PRESENTS:

GEOLOGIC PERIODS

The Earth has been around for a long time. So long, in fact, that scientists have devised a ***geologic time scale*** to better quantify the tremendous number of years in our Earth's history. The geologic time scale is divided into the following units, in order of increasing length: ages, epochs, ***periods,*** eras, and eons. This guide will focus on a few of these periods ***preceding the emergence of humans.***

By analyzing questions, you can see patterns emerge, patterns that will help you answer questions. Qwiz5 is all about those patterns. In each installment of Qwiz5, we take an answer line and look at its five most common clues. Here we explore five clues that will help you answer a tossup on ***Geologic Periods.***

Cambrian

Rock of Ages: The Cambrian Period was the ***first period of the Paleozoic Era.*** It lasted approximately 53 million years, ending about 485 million years ago. The period immediately preceding it, the last period of the ***Phanerozoic Era,*** was the ***Ediacaran Period.***

Set in Stone: One of the best-preserved fossil records of life from the Cambrian Period is the ***Burgess Shale.*** Discovered by Charles Walcott in 1909, the ***Burgess Shale*** is a rock formation in the ***Canadian Rockies.*** The Burgess Shale is unique for containing

fossils of ***soft-bodied*** as well as hard-bodied marine animals. The fossils found in the Burgess Shale were preserved by a mudslide into a deep-water basin

Before They Were Fossils…The Cambrian Period was notable for an evolutionary burst resulting in unprecedented numbers of new organisms (more on this later). One of the best-known organisms of the Cambrian Period is the humble ***trilobite.*** Trilobites were among the ***earliest arthropods on Earth,*** and they flourished during the Cambrian Period.

Rolling Stones: A lot can happen during 53 million years. One of the greatest changes of the Cambrian Period was the namesake ***Cambrian Explosion.*** Between 20 and 35 of the major phyla still seen today emerged during this period. Other phyla came into being during the explosion, but many of them later went extinct.

Buzz On: ***Treptichnus,*** the fossilized burrow of an animal, is used to help determine the division between the Ediacarn and Cambrian periods; ***Precedes the Ordovician Period--***the second period of the Paleozoic Era is the Ordovician period.

Permian

Rock of Ages: The Permian Period is the ***last period of the Paleozoic Era.*** It follows the ***Carboniferous Period*** and precedes the ***Triassic Period.*** The Permian Period lasted from 298.9 million years ago to 252.2 million years ago.

Set in Stone: Geological features dating to the Permian Period can be found in parts of Texas and New Mexico, in a region known as the ***Permian Basin.*** The ***Glass Mountains*** of southwest Texas contain strata full of ***marine fossils dating from the Permian Period.***

Before They Were Fossils…One of the best-known Permian genera (that's the plural of genus) is the ***Dimetrodon.*** The Dimetrodon was a four-legged creature that resembled a reptile but was in fact a closer relative to mammals. Despite the reptilian appearance and the ***neural spine sail*** projecting from the Dimetrodon's back, the creature lived long before the first dinosaurs. On the vegetation side, ***Gymnosperms,*** plants such as conifers, were a dominant species of flora during the Permian Period and still exist today.

Rolling Stones: The Permian Period's most notable event was the ***mass extinction*** that occurred at its end. This extinction, known as the ***Great Dying, marks the boundary between the Permian and Triassic Periods.*** During the Great Dying a staggering 96% of marine life went extinct, far greater than the more famous Cretaceous extinction event. This extinction was most likely caused by climate change induced by massive volcanic activity in what is now Siberia. This volcanic activity left behind a huge rock formation known as the ***Siberian Traps.***

Buzz On: ***Zechstein Sea,*** a shallow, inland sea dating to the Permian Period that covered much of northwestern Europe; ***Olson's Extinction,*** a smaller mass extinction event that preceded the Great Dying that ended the Permian Period.

Triassic

Rock of Ages: The Triassic Period follows the ***Permian*** and is the ***first period of the Mesozoic Era.*** The Mesozoic Era is best known as the era when ***dinosaurs ruled the Earth,*** and the Triassic Period spanned roughly 50 million years of it.

Set in Stone: The Triassic Period's fossil record is unique for a ***lack of coal from the early-mid Triassic Period.*** There are several possible explanations for this Triassic ***coal gap***, and the most likely one is the ***extinction of peat-forming plants*** that occurred at the end of the preceding Permian Period.

