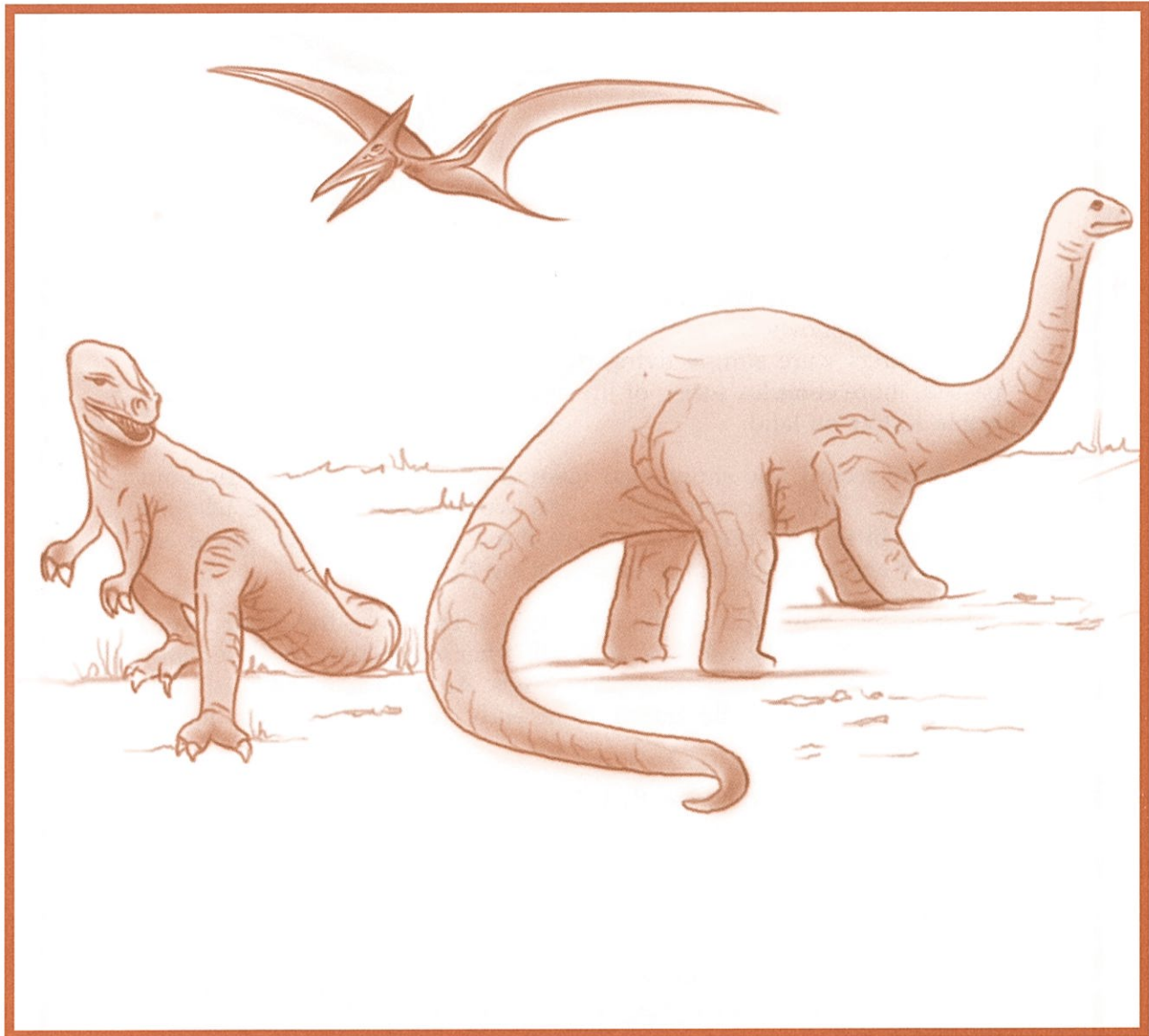


What is the fossil record?



