Chapter: **Geologic Time**

Read each question thoroughly. The Science Coach boxes will help you apply the skills and concepts you need to answer the questions.

1. The first vertebrate animals evolved during the middle part of the Paleozoic Era.

Which type of vertebrate was most common during this time?

(A) amphibians

(B) fish

(C) reptiles

(D) mammals

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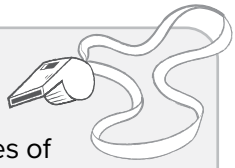


Think about the order in which types of animals **evolved** through evolutionary **processes** and that vertebrates first existed during the middle Paleozoic Era.

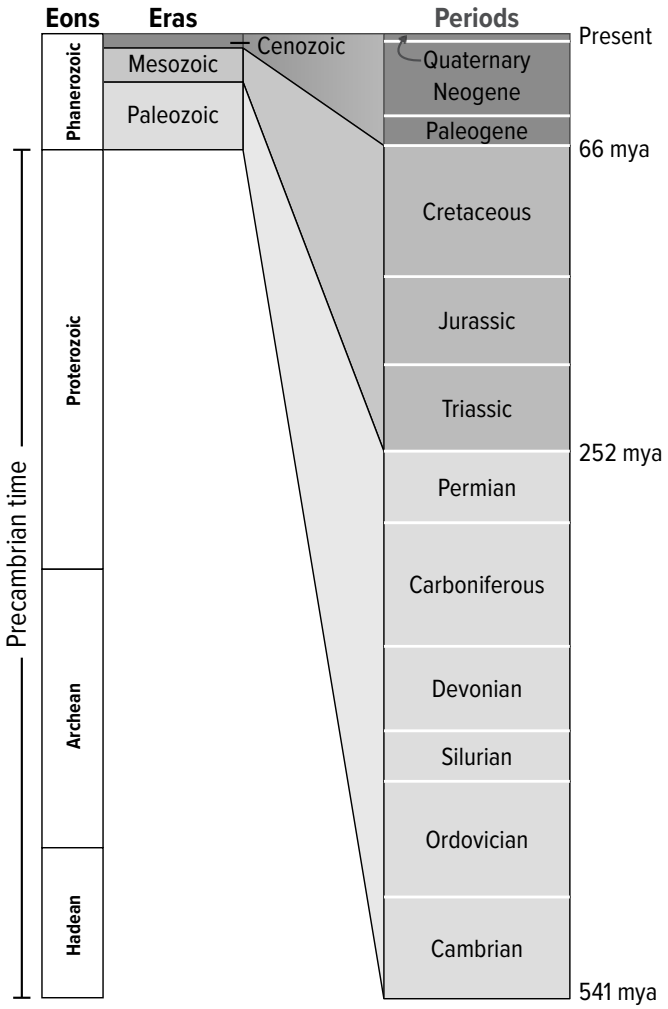
Name: _____ Date: _____

For questions 2, 3, and 4, refer to the following passage and illustration.

In this group of questions, you will use your knowledge about geologic history to answer three questions.

A Geologic Timeline

Scientists study Earth's past by observing evidence in the rock layers that have formed over billions of years. This evidence includes fossils found in the different layers. Geologists have organized information about the rock layers and represented their conclusions as a timeline, or time scale. This timeline organizes the rocks from the most ancient to the most recent. A geologic time scale is shown in the illustration. Rock layers from around the world that are the same age are included in the same division of the scale. The oldest division is at the bottom of the scale. The earliest fossil evidence of life on Earth is in rocks that are about 3.7 billion years old. These very rare fossils are one-celled organisms. Early geologists did not know about them.



2. When geologists first made the geologic time scale, their theory was that the first life developed in the Cambrian period. Current theories state that the first living things appeared much earlier than that time.

Which statement **best** explains why the theories have changed?

Ⓕ Early geologists made an error in interpreting the data.

Ⓖ The theory was modified to include new data that was discovered.

Ⓗ Scientists discovered new rock layers, so they had to make different conclusions.

Ⓘ Early scientists were only guessing about when life began, but later scientists figured out what happened.

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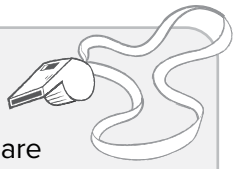

Remember that **scientific theories** are based on **evidence** and that they can change when new evidence is discovered.

Name: _____ Date: _____

3. Which period includes the oldest fossils of the Phanerozoic Eon?

(A) Cambrian

(B) Paleozoic

(C) Permian

(D) Quaternary

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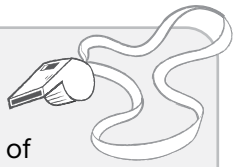

Consider how **physical evidence** of the ages of rock layers is recorded in the fossil record and how that record is related to the divisions of the timeline.

