4 The Geologic Time Scale

Reading Preview

Key Concepts

- Why is the geologic time scale used to show Earth's history?
- What are the different units of the geologic time scale?

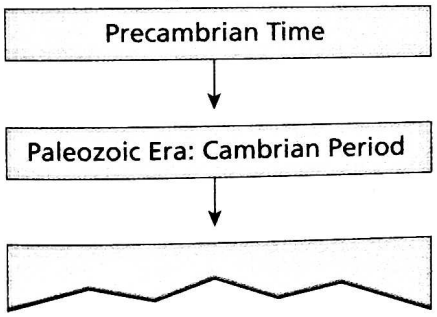
Key Terms

- geologic time scale
- era
- period

Target Reading Skill

Sequencing As you read, make a flowchart like the one below that shows the eras and periods of geologic time. Write the name of each era and period in the flowchart in the order in which it occurs.

Geologic Time Scale



Lab zone

This Is Your Life!

1. Make a list of about 10 to 15 important events that you remember in your life.
2. On a sheet of paper, draw a timeline to represent your life. Use a scale of 3.0 cm to 1 year.
3. Write each event in the correct year along the timeline.
4. Now divide the timeline into parts that describe major periods in your life, such as preschool years, elementary school years, and middle school years.

Think It Over

Making Models Along which part of your timeline are most of the events located? Which period of your life does this part of the timeline represent? Why do you think this is so?

Imagine squeezing Earth's 4.6-billion-year history into a 24-hour day. Earth forms at midnight. About seven hours later, the earliest one-celled organisms appear. Over the next 14 hours, simple, soft-bodied organisms such as jellyfish and worms develop. A little after 9:00 P.M.—21 hours later—larger, more complex organisms evolve in the oceans. Reptiles and insects first appear about an hour after that. Dinosaurs arrive just before 11:00 P.M., but are extinct by 11:30 P.M. Modern humans don't appear until less than a second before midnight!

The Geologic Time Scale

Months, years, or even centuries aren't very helpful for thinking about Earth's long history. **Because the time span of Earth's past is so great, geologists use the geologic time scale to show Earth's history.** The **geologic time scale** is a record of the life forms and geologic events in Earth's history. You can see this time scale in Figure 14.

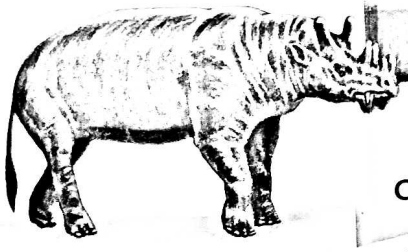
Scientists first developed the geologic time scale by studying rock layers and index fossils worldwide. With this information, scientists placed Earth's rocks in order by relative age. Later, radioactive dating helped determine the absolute age of the divisions in the geologic time scale.

FIGURE 14

The Geologic Time Scale

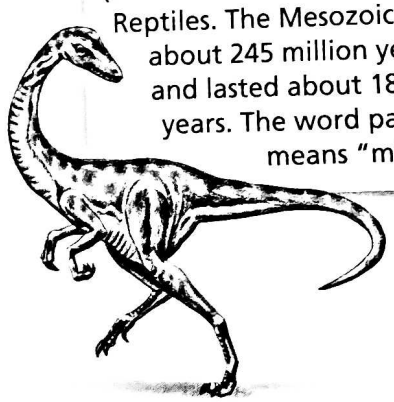
The eras and periods of the geologic time scale are used to date the events in Earth's long history.

Interpreting Diagrams *How long ago did the Paleozoic Era end?*



Cenozoic Era
The Cenozoic (sen uh ZOH ik) began about 66 million years ago and continues to the present. The word part *ceno-* means "recent," and *-zoic* means "life." Mammals became common during this time.

Mesozoic Era
People often call the Mesozoic (mez uh ZOH ik) the Age of Reptiles. The Mesozoic began about 245 million years ago and lasted about 180 million years. The word part *meso-* means "middle."



Paleozoic Era
The Paleozoic (pay lee uh ZOH ik) began about 544 million years ago and lasted for 300 million years. The word part *paleo-* means "ancient or early."

Era	Period	Millions of years ago	Duration (millions of years)
Cenozoic	Quaternary	1.8	1.8 to present
	Tertiary	65	65
Mesozoic	Cretaceous	144	78
	Jurassic	208	64
	Triassic	245	37
Paleozoic	Permian	286	41
	Carboniferous	360	74
	Devonian	408	48
	Silurian	438	30
	Ordovician	505	67
	Cambrian	544	39
Precambrian		*544 million years ago–4.6 billion years ago*	

Divisions of Geologic Time

As geologists studied the fossil record, they found major changes in life forms at certain times. They used these changes to mark where one unit of geologic time ends and the next begins. Therefore the divisions of the geologic time scale depend on events in the history of life on Earth.

When speaking of the past, what names do you use for different spans of time? You probably use names such as century, decade, year, month, week, and day. Scientists use similar divisions for the geologic time scale.

Geologic time begins with a long span of time called Precambrian Time (pree KAM bree un). Precambrian Time, which covers about 88 percent of Earth's history, ended 544 million years ago. **After Precambrian Time, the basic units of the geologic time scale are eras and periods.** Geologists divide the time between Precambrian Time and the present into three long units of time called **eras.** They are the Paleozoic Era, the Mesozoic Era, and the Cenozoic Era.

Eras are subdivided into units of geologic time called **periods.** You can see in Figure 14 that the Mesozoic Era includes three periods: the Triassic Period, the Jurassic Period, and the Cretaceous Period.

The names of many of the geologic periods come from places around the world where geologists first described the rocks and fossils of that period. For example, the name Cambrian refers to Cambria, the old Roman name for Wales.

Reading Checkpoint **To what era does the Jurassic Period belong?**

FIGURE 15
Fossil of the Quaternary Period
This saber-toothed cat lived during the Quaternary Period.

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Section 4 Assessment

Target Reading Skill Sequencing Refer to your flowchart about the geologic time scale as you answer Question 2.

Reviewing Key Concepts

1. a. **Defining** What is the geologic time scale?
   b. **Explaining** What information did geologists use in developing the geologic time scale?
2. a. **Listing** What are the basic units into which the geologic time scale is divided?
   b. **Interpreting Diagrams** Study Figure 14. Which major division of geologic time was the longest? When did it begin? When did it end?
   c. **Sequencing** Place the following in the correct order from earliest to latest: Tertiary, Jurassic, Quaternary, Triassic, Cretaceous.

Writing in Science

An Address in Time Pick one of the periods in the geologic time scale. Write a paragraph that describes, as completely as you can, that period's place in geologic time relative to the other periods and eras.