Name _____ Date _____

Earth's History

Use the text to answer each question below.

1. Analyzing rock formations yields clues that help establish ages and events in Earth's 4.6-billion-year past. The branch of geology concerned with this is called stratigraphy. Two important laws, or principles, of stratigraphy are the law of original horizontality and the law of lateral continuity. According to the law of original horizontality, sediments are laid down in horizontal, or nearly horizontal, layers. The law of lateral continuity states that these layers are deposited over large areas. You might think of the way snow falls to help illustrate this. If drifts haven't formed, snow will accumulate in a layer across your yard. And, as that happens, it's not just snowing on *your* yard. Snow is falling on a large area, probably your whole city or town.

Sedimentary rocks have layers that form over time.

Which sentence was included in the passage to illustrate the law of original horizontality?

A. "And, as that happens, it's not just snowing on *your* yard."

B. "Snow is falling on a large area, probably your whole city or town."

C. "Analyzing rock formations yields clues that help establish ages and events in Earth's 4.6-billion-year past."

D. "If drifts haven't formed, snow will accumulate in a layer across your yard."

2. The laws of stratigraphy help geologists make inferences about the Earth's past. For example, the law of superposition states that older rocks are typically found farther down, and younger rocks are typically found toward the top. Imagine finding a dinosaur fossil in a layer of rock above another layer that has a trilobite fossil. You might infer from the law of superposition that the trilobite fossil is older. The law of lateral continuity states that layers of rock extend over large areas. Imagine finding rock layers that are similar in other ways but are now separated by a valley. You might infer from the law of lateral continuity that those areas used to be continuous.

How does the author support the statement that the laws of stratigraphy help geologists make inferences?

A. by using statistics, including the number of times geologists use the laws of stratigraphy every day

B. by using specific examples of inferences that could be made using two laws of stratigraphy

C. by quoting a famous geologist who describes how the law of lateral continuity led to the discovery of the trilobite

D. by describing what we would not know without these laws

3. The Earth's 4.6-billion-year history is almost too big to imagine. To organize and measure all that time, geologists can't use weeks or months, or even decades or centuries. After all, one *billion* is one thousand *millions*. On the geologic time scale, there are different units of time. These are eons, eras, periods, epochs and ages. While an eon is longer than an era, there is no set length for either. Instead, each is bound by major changes in life on Earth. Clues from rock strata, as well as evidence from absolute dating, helped geologists come up with this timeline of our planet.

According to the passage, an eon

A. is shorter than an age.
B. is longer than an era.
C. always lasts 2 billion years.
D. must contain at least four epochs.

4. With just its placement in the rock, we cannot tell exactly how many years old a fossil is. That's its absolute age. But we might be able to determine a fossil's relative age. For example, we can use superposition to infer that a fossil is younger than the fossils found below it. The remains of some species that lived for a short time are so widespread and well-known that they help geologists determine other dates, too. These are known as index fossils. Brachiopods are an index fossil. They first appeared during the Cambrian Period. When geologists find a brachiopod fossil in a layer of rock, they can correlate other fossils found in the strata.

Geologists can infer the relative age of a fossil from its location in rock layers.

Based on the passage, brachiopods are an index fossil because they are

A. older than most other fossils.
B. extremely hard to find.
C. abundant and recognizable.
D. never found near other fossils

5. The geologic record isn't always "perfect." But the imperfections give important clues, too. Unconformities are inconsistencies in the rock layers. They often show how erosion, uplift, sea level change and other processes shaped a landscape. There are different kinds of unconformities. An angular unconformity occurs when older rock layers are tilted, and then younger rocks form a horizontal layer above them. This indicates that deformation and erosion took place during a pause in sediment deposition. One angular unconformity is visible in the Grand Canyon.

Which of the following is the best title for this passage?

A. The Grand Canyon
B. Geology
C. Tilted Rocks
D. Unconformities

6. Some elements are unstable. Their atoms give off particles over time at specific and constant rates. When molten rock cools to form igneous rock, some radioactive atoms are trapped. By using the rate of decay and looking at how many unstable atoms are left, scientists can estimate when that rock was formed. That's called radiometric dating. Sedimentary rocks, where fossils are usually found, can only be dated this way if they are younger than 50,000 years old. But imagine a fossil found between layers of volcanic ash. Scientists could use radiometric dating for the layers above and below the fossil. Then, according to the law of superposition, they would know that the fossil's age is somewhere within that range.

Based on the passage, when is radiometric dating possible?

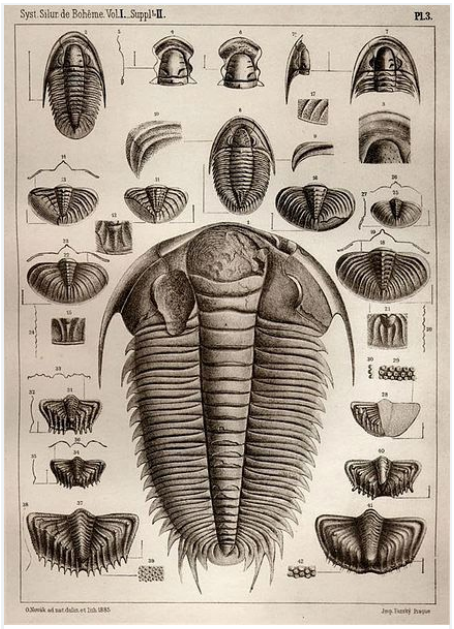
A. when a substance is made of unstable atoms

B. when a substance contains a fossil

C. when the mass of a fossil is unknown

D. when relative dating will not work

7. Intervals of geologic time are bound by important events, like mass extinctions or the appearance of animals with hard parts. The first single-celled organisms appeared about 3.5 billion years ago. Many sea animals first show up in the Cambrian period of the Paleozoic era. That was about 545 million years. It is sometimes referred to as the Cambrian explosion because it happened relatively quickly. It lasted just over 50 million years. The next period, the Ordovician, ended with mass extinctions of 60% of all marine invertebrates. Dinosaurs wouldn't appear for over 200 million years, during the Jurassic period in the Mesozoic era.



Fossils dating back to the Cambrian explosion

Based on the passage, in geology, 50 million years is

A. an era.

B. not considered a very long time.

C. too short for any significant events to occur.

D. about how long dinosaurs were on the planet.

8. Where are we now, geologically? We're in the Cenozoic era, which began over 65 million years ago. But we haven't been here long. The earliest Homo sapiens found to date are an estimated 200,000 years old. That might sound old, but remember how old the Earth is and the scale we must use to organize and understand it. If all of our planet's history were put on a 24-hour clock, the Homo genus wouldn't even appear until a few seconds before midnight.

The author of this passage would most likely agree with which statement?

A. We cannot fully organize or understand how old Earth is.

B. The Cenozoic era is not as important as the Mesozoic era.

C. Humans are relatively new to the planet.

D. The human species is probably over one-million years old.