Name _____ Date _____ Class _____

Note-taking Worksheet

Geologic Time – Chapter 14 orange Book

Section 1 Life and Geologic Time

A. _____ time—Earth's history is divided into time units that make up a **geologic time scale.**

1. Time units on the scale are based on the appearance or disappearance of types of organisms such as _____, index fossils that lived during specific periods of time.
2. Geologic time is divided into four major _____.
   a. _____—longest subdivision; based on abundance of fossils
   b. _____—marked by significant worldwide changes in the types of fossils present in rock
   c. _____—based on types of life existing worldwide at a particular time
   d. _____—characterized by differences in life-forms, but differences can be regional rather than global
3. Geologic time can be subdivided only if fossils are present in rock records.

B. _____ **evolution**—Organisms have changed over time, most likely because of environmental changes.

1. **Species**—organisms that normally _____ only with other members of their group
2. Darwin's theory of **natural** _____—organisms more adapted to an environment are more likely to reproduce
3. Natural selection within a species occurs only if characteristics present in some numbers increase their _____.
4. _____ selection—breeding individuals with desired characteristics; humans use this type of selection when breeding domestic animals
5. _____ species can evolve from natural selection.

C. Trilobites—have an exoskeleton with three lobes; lived in oceans for more than 200 million years

1. Trilobite _____ position changed as the species adapted to various environments.
2. Trilobite bodies and _____ changed in response to changing environments.

Meeting Individual Needs

Note-taking Worksheet (continued)

3. Continental collisions formed the giant landmass _____ near the end of the Paleozoic _____. These collisions may have dropped _____, causing the extinction of trilobites.

Section 2 Early Earth History

A. _____ **time**—from 4 billion to about 544 million years ago

1. Very few _____ remain from this time.
   a. Many Precambrian rocks were deeply buried, causing the fossils in them to be changed by _____ and pressure.
   b. Most Precambrian organisms lacked _____ parts.
2. **Cyanobacteria** are blue-green _____.
   a. One of the _____ life forms to appear
   b. Added _____ to the atmosphere through photosynthesis
3. _____ and Ediacaran animals appeared late in Precambrian time.

B. The _____ **Era**—about 544 million years ago to about 245 million years ago

1. Many organisms with _____ and vertebrates evolved in the warm, shallow seas.
2. _____ evolved to survive in water and on land.
   a. Might have evolved from _____
   b. Could obtain oxygen from _____ or from lungs.
3. _____ evolved from amphibians to survive farther from water
4. Several mountain-building episodes occurred during the Paleozoic Era because of _____ collisions.
5. Most marine and land species became _____ at the end of the Paleozoic Era.

Section 3 Middle and Recent Earth History

A. _____ **Era**—lasted from 245 to 65 million years ago

1. Pangaea separated into _____ and the climate became drier.
2. _____ evolved; they might have been warm-blooded, traveled in herds, and nurtured their young.

Meeting Individual Needs

Note-taking Worksheet (continued)

3. _____, which probably evolved from small, meat-eating dinosaurs, appeared during the Jurassic Period.
4. Small, mouse-like _____, which are warm-blooded vertebrates with hair and milk to feed their young, appeared in the Triassic Period.
5. _____, plants that produce seeds but not flowers, appeared in the Paleozoic Era.
6. Flowering plants or _____ appeared during the Cretaceous Period.
7. A great extinction, perhaps caused by a comet or an asteroid collision, occurred about _____ years ago, marking the end of the Mesozoic Era.

B. The _____ **Era** began about 65 million years ago and continues today.

1. Many _____ formed, perhaps creating cooler climates worldwide.
2. Mammals continued to evolve
   - **a.** Many species became _____ as the continents continued to separate.
   - **b.** *Homo sapiens*, or _____, appeared about 400,000 years ago.