Before They Were Fossils… As we enter the Mesozoic Era we start to see some familiar names. The Triassic Period saw the first ***theropods,*** a diverse group of bipedal, carnivorous dinosaurs belonging to order *Saurischia.* Future well-known dinosaurs, such as T. Rex, would eventually be classified as theropods.

Rolling Stones: Earth's climate drastically changed during the Triassic Period, in an event known as the ***Carnian Pluvial Episode.*** Earth's climate warmed and transitioned from arid to humid. This change caused the extinction of pre-existing herbivorous groups and helped lead to the emergence of dinosaurs.

Buzz On: ***Lystrosaurus,*** a four-legged herbivore that successfully survived the Great Dying and dominated the early Triassic fossil record; ***Synapsids,*** the ancestors of what would eventually be mammals, the synapsids continued into the Triassic Period but played second fiddle to the *sauropsids,* who eventually developed into dinosaurs.

Jurassic

Rock of Ages: The Jurassic Period is the ***second of the three periods of the Mesozoic Era.*** This period lasted from 251.9 million years ago to 201.3 million years ago.

Set in Stone: The ***Morrison Formation*** is one of the key rock formations of the Jurassic Period. Stretching throughout the Western United States, the Morrison Formation contains fossils of countless dinosaurs native to the Jurassic Period. ***Dinosaur National Monument,*** on the border of Colorado and Utah, contains part of the Morrison Formation.

Before They Were Fossils…Think of a classic dinosaur and chances are it lived during the Jurassic. Common genera dating to this time include ***Stegosauruses,***

Allosauruses, and ***Apatosauruses.*** The ancestors of what would eventually evolve into birds ***flew for the first time*** during the Jurassic as well.

Rolling Stones: Throughout the Jurassic Period the supercontinent ***Pangea*** gradually split apart. This slow-motion continental dance formed the eventual shape of the continents we know today.

Buzz On: ***Solnhofen Limestone,*** the Solnhofen Limestone is another geological formation dating to the Jurassic Period; ***Sundance Sea,*** a shallow, inland sea covering what is now western North America.

Cretaceous

Rock of Ages: The Cretaceous Period is the ***final period of the Mesozoic Era***. It follows the Triassic Period and precedes the ***beginning of the Cenozoic Era.*** Lasting from 145 to 66 million years ago, the Cretaceous Period is so far the longest period of the current eon, ***The Phanerozoic.***

Set in Stone: The best-known geologic formation of the Cretaceous Period is the ***K-T Boundary.*** The K-T Boundary, also known as the ***Cretaceous-Tertiary Boundary*** or the Cretaceous-Palogene Boundary, is a ***thin band of clay separating rocks deposited during the Cretaceous Period from those deposited during the Tertiary Period.*** This band of clay is unique for containing a ***high concentration of iridium,*** a fact that will be discussed further below.

Before They Were Fossils…The most famous dinosaur of the Cretaceous Period is the ***Tyrannosaurus Rex.*** However, the Cretaceous' name derives from a humbler organism. The ***Coccolithophore*** is a single-celled algae that produces plates of calcium carbonate known as ***coccoliths.*** These coccoliths were constituent elements of many chalk deposits formed during the Cretaceous Period. ***These chalk deposits give the period its name.***

Rolling Stones: The Cretaceous Period literally ended with a bang. The Cretaceous-Tertiary Extinction Event (known as the ***K-T Event*** or also the ***K-Pg Event)*** wiped out 70% of life on Earth. In the 1970s Physicist ***Luis Alvarez*** and his son Walter discovered the K-T Boundary discussed above. Due to the high concentration of iridium, an element rarely found on Earth, they deduced that it had been brought to Earth by a ***meteorite.*** They proposed that this meteorite ***wiped out the dinosaurs approximately 66 million years ago.*** Their claims were further reinforced by the discovery of the ***Chicxulub Impact Crater*** off Mexico's ***Yucatan Peninsula.***

Buzz On: ***Deccan Traps,*** A series of massive volcanic eruptions towards the end of the Cretaceous Period, initially thought to be responsible for the K-T Event; ***Laramide Orogeny,*** a period of mountain building in what is now North America during the late Cretaceous.

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