KEY TERM

geologic time scale: an outline of the major events in the earth's history

LESSON | What is the fossil 31 | record?

The “detectives” who have “read” fossil clues have put together the story of life on earth.

Fossils tell us much about the earth’s history. Fossils show that many kinds of organisms lived at different times in the earth’s history. The fossil record shows that life probably began in the water. The earliest living things were simple living things that lived in the sea. As time passed, more complex forms of life appeared. Some plants and animals began to live on land.

The fossil record also shows that many kinds of living things died out completely. They became extinct. The woolly mammoth, the trilobite [TRY-luh-bite], and the dinosaur are three extinct animals. There are fossils of about 130 thousand extinct living things.

Other forms of life did not become extinct. However, the fossil record shows they changed over time. And still other things that are alive today have not changed much since early times. Animals like snails, snakes, and cockroaches can be traced from early times. They have hardly changed.

The fossil record also shows that the earth’s climate and surfaces have changed. For example, fossils of alligator-like animals have been found in Canada. Today, alligators live in warm climates. The fossils in Canada indicate that at some time in the earth’s history, Canada had a warmer climate than it does today.

The fossil record is not complete. There are many gaps, or empty spaces. However, we now have a pretty clear story. We have been able to trace the major events in the earth’s history and the development of most living things. In addition, we have been able to trace the development of human beings.

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HOW THE HORSE DEVELOPED

Everyone knows what a horse looks like, but the horse did not always look like it does today. The diagrams below show how the horse has changed. It took about 60,000,000 years for the horse to develop. Here's a surprise. The earliest horse was only about 61 centimeters (24 inches) tall.