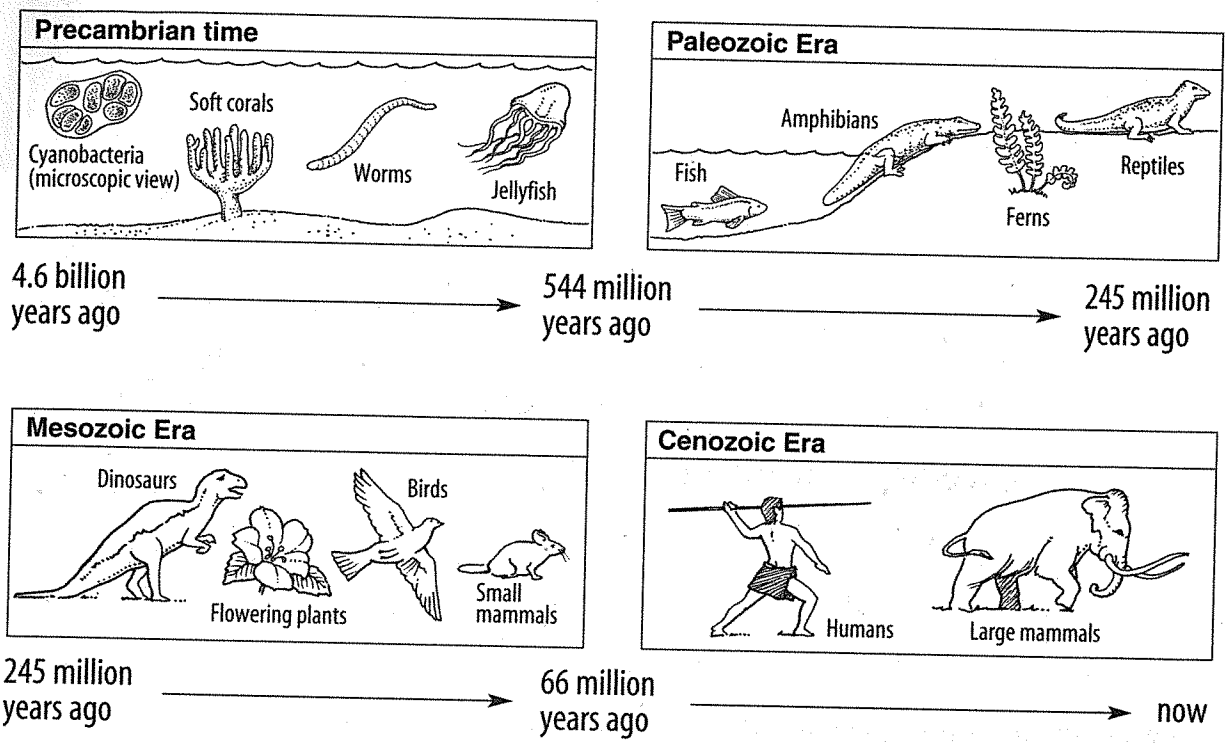
Assessment

Name _____ Date _____ Class _____

Directed Reading for Content Mastery

Overview Geologic Time

Directions: *Study the diagram. Then complete the sentences below.*



1. Ferns and reptiles appeared in the _____ Era.
2. In the _____ Era, humans and large mammals appeared.
3. Dinosaurs, birds, and flowering plants first appeared in the _____ Era.
4. During _____ time, the earliest life-forms appeared.
5. Small mammals appeared in the _____ Era.
6. The earliest life-form shown above is _____.
7. Reptiles appeared during the same era as ferns, fishes, and _____.
8. Worms and jellyfishes first appeared in _____ time.