4. How do scientists determine when a change occurs from one era to the next?

(F) A new era begins after each third period.

(G) A new era begins at every interval of 100 million years.

(H) A change in the type of rocks and fossils indicates a change in era.

(I) The names of the eras are just a way to indicate age and are not related to change.

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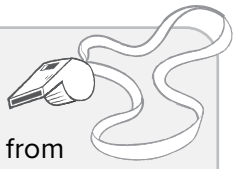

Think about how **physical evidence** from the fossil record is related to natural processes and changes in life throughout **geologic time**.

Name: _____ Date: _____

5. Many marine fossil and salt beds formed during the Mesozoic Era. Scientists have concluded that this is the result of more shallow seas during that era than there are currently.

What can scientists determine from the existence of these seas?

(A) More water was locked up as ice in ice caps and glaciers.

(B) There were many more mountain ranges to surround shallow seas.

(C) The continents were all located together in Pangaea and Gondwanaland.

(D) Water levels on the continents were higher because the climate was warmer.

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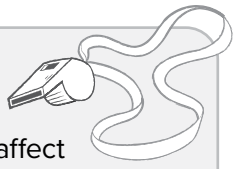

Think about how **natural processes** affect one another and how the levels of water in various places relate to the amount of water available.

6. Dinosaurs existed for millions of years and then went extinct over a brief time.

When did this extinction event occur?

Ⓕ at the beginning of the Paleozoic Era

Ⓖ at the beginning of the Mesozoic Era

Ⓗ at the end of the Mesozoic Era

Ⓘ at the end of the Cenozoic Era

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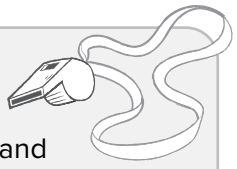

Consider the **geologic timeline** and the order in which different types of organisms **evolved**.

Name: _____ Date: _____

7. Humans have spread to inhabit every continent on Earth in modern day.

According to current theories, where did humans originally evolve?

(A) Africa

(B) Antarctica

(C) Asia

(D) Europe

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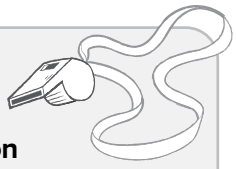

Consider how the **process** of **evolution** applies to humans and where fossils have been found.

8. Throughout the geologic timeline, the dominant type of life has evolved due to changes in the environment and the adaptation of these organisms. This table shows the dominant type of organisms during various eras.

Table 1: Dominant Types of Organisms During Different Eras

Era	Dominant types of life
Precambrian (eon)	Single-celled and soft-bodied organisms
Paleozoic	?
Mesozoic	Amphibians, dinosaurs, and reptiles
Cenozoic	Mammals

Which types of organisms complete the table?

Ⓕ bacteria and jellyfish

Ⓖ fish and snails

Ⓗ plesiosaurs and pterosaurs

Ⓘ small rodents and lizards

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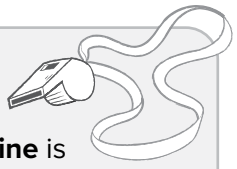
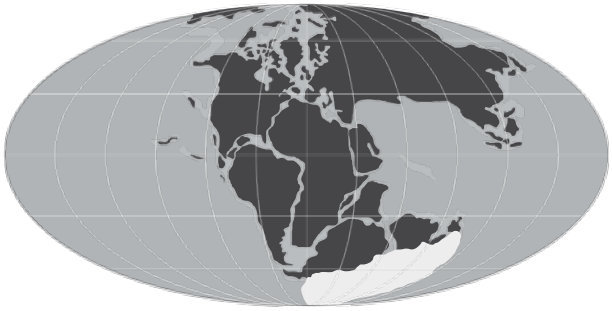


Think about how the geologic **timeline** is related to **natural processes**, including the **evolution** of organisms.

Name: _____ Date: _____

9. The map shows the supercontinent, Pangaea. Scientists have concluded that Pangaea existed based on evidence.



Which observation does NOT provide evidence that the present continents were previously connected to form Pangaea?

(A) Similar types of life exist in all the oceans in the current time.

(B) Some mountains in North America and Europe have rock layers that are alike.

(C) The eastern coast of South America and the western coast of Africa appear to fit together.

(D) Some late Paleozoic and early Mesozoic Era fossils found in Africa and North America are the same.

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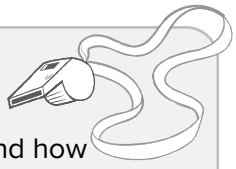

Consider how rock layers form and how living things **evolve** and migrate on Earth's surface throughout **geologic time**.