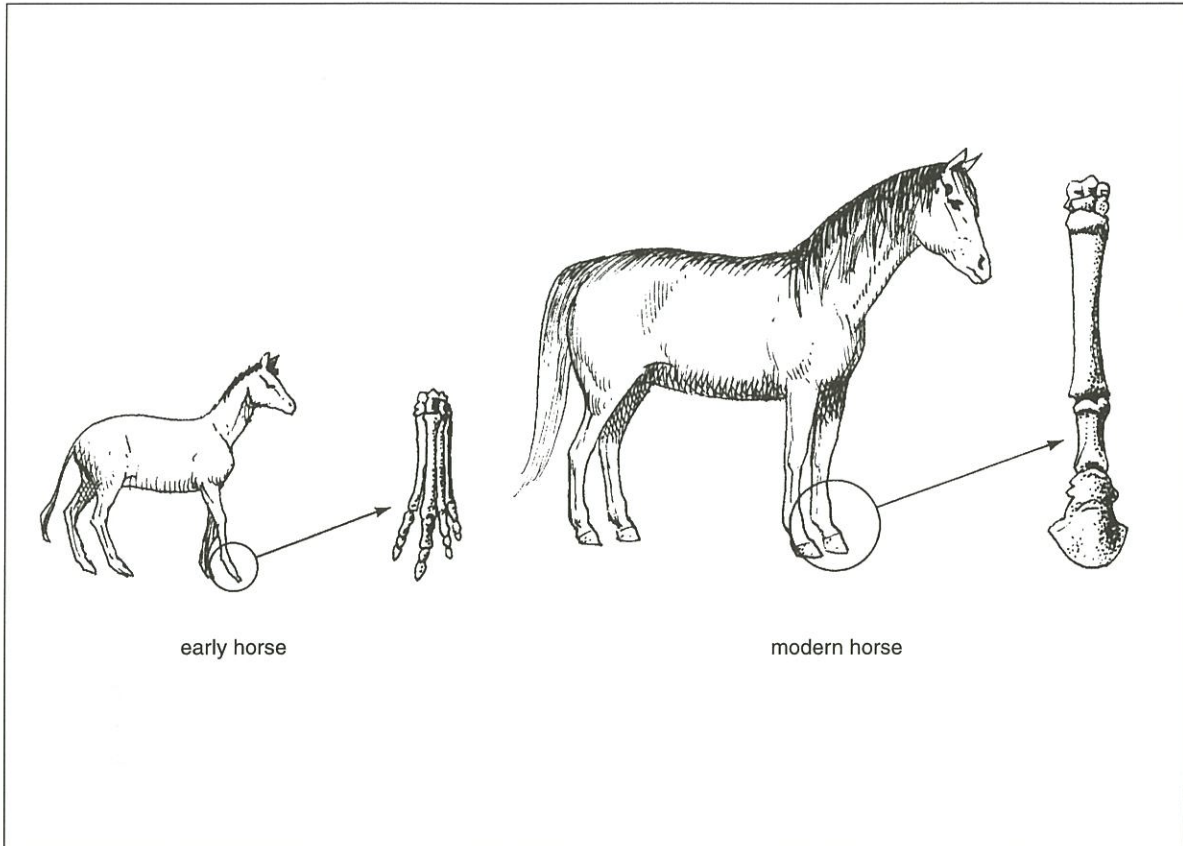


Figure A

Study the diagrams in Figure A. What changes do you see? Fill in the correct answers on the lines provided.

1. The horse _____ grown in size.
has, has not
2. The legs have become _____ .
shorter, longer
3. The early horse _____ toes.
had, did not have
4. The modern horse _____ toes.
has, does not have

A cow eats only plants. A cow's teeth are mostly flat. A tiger eats only meat. A tiger's teeth are mostly pointed. The teeth of a modern horse are mostly flat.

5. What do you think modern horses eat? _____

TIMETABLE OF LIFE ON EARTH

By studying rocks and fossils, scientists have developed a **geologic** [jee-uh-LAJ-ik] **time scale**. The scale is an outline of major events in the earth's history. The scale lists four eras of our planet. It tells about how long ago each one began and about how long it lasted.

Study the chart. Then answer the questions on the next page. (Hint: Read this chart from the bottom up.)





Era	Began About	Lasted About	Important Forms of Life
<p>Cenozoic recent life</p>	<p>65 million years ago</p>	<p>65 million years (to present)</p>	<p>Modern humans, cattle, modern horse, apes and monkeys.</p> <p>Flowering plants spread.</p> 
<p>Mesozoic middle life</p>	<p>225 million years ago</p>	<p>160 million years</p>	<p>Huge dinosaurs rule the earth — then become extinct. First birds and mammals.</p> <p>First flowering plants.</p> 
<p>Paleozoic ancient life</p>	<p>600 million years ago</p>	<p>375 million years</p>	<p>Fish. First land animals (amphibians), and then early reptiles.</p> <p>Insects. Trilobites and many other sea animals with shells.</p> <p>Coal-forming period.</p> <p>Early land seed plants, then thick swamp forests.</p> 
<p>Precambrian early life</p>	<p>4.5 billion years ago</p>	<p>3.9 billion years</p>	<p>Only simple seafife. One-celled living things called bacteria.</p> 

Figure B

WHICH ERA?

Name the era . . .

1. that started 65 million years ago? _____
2. that started about 4.5 billion years ago? _____
3. that lasted the longest? _____
4. in which we live? _____
5. during which dinosaurs lived? _____
6. during which the simplest life-forms developed? _____
7. during which flowering plants first grew? _____
8. during which the first land animals lived? _____
9. in which insects first appeared? _____
10. in which early reptiles developed? _____
11. in which there was only sea life? _____
12. in which the dinosaurs died out? _____
13. in which birds first developed? _____
14. in which apes first developed? _____
15. which lasted about 375 million years? _____

MATCHING

Match each term in Column A with its description in Column B. Write the correct letter in the space provided.

	Column A	Column B
_____	1. woolly mammoth	a) where life began
_____	2. sedimentary rocks	b) had four toes
_____	3. the sea	c) where most fossils are found
_____	4. early horse	d) earliest forms of life
_____	5. bacteria	e) extinct

TRUE OR FALSE

In the space provided, write "true" if the sentence is true. Write "false" if the sentence is false.