Meeting Individual Needs

Name _____ Date _____ Class _____

Directed Reading for Content Mastery

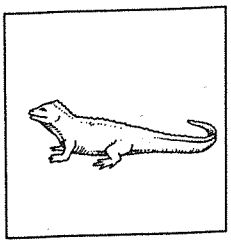
Section 1 ▪ Life and Geologic Time
Section 2 ▪ Early Earth History

Directions: *Circle the term in parentheses that makes each statement correct.*

1. The longest subdivisions of geologic time are called (epochs, eons).
2. The division of Earth's history into time units makes up the (geologic time scale, trilobite time scale).
3. A group of organisms that reproduce only with members of their group is a (population, species).
4. The process by which organisms that adapt well to their environment survive and reproduce is called (natural selection, organic evolution).
5. Pangaea formed during the (Paleozoic, Mesozoic) Era.
6. A subdivision of eras, called (epochs, periods), are characterized by the types of life existing worldwide.
7. (Fossils, Plates) help scientists divide Earth's history into time units.
8. The changing of organisms over geologic time is known as (natural selection, organic evolution).
9. The oldest rocks on earth contain (only a few, no) fossils.
10. The Precambrian time is the (longest, shortest) part of Earth's history.
11. Cyanobacteria are (colorless, blue-green) bacteria thought to be one of the earliest forms of life on Earth.

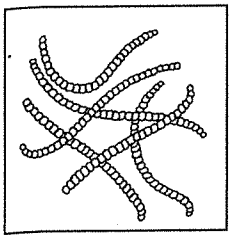
Directions: *Write* **A**, **B**, **C**, **D**, *or* **E** *beneath the proper illustration to show in which order they first appeared on Earth.*

Reptile



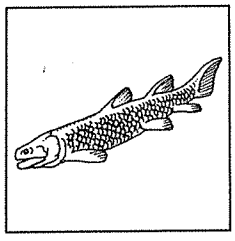
12. _____

Cyanobacteria



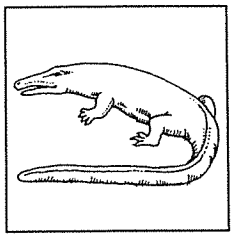
13. _____

Fish



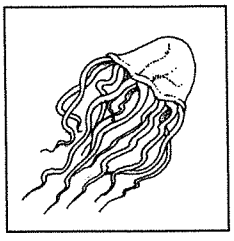
14. _____

Amphibian



15. _____

Jellyfish



16. _____

Meeting Individual Needs

Name _____ Date _____ Class _____

Directed Reading for Content Mastery

Section 3 ▪ Middle and Recent Earth History

Directions: *Use the following terms to fill in the chart below.*

present **birds** ***Homo sapiens*** **Pangaea**
Alps and Himalayas **dinosaurs** **angiosperms**

Era	Time Span	Period	Life-forms	Geologic Events
Mesozoic	245 to 65 million years before present	Triassic	The first small **2.** _____ appeared.	**6.** _____ separated into two large land masses.
		Jurassic	The first **3.** _____ appeared.	
		Cretaceous	New plants called **4.** _____ evolved.	
Cenozoic	65 million years before present to **1.** _____	Tertiary	Dinosaurs became extinct.	**7.** _____ begin to rise. Ice Age began.
		Quarternary	**5.** _____ appeared.	Ice ages begin.

Directions: *For each of the following, write the letter of the term or phrase that best completes the sentence.*

_____ **8.** The Mesozoic Era is also known as the era of _____.
a. middle life **b.** new life

_____ **9.** Birds appeared during the _____ Period.
a. Triassic **b.** Jurassic

Meeting Individual Needs

Name Date Class

Directed Reading for Content Mastery

Key Terms
Geologic Time

Directions: *Draw a line to connect the description on the left to the correct term on the right.*

1. major subdivisions of geological time based on differences in life-forms
2. organisms that lived hundreds of millions of years ago with bodies divided into three sections
3. the longest geological part of Earth's history
4. one of the earliest life-forms, which gave off oxygen
5. flying animals that evolved from dinosaurs
6. the single landmass that once contained all Earth's continents
7. smaller units of time in a geologic period
8. the time period where dinosaurs were the dominant life-form
9. the division of Earth's history into time units
10. the longest subdivisions of geologic time
11. major divisions of an era
12. the change in organisms over time
13. a group of organisms that normally reproduce with other members of their group
14. process by which certain organisms survive and reproduce

Precambrian

geologic time scale

eras

species

trilobites

periods

Pangaea

natural selection

cyanobacteria

eons

birds

organic evolution

Jurassic

epoch

Meeting Individual Needs

Name _____ Date _____ Class _____

SECTION 3 Reinforcement

Middle and Recent Earth History

Directions: *Match the descriptions in Column I with the terms in Column II. Write the letter of the correct term in the space provided in the left-hand column.*

Column I

_____ **1.** seed plants which first appeared in the Paleozoic Era

_____ **2.** era of "middle life"

_____ **3.** most recent period in the Mesozoic Era

_____ **4.** oldest period in the Mesozoic Era

_____ **5.** northern part of Pangaea

_____ **6.** southern part of Pangaea

_____ **7.** fast-moving dinosaur

_____ **8.** dinosaur thought to nurture hatchlings

_____ **9.** winged animal resembling both dinosaurs and birds

_____ **10.** milk-producing animals; first appeared in the Triassic Period

_____ **11.** flowering plants

_____ **12.** most recent era

_____ **13.** most recent period in the Cenozoic Era

_____ **14.** climate change that allowed flowering plants to increase

_____ **15.** where most marsupials live

_____ **16.** animals with pouches

Column II

a. Gondwanaland

b. mammals

c. Australia

d. Laurasia

e. Cretaceous

f. gymnosperms

g. angiosperms

h. Mesozoic

i. Quaternary

j. *Maiasaura*

k. Triassic

l. Cenozoic

m. marsupials

n. tyrannosaurs

o. cooling

p. *Archaeopteryx*

q. *Gallimimus*

Directions: *Complete the following statements.*

17. The bones of cold-blooded animals have _____.

18. The bones of dinosaurs resemble those of _____-blooded animals.

19. Some dinosaurs may have _____ their young.

Meeting Individual Needs

Name Date Class

SECTION 1 Enrichment

The Earliest Primates

Fossils have allowed scientists to trace the evolution of not just trilobites, but of many species of animals. From the fossils, scientists have learned a tremendous amount about what earlier forms of these animals looked like. One of the problems, though, in studying fossils is that often not all of the fossil skeleton can be found. Therefore, scientists have to draw conclusions about the animal without being able to see and study the animal's entire structure. This particular problem led to some interesting "reconclusions" about primates in 1990.

Primates

Primates are a group of about 200 species of animals that include lemurs, monkeys, apes, and humans. They are grouped together on the basis of similar skeletal and other features. It's believed that they have a common ancestor and developed into separate species over millions of years.

For a long time, paleontologists thought that the oldest primates were the 60-million-year-old creatures they named plesiadapiforms. Plesiadapiform fossils included teeth, jaws, and parts of skulls. From the fossils, scientists concluded that plesiadapiform was a primate. Certainly, its teeth were like those of other primates. They were adapted for grinding, designed for a diet of insects, fruits, and seeds.

Is it a primate?

In 1990, new plesiadapiform bones were dug up in Wyoming. These included the first complete skull and some fingers and wrists which were parts that had never been found before. The paleontologists who studied the finger bones were surprised to find that they did not resemble those of primates. The only living animal with a similar arrangement of finger bones is a small, tree-dwelling mammal of the Borneo and Philippine rain forests, called a colugo. The scientists who examined the intact skull identified it as resembling that of the colugo. The conclusion was the plesiadapiforms were not primates, since colugos are not primates.

Other scientists were studying an animal discovered at the foot of the High Atlas Mountains in Morocco. The creature, called the *Altiatlasius,* lived 60 million years ago. The paleontologists found ten tiny teeth similar to those in one of today's smallest primates, the 57-gram mouse lemur of Madagascar.

The earliest primate?

Another animal, less advanced but much larger than the *Altiatlasius,* has also been found. Many scientists are calling it an earlier primate. It's a house-cat-sized microsyopid and may have lived more than 60 million years ago. It's identified as an early primate from its bone structure.

1. If the microsyopid is proved to be a primate, what conclusion about primates might be changed?

2. Why do you think the *Altiatlasius* was so named?

3. What does the reading tell you about scientific inquiries?

Meeting Individual Needs