

About the Activity

In the previous activity, 2.3, [Radioactivity](#), students learned about dating rocks and the age of the Earth. In this activity, students place major events in the history of the solar system, with a particular focus on events in the history of the Earth, on a cosmic timeline that stretches from the beginning of the universe (the Big Bang) to the present day. This activity provides students with a perspective on these major events and the Earth's place in them. In subsequent lessons, students will explore in more detail some of the major events noted on the timeline.

NOTE: This timeline activity has two options: one to use if you have not taught a previous VTT module, the other if you have. The timeline activity is an essential part of the Planetary Evolution module, and includes information on events presented in the Planetary Evolution activities.

Learning Objectives

After completing this activity, students will be able to:

- Determine and select the most important events in the history of the Earth and solar system.
- Order the sequence of these major events.

During the Activity

Activity Sequence in Brief

Engage

Students discuss what events to include on a planetary timeline.

Explore

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

Explain

Students record the correct dates and events on their activity sheets.

Elaborate

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

Evaluate

Students take a quiz covering all of