- _____ 1. Fossils are traces of past life.
- _____ 2. Animals are the only kind of life.
- _____ 3. There has been life on earth for billions of years.
- _____ 4. Life began on land.
- _____ 5. All organisms moved from the sea to land.
- _____ 6. The fossil record shows the earth's climate has changed.
- _____ 7. As time passed, more complicated life developed.
- _____ 8. Many kinds of plants and animals have changed a lot.
- _____ 9. Snails and snakes have changed a lot.
- _____ 10. Fossils help us understand how people developed.

WHICH CAME FIRST?

In each of the pairs below, one of the things came before the other. On the line next to each pair, write the name of the thing that came before the other. (To answer this, use the Geologic Time Scale on page 196).

- 1. bacteria or trilobites? _____
- 2. fishes or birds? _____
- 3. frogs or birds? _____
- 4. flowering plants or seed plants? _____
- 5. people or dinosaurs? _____
- 6. land animals or sea animals? _____
- 7. cockroaches or birds? _____
- 8. birds or monkeys? _____
- 9. complicated life or simple life? _____
- 10. bacteria or seed plants? _____

THE METRIC SYSTEM

METRIC-ENGLISH CONVERSIONS

	<i>Metric to English</i>	<i>English to Metric</i>
Length	1 kilometer = 0.621 mile (mi)	1 mi = 1.61 km
	1 meter = 3.28 feet (ft)	1 ft = 0.305 m
	1 centimeter = 0.394 inch (in)	1 in = 2.54 cm
Area	1 square meter = 10.763 square feet	1 ft ² = 0.0929 m ²
	1 square centimeter = 0.155 square inch	1 in ² = 6.452 cm ²
Volume	1 cubic meter = 35.315 cubic feet	1 ft ³ = 0.0283 m ³
	1 cubic centimeter = 0.0610 cubic inches	1 in ³ = 16.39 cm ³
	1 liter = .2642 gallon (gal)	1 gal = 3.79 L
	1 liter = 1.06 quart (qt)	1 qt = 0.94 L
Mass	1 kilogram = 2.205 pound (lb)	1 lb = 0.4536 kg
	1 gram = 0.0353 ounce (oz)	1 oz = 28.35 g
Temperature	Celsius = 5/9 (°F -32)	Fahrenheit = 9/5°C + 32
	0°C = 32°F (Freezing point of water)	72°F = 22°C (Room temperature)
	100°C = 212°F (Boiling point of water)	98.6°F = 37°C (Human body temperature)

METRIC UNITS

The basic unit is printed in capital letters.

<i>Length</i>	<i>Symbol</i>
Kilometer	km
METER	m
centimeter	cm
millimeter	mm
<i>Area</i>	<i>Symbol</i>
square kilometer	km ²
SQUARE METER	m ²
square millimeter	mm ²
<i>Volume</i>	<i>Symbol</i>
CUBIC METER	m ³
cubic millimeter	mm ³
liter	L
milliliter	mL
<i>Mass</i>	<i>Symbol</i>
KILOGRAM	kg
gram	g
<i>Temperature</i>	<i>Symbol</i>
degree Celsius	°C

SOME COMMON METRIC PREFIXES

<i>Prefix</i>		<i>Meaning</i>
micro-	=	0.000001, or 1/1,000,000
milli-	=	0.001, or 1/1,000
centi-	=	0.01, or 1/100
deci-	=	0.1, or 1/10
deka-	=	10
hecto-	=	100
kilo-	=	1,000
mega-	=	1,000,000

SOME METRIC RELATIONSHIPS

<i>Unit</i>	<i>Relationship</i>
kilometer	1 km = 1,000 m
meter	1 m = 100 cm
centimeter	1 cm = 10 mm
millimeter	1 mm = 0.1 cm
liter	1 L = 1,000 mL
milliliter	1 mL = 0.001 L
tonne	1 t = 1,000 kg
kilogram	1 kg = 1,000 g
gram	1 g = 1,000 mg
centigram	1 cg = 10 mg
milligram	1 mg = 0.001 g

