

About the Activity

In previous activities, students learned qualitatively "what happened when" in the early history of the universe. This activity quantifies that knowledge as students place major events in the history of the universe in their proper place on a cosmic timeline that stretches from the [Big Bang](#) to present day. Students first estimate the placement of events on a scaled timeline. They reposition the events according to the correct dates and record these dates on an activity sheet. At the end of the activity, students take a quiz covering the main points presented in Lesson 4. In subsequent lessons, students will explore in more detail some of the major events noted on the timeline.

Learning Objectives

After completing this activity, students will be able to:

- Suggest a few of the most important events in the history of the universe.
- Order the sequence of these major events.
- Recognize that human activity is recent compared to the history of the universe.

During the Activity

Activity Sequence in Brief

Engage

Students discuss homework on the Cosmic Microwave Background and evidence in favor of the Big Bang, then talk about what events to include on a cosmic timeline.

Explore

Students receive event cards and align themselves along the wall in a living timeline.

Explain

Students record the major dates and events on their student activity sheets.

Elaborate

Students examine the one-year-calendar analogy and relate it to the dates on their activity sheets.

Evaluate

Students take a quiz covering all of lesson 4.

Engage (5 minutes)

1. Discuss the previous night's homework as a class, using the  [The Big Bang Homework Questions Teacher Answer Key](#) as a guide.
2. Ask students which cosmic events they would include if they were making a timeline of the history of the universe. Record their observations on the blackboard or overhead projector.

Explore (15 minutes)

1. Point out the timeline that you prepared and posted on the wall in advance. Explain that the approximately 15 billion years that have passed since the origin of the universe (the Big Bang) are represented on the 15-meter timeline. See the  [Cosmic Event Teacher Information Sheet](#) for more information.
2. Distribute the  [Cosmic Event Cards](#) and  [Representative Event Cards](#) to students. Ask these students to read the information on their Event Cards aloud to the class.
3. Allow the class to speculate on the placement of each event, keeping the discussions very brief. If desired, have students holding the cards stand in the appropriate place under the timeline. Then verbally reveal the date for each, using the  [Cosmic Timeline Teacher Answer Key](#). Instruct students to align themselves in a "living timeline" under the timeline on the wall, in the order the events occurred.
4. Because students will have a quiz on this information at the end of class, you may wish to postpone taping or tacking the event cards to the wall until the next day.

Explain (10 minutes)

1. Display the image: [Cosmic Event Dates](#) for students to refer to.
2. Distribute a copy of the  [Cosmic Timeline Student Activity Sheet](#) to each student. Have students record the dates and events on their activity sheets (while leaving the image: [Cosmic Event Dates](#) displayed).

NOTE: The  [Cosmic Event Teacher Information Sheet](#) provides detailed information about the events discussed.

# years ago*	Event
15 billion	The Big Bang
14.9997 billion	Atoms
14 billion	Stars and Galaxies Form
10 billion	Milky Way Galaxy
6 billion	Proxima Centauri
4.5 billion	Our Solar System Forms
4.4 billion	Moon
3.5 billion	Biological Fossil
1 billion	Multicelled Life
395 million	Animals On Land
330 million	Forests
270 million	Pangea
100 million	Pleiades

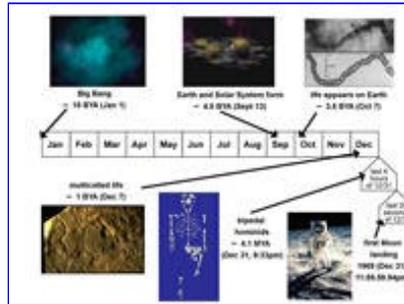
Elaborate (10 minutes)

1. Describe the calendar analogy. Using a one-year calendar as a prop (optional), ask students to imagine that their entire lives took place in one calendar year, with their birth occurring at the first instance on January 1st, and with the present time being the last moment on December 31st. In this analogy, if a person were currently twelve years old, what period of time would each month represent? (*Students should be able to answer that each month would be equal to a year of that person's life.*)

2. Now have students imagine that the calendar represents the entire span of time since the universe formed (the Big Bang). They can see from the timeline on the wall that this happened 15 billion years ago. Thus, each month on the calendar would be equivalent to 1.25 billion years.

3. Show the series of images: [Cosmic Calendar](#) to illustrate this analogy.

4. Have students add the calendar months to their [Cosmic Timeline Student Activity Sheet](#). Demonstrate the process for one month, using the [Cosmic Timeline Teacher Answer Key](#) as a guide.



Ex EXTENSION: Have students calculate the exact date and time of all the events if the events were to be placed on a one-year calendar that begins with the Big Bang (15 bya) being represented at the very start of January 1. See **Ex** [Cosmic Calendar Math](#) for more information

Evaluate (10 minutes)

1. Administer the quiz for this lesson: distribute a copy of the [Origin of the Universe Lesson Quiz](#) to each student. Collect quizzes when students have finished.
2. Remind students that they will be meeting in the computer lab during the next class session.
3. **OPTIONAL HOMEWORK:** Have students answer the following question on their own paper. Comment on the distribution of events. What do you notice about events in human history compared to cosmic events? Is this different from what you expected? Explain.

Materials	Preparation
<p>For Each Student</p> <ul style="list-style-type: none"> • Calculator (if you do the Extension calculation in Elaborate) <p>For Each Student Team</p> <ul style="list-style-type: none"> • None <p>For Teacher</p> <ul style="list-style-type: none"> • The Big Bang Homework Teacher 	<ol style="list-style-type: none"> 1. Prepare any necessary handouts and transparencies. Familiarize yourself with the media. For background information on the topics covered in this activity, review "The Science & Resources" section (accessed from the menu bar above). 2. See Setting Up an Event Timeline for instructions and ideas on timelines. 3. Print, laminate (optional), and cut out the Representative Event Cards and the Cosmic Event Cards. 4. Review the Cosmic Event Teacher Information Sheet for additional information about each event.

[Answer Key](#)

-  [Representative Event Cards](#)
-  [Cosmic Event Cards](#)
- Materials for Event Timeline (see [Setting Up an Event Timeline](#))
 - Roll of tape
 - Scissors
 - Calculator
 - String
 - Adding machine tape
-  [Cosmic Timeline Teacher Answer Key](#)
- *Ex*  [Cosmic Calendar Math](#)
-  [Origin of the Universe Lesson Quiz Teacher Answer Key](#)

Student Handouts

-  [Cosmic Timeline Student Activity Sheet](#)
(one per student)
-  [Origin of the Universe Lesson Quiz](#)
(one per student)

Student Reader Articles

- None

Media

- Image: [Cosmic Event Dates](#)
- Slideshow: [Cosmic Calendar](#)