The History of Life on Earth

lesson ●1 Geologic Time and Mass Extinctions

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1. Highlight the criteria that relates to time.
4. Species must have lived for a short time before they became extinct.This allows rock layers to be divided into small units of geologic time.p.93(chart)

2. Identify What major event occurred at the end of the Mesozoic era?
Triassic period occured p.94(graph)

3. Define mass extinction.
A mass extinction is the dying off of many different species of organisms over a short period in geologic time.p.94(paragraph 3)

4. List possible effects of global warming.
Global warming could cause a decrease in oxygen levels in the water because warm water holds less oxygen than cold water. If the oxygen levels drop in shallow waters, where most organisms live, mass extinctions could occur.Global warming could also melt glaciers, causing water to flow into the oceans. Glacial melting could cause sea levels to rise. Geologists found evidence that warm temperatures, a rising sea level, and shallow areas flooded with oxygen-poor water occurred during the Devonian Period.p.95(paragraph 2)

5. Explain What happens to sea levels during global cooling? Why?
As glaciers formed during periods of global cooling, sea levels went down. Less water in the oceans would mean fewer warm, shallow-water environments. With fewer warm-water environments, there would be less space to support marine ecosystems.p.96(paragraph 1)

6. Draw Conclusions how does volcanic haze affect organisms?
The gases produced by basalt flows cause a series of effects. First, sulfur dioxide gas is released into the atmosphere. Sulfur dioxide in the air can result in the formation of acid

clouds. These clouds prevent the Sun's warming rays from reaching Earth's surface.p.96(paragraph 3)

7. Compare the effects of volcanic haze and an asteroid impact.
The impact of volcanic haze:
The gases produced by basalt flows cause a series of effects. First, sulfur dioxide gas is released into the atmosphere. Sulfur dioxide in the air can result in the formation of acid clouds. These clouds prevent the Sun's warming rays from reaching Earth's surface. At first, global cooling occurs. This is called the volcanic haze effect. But then, over periods of tens to hundreds of thousands of years, global temperatures may increase. That is because heat becomes trapped in Earth's atmosphere by the acidp.96(paragraph 4)
Asteroid impact:Some geologists now suggest that this asteroid impact in Central America sent enough dust and other material into the atmosphere to screen out sunlight. In the months that followed the impact, scientists believe, cold and darkness killed plants and other primary producers. Ecologic systems collapsed and massive extinctions followed.p.97(paragraph 1)

8. Determine What time span is typical for mass extinctions to occur?
Mass extinctions occur over a short geologic time span, but they are not sudden events. Fossil evidence indicates that mass extinctions can occur over a few million years or more.p.97(paragraph 3)

lesson ●2 Early Earth History

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1. Explain Why are there no large amounts of pyrite and uraninite in modern sediments?
Archean sediments contain large amounts of the minerals pyrite and uraninite. The oxygen in today's atmosphere quickly destroys these minerals through the chemical process of oxidation. So, the presence of these minerals in very old rocks shows that Earth's early atmosphere had little oxygen.p.99(paragraph 2)

2. Determine What is a photosynthetic organism?
Cyanobacteria are photosynthetic organisms

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.0xygen could kill early organisms. But, because cyanobacteria are photosynthetic, they released oxygen into the atmosphere.p.99(paragraph 3)

3. Explain What happened to organisms during the Proterozoic Eon?
Organisms increased in complexity in the Proterozoic eon. During this eon, the first invertebrate organisms appeared.p.100(paragraph 1)

.5. Define What is a Vertebrate?
Vertebrates are the animals with backbones.
Animals with backbones, or vertebrates, evolved during the early Paleozoic era. The first of these vertebrates lived in the oceans.p.101(paragraph 1)

7. Name What evolutionary adaptation allowed plants to grown large and above water?.
Once vascular systems evolved, new plants developed quickly. Early vascular club mosses were small, but by the Late Devonian they had become trees.p.102(paragraph 1)

8. List the events that might have caused the Paleozoic era extinctions.
The Paleozoic era ended with the late Permian extinction—the extinction of more than 90 percent of all marine species and more than 70 percent of all land species. Several hypotheses have been proposed to explain the Permian extinction. One proposal is that the uplifting formation of Pangaea left little room for shallow-water life forms as marine terraces became dry land. Another proposal is that the Siberian traps released ash and sulfur into the atmosphere,causing global cooling and the forming of glaciers on land.p.102(paragraph 2)

lesson ●3 Middle and Recent Earth History

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1. Name an important development during the triassic period.

An important development during the Triassic period was the evolution of the first reef-building corals.p.104(paragraph 1)

2. Determine Why did scientists think at first that dinosaurs were ectotherms?
Scientists who studied dinosaur fossils first thought that the skulls, feet, and tails of dinosaurs were shaped like same parts of modern reptiles'. Early ideas of dinosaurs made scientists assume dinosaurs had behavior patterns like reptiles. That would mean dinosaurs were ectotherms, p.104(paragraph 3)

3. Contrast How are gymnosperms and Angiosperms different?
Gymnosperms produce seeds but no flowers,however, Angiosperms are flowering plants that produce seeds with hard outer coverings. climates.p.105(paragraph 3)

4. Conclude Why were many mammal species able to survive the mass extinctions of the Mesozoic era?
In the late Cretaceous period, mammals began to increase in both number and diversity. As dinosaur species became extinct, mammals were able to move into the niches that dinosaurs once occupied.p.105(paragraph 2)the lifestyles of mammals gave them an advantage .

5. Describe When did hominids evolve?

About 4.4 million years ago, during the Pliocene epoch, the hominids evolved.p.105(paragraph 1)

6. Explain How is life continuing to become complex?
Fossil sequences from the Archean eon to the Cenozoic era show that complexity increases over time. Life began as simple bacteria. Then more complex organisms with shells evolved. Organisms became more diversified and continued to evolve from marine invertebrates to marine and land vertebrates and plants. The fossil record reveals this change.p.106(paragraph 3)