the central portion of a soil-texture diagram and where no single soil particle type dominates over the other two?

ANSWER: Loam

Bonus: ERSC: Multiple Choice: What type of unusual glaciers occupy broad lowlands at the bases of steep mountains and form when one or more valley glaciers emerge from the confining walls of mountain valleys?

W. Alpine Glaciers

X. Continental Glacier

Y. Coastline Glacier

Z. Piedmont Glacier

ANSWER: Z

1. Toss-up: ERSC: Multiple Choice: Which of the following is not method that alters the composition of a magma body to create diverse types of rocks?

W. Magmatic Differentiation

X. Magma Mixing

Y. Magma Separation

Z. Assimilation

ANSWER: Y

Bonus: ERSC: Short Answer: During the crystallization process, the composition of magma constantly changes because it becomes depleted in those elements necessary to make earlier formed minerals. What is the name the most prominent process where earlier-formed minerals sink to the bottom of the chamber due to their higher density than the liquid portion?

ANSWER: Crystal Settling

1. Toss-up: ERSC: Short Answer: This foliated metamorphic rock is produced by the more intense medium-grade metamorphism of slate and breaks along wavey surfaces, has a glossy sheen, and contains fine-grained particle texture.

W. Schist

X. Phyllite

Y. Gneiss

Z. Marble

ANSWER: X

Bonus: ERSC: Short Answer: What is the name of schists composed mainly of muscovite and biotite?

ANSWER: Mica Schists

1. Toss-up: ERSC: Multiple Choice: What is the name of the material deposited by a stream? This term is the general term for any stream-deposited sediment.

W. Silt

X. Load

Y. Alluvium

Z. Lamina

ANSWER: Y

Bonus: ERSC: Short Answer: What is the name of the process that moves sediment in the bed load of a river or stream by making them appear to jump or skip along the river bed?

ANSWER: Saltation

1. Toss-up: ERSC: Short Answer: What term in meteorology is defined as a ration of the air's actual water-vapor content compared with the amount of water vapor require for saturation at that temperature and pressure?

ANSWER: Relative Humidity

Bonus: ERSC: Multiple Choice: Assuming air has a high moisture content, determine the amount rising air drops will cool if they rise 2000 meters above the condensation level.

W. 0 °C

X. 10 °C

Y. 20 °C

Z. 30 °C

ANSWER: X

1. Toss-up: ERSC: Short Answer: Some minerals, such as quartz, fracture to produce smooth, curved surfaces resembling broken glass. What are these fractures called?  
   ANSWER: Conchoidal Fractures

Bonus: ERSC: Short Answer: When a transparent piece of calcite is placed over printed material, the letters appear twice. This phenomenon is known as what?

ANSWER: Double Refraction