Timeline

Scientists generally agree that the Earth is about 4.5 billion years old. That's OLD! The problem is, it can be difficult to wrap one's head around that age, let alone help fourth graders understand this notion of "deep time." The "Charlie's Playhouse" timeline activities are designed to help. The timeline itself displays "600 million years of life on earth," though extension activities (like "How Long?") can go all the way back to the birth of the Earth!

There are many activities that can be done with the timeline. The following focus on student understanding of deep time:

- Walk through Time
- How Long?
- Matching Game

See the back of the timeline for more ideas!

See also: http:/www.charliesplayhouse.com/mat.html

Learning Goals

Big Idea 5: Interspecific Differences

- There are differences between species.

Big Idea 11: Descent with modification

- Species evolve from common ancestors.

Big Idea: Deep Time

- There has been life on earth for about 3.8 billion years. Animals really began to diversify about 600 million years ago. Humans have only lived on Earth for less than 200,000 years.
- The Earth itself is about 4.5 billion years old.

Lesson Plan

1. Estimated time

These activities should take approximately 1 hour. (Complete them in more than one session, if necessary.)

2. Introduce the activity (Engage)

Remind students of the *Life on Earth* book, which you've already read together. Show them the timeline near the end of the book.

3. Guided inquiry (Explore)

If possible, the activities should be done in a gymnasium, playground, hallway, or other large open area. An open space is necessary. If you work in a classroom, you may need to reorganize desks.

Materials

- Timeline floor mat
- Creature cards
- 200 ft of string [Note: lengths of string are 18 feet each, which is the length of the timeline and represents 600 million years.]

Instructions: There are many activities that can be done with the timeline. The following three focus on student understanding of deep time.

Walk through Time. Have students walk through the timeline. Ask them to remember one interesting thing and present it to the class. Help students notice that it is a LONG time and there is a sequence. In addition, ask the students what the colors in the background of the timeline might mean. (Answer: At first, the background is all blue, representing water. All life on Earth began in the water. Life on land did not appear until later and is represented by a tan color background in the timeline.)

Now, choose three students to point out (or stand near) the three trilobites on the mat. Find the three trilobite cards in the deck of creature cards and have students read them aloud. Discuss what makes the three trilobites related and what makes them different. Note the changes over time in the body of the trilobites. Trilobites are the first animals to have evolved eyes. *Extension*: refer to the "Good designs" page in the *Life on Earth* book (near the end), which shows that some traits are so successful they last a very long time.

How Long? This is to be done on a football field or in the gym. Cut 6 pieces of string — each should be as long as the timeline. The timeline starts with simple organisms and ends with more complex organisms. However, there were even simpler organisms before the ones represented on the mat. Have kids line up 5 pieces of string before the beginning of the mat. This would represent 5x600 million years = 3 billion years. Plus the 600 million on the timeline we have a total of about 3.5 billion years, which is approximately how many years ago life started on Earth. Have kids line up 1 more string before the beginning of life on Earth and for a total of about 4.2 billion years, which is about how old the Earth is!

Matching Game. Split class into two teams. Give each student a creature card. Have them run from across the room and match their card with the animal on the timeline. Run this as a relay. How fast can they match their creature to the timeline? Run this TWICE. The second time, the kids should get the idea that the "squishy" ones are at the beginning of the timeline and those with four legs are on the

other end. The background color of each creature card is a helpful hint about where it goes on the timeline. Help students to notice that the blue-colored cards come first – they represent life in the oceans.

4. Discuss the activity (Explain)

Use the following questions during or at the end of the activities:

- A number of the ancient creature cards say "Extinct" on them. What does this tell us? (Answer: most organisms that have ever lived are now extinct.)
- What do you notice about creatures at the beginning of the timeline? Near the end of the timeline? (Answer: creatures moved from water to land. They started as very simple organisms.)
- Are you surprised that humans have only lived for a short amount of time in Earth's history? How do humans affect life on Earth? (Answer: Humans change the environment by building cities, roads, and buildings. This disturbs the natural habitats of animals. Human activity also pollutes the land, water and air.)