

Understanding Geologic Time

from the Texas Memorial Museum

Objective

To gain a better understanding of the geologic time scale.

Materials

Activity 1: Geologic Time

Geologic Time Activity Worksheet (included)

Geologic Time Football Field (included)

Pen or pencil

Calculator

Activity 2: Relative vs. Absolute Time

Relative vs. Absolute Time Activity Worksheet (included)

Pen or Pencil

Introduction

Activity 1:

Sometimes geologists want to know about an event that occurred before humans were around to record it. They have evidence of when the event occurred by looking at rocks, which contain fossils and other information. To keep all of the events in order, geologists have created the geologic time scale. The geologic time scale is divided into 3 eons, and each eon is subdivided into eras. Eras are then subdivided into periods, which are further separated into epochs. This may sound confusing, but looking at a real geologic time scale and completing this activity will help.

Activity 2:

If your students are not familiar with the geologic time scale, relative dating, or absolute dating, have them perform this short activity.

Teaching Strategies

1. Activity 1: If time permits, assign the students to play the role of a certain event in time. Take the students to a football field and have them mark their event by standing in the appropriate place. This will create a better picture for those who learn best through visual techniques.

2. Activity 1: The mathematical difficulty may be increased by assigning more ages of periods and epochs to calculate and correspond to the football field.

Understanding Geologic Time

Geologic Time Activity Worksheet

Instructions

Go to <http://pubs.usgs.gov/gip/fossils/numeric.html> and use the geologic time scale to find the missing dates and fill in the blanks under the Approximate Age category. Next, calculate the corresponding distance on a football field that each event represents and fill in the blanks under the Distance category. For this activity, 1 yard = 50 million years. Mark the events on the Geologic Time Football Field. One end zone is labeled "TODAY" and the other is "BEFORE EARTH." As you place your events on the football field, pay close attention to which end is which. Place events at the nearest yard.

Geologic Event	Approximate Age	Distance (yds)
Rocky Mountains are formed	80 million years	
First known fish	510 million years	
Paleozoic Era begins		
Earliest humans	2 million years	
Formation of the Earth	4.6 billion years	
First known mammal	200 million years	
Proterozoic Eon begins		
First single-celled organism	1.2 billion years	
Columbus discovers America	506 years	
Oldest rock	3.8 billion years	
Extinction of the dinosaurs	65 million years	
First known plant	498 million years	
First known reptile	325 million years	
First multi-celled organism	700 million years	
First known amphibian	375 million years	
First known bird	160 million years	

Geologic Time Activity Worksheet (continued)

Investigation

1. What event is exactly in the middle of the football field?

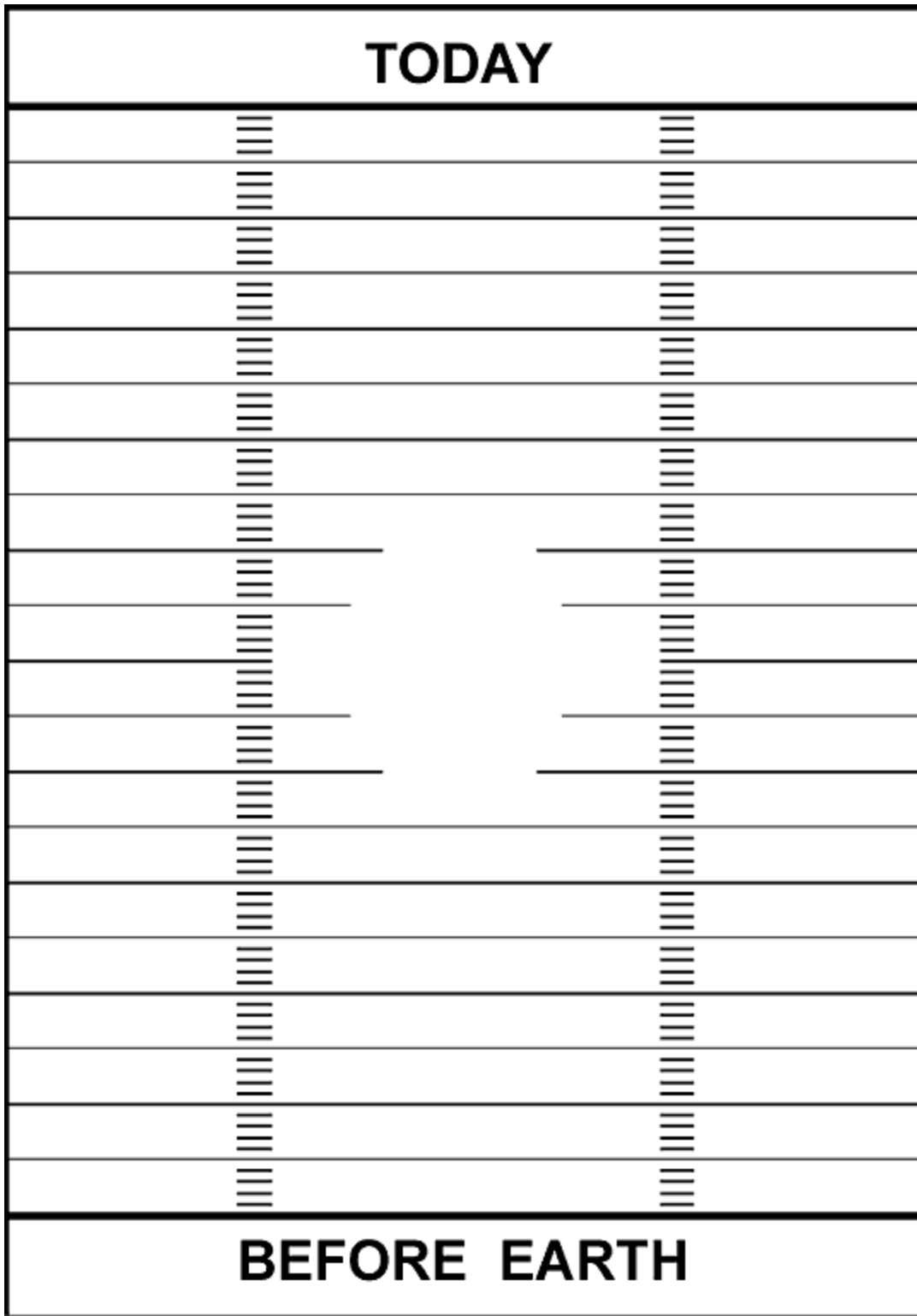
2. Find where your birth date would be on the football field. Why is it almost impossible to show a human's life on this scale? Would it be easier if we changed the number of years that 1 yard represents?

3. In what periods did fish, mammals, reptiles, amphibians, and plants appear on Earth?

4. Look at the geologic time scale. Why do you think the Phanerozoic Eon has many more divisions and dates associated with it than the Archean Eon?

5. How many years does the first 10 yards represent? What events are within the first 10 yards of the football field from the TODAY end zone?

Geologic Time Football Field



Understanding the Geologic Time Scale

Relative vs Absolute Time

Introduction

By knowing the age of the rock that a fossil is found in, geologists can usually tell the age of the fossil. Sometimes they cannot give it an exact date, but they know that it is older or younger than another fossil. Dating a fossil by saying it is older or younger than another fossil is called relative dating.

If the geologists know the exact age of a fossil, they usually express its age in millions of years ago (mya) that it was formed. Dating a fossil by assigning it a specific age is called absolute dating.

Instructions

To practice this concept, make a relative time scale out of seven or eight events that have occurred in your lifetime. For example, include important events such as your birth, something you did today, starting kindergarten, and losing your first tooth.

Remember, these events only show chronological order, not exact dates. After making a relative time scale, assign dates to the events that you chose, so that it is an absolute time scale. The following is an example.

Example Time Scale			
Relative Time Scale		Absolute Time Scale	
<i>I was born.</i>		<i>I was born.</i>	<i>July 25, 1984</i>
<i>I took my first steps.</i>		<i>I took my first steps.</i>	<i>April 2, 1985</i>
<i>My little sister was born.</i>		<i>My little sister was born.</i>	<i>June 23, 1987</i>
<i>My family and I went to Disneyland.</i>		<i>My family and I went to Disneyland.</i>	<i>May 21, 1995</i>
<i>Today</i>		<i>Today</i>	<i>Today's date</i>

My Time Scale			
Relative Time Scale		Absolute Time Scale	