



The Passage of Time Teacher Activity Page

[\[Teachers\]](#) [\[Student\]](#) [\[Standards\]](#) [\[Related Hot Links\]](#) [\[PDF File\]](#) [\[Pre-Visit Activities\]](#)

Background

As the students view the majestic wonders of the Black Canyon area, the painted walls and incredible depth of the erosion that has occurred stand out dramatically. From the 2 billion year old Precambrian rock at the rivers edge to the plateau that soars 2,200 feet above, one can see a living geologic timeline.

The Geologic Time Scale activity engages students to understand the changes in our earth over billions of years. Although most of us understand that time is measured in linear sequence, comprehending events that took millions of years to happen or others that took place millions of years in the past is difficult. In the following activity, students will try three different exercises to help them more clearly understand the time scale with which the Earth measures its "life."

Resources/Materials/Supplies

Graph paper
Notebook paper
Pencils or thin magic markers
Internet access

Teacher Directed Activity 1

- What other objects or concepts can you name that might help you imagine such numbers as 300 million years? For example, how do the number of years from the creation of the Pacific Island Arc to today compare to the number of miles to the moon? To the first star? To the number of dollars in the national debt?

Distribute the graph paper and pencils/markers. Direct students to fold the paper lengthwise into 3 equal columns and title, **Personal Time Scale**; title the left column, **Intervals**; the middle column **Millions of Years Ago**; the right column **Events**.

- Have them list on notebook paper at least 10-20 events in their lives, beginning with their birth and ending with an event that occurred in the past 24 hours.
- Invite students to work on this together so that they can prod each other's memories for events.
- Have them arrange their lists in sequence from most recent to least recent.
- Instruct students to inscribe the events of their lives in order from top to bottom in the right hand column, beginning with the most recent event, ending with birth. Explain that they have created a sequential timeline exactly like that created by scientists to chronicle the events of Earth's "life."
- Using their **Personal Time Scales**, they could describe their growing up and may be able to identify prerequisites to certain events. For example, "I learned to ride my bike with training wheels before I learned to ride without them."
- In the middle column, have students write the number of years from the present that each event occurred. This is the Numerical Time Column.
- Designate the present as zero in the column.
- Number events according to number of years back from the time it occurred.
- The last number in the column would be the student's age.
- Using these 2 sets of information together, students could begin to determine the number of years

it took them to learn a new skill or at what (class average) age the class learned to walk or recite the alphabet.

- Scientists divide Earth's timeline into specific intervals, such as Jurassic or Precambrian. Use the left-hand column to show students larger, descriptive intervals for their own lives.
- Using the left-hand column, have students divide their timelines into the following intervals: Preschoolian, Gradeschoolian, Midschoolian.
- Can they think of natural divisions within these larger groupings? **For example**, could the Preschoolian age be further divided into Crawlman and Walkman? Brainstorm a number of such possible divisions with students and then have them complete their Personal Time Scales.
- Color code intervals created in the first column across the chart to show what events and numerical designations belong in each major interval division.

Distribute copies of the Geologic Time Scale from one of the attached [Hot Links](#) and invite students to compare them to their Personal Time Scales.

Have students use the geologic time scales to describe events in Earth's "life" in the same way they described events in their own lives.

What happened in the Precambrian interval of Earth's life? How many years ago?

- At what point in the Geologic Time Scale did the Black Canyon form?
- In what time interval did the first glacier bring a halt to the chemical reaction that formed the copper ore?

Teacher Directed Activity 2

You need a large measured space such as a football field, basketball court. Students must be able to use the following ratio equation to solve for an unknown.

Note: In the equation, "metaphor" represents the large space you've chosen to represent Geologic Time Scale.

$$\frac{\text{Known Age of Past Event (Years Before Present) Time Scale Metaphor (Distance Unknown) X}}{\text{Known Age of the Earth (Years Before Present) Maximum Measurement of Metaphor}} =$$

Discuss the ratio equation above. Have students copy the formula on a sheet of scratch paper, share the maximum measurement of the space you are using for the Geologic Time Scale metaphor, and add the known information into the formula.

Take students to the space. Designate one end of the space as Present and the other as the beginning of Earth's history.

- Divide students into 5 groups. Assign one of the above events to each group.
- Have groups calculate in yards (or feet depending upon the metaphor) the distance the point on the scale at which their assigned event took place.

Groups should move the appropriate distance from the starting point on the space.

Once in place, in order, groups can name their event and tell when it took place.

Gather students. Start a discussion comparing time from a geologic point of view and time from a human point of view. Do students agree or disagree that human beings are every bit as catastrophic to the Earth's development as moving crustal plates or ice ages? Why or why not?

Student Directed Activity

Have students follow the directions from their pages to create an illustration of the geologic time scale using a metaphor of their own choosing.

Management Tips and Hints

Rather than expect individuals to complete the metaphor assignment as homework give groups class time to work together on the assignment. Invite one group to create a display for the class or the school to teach observers about geologic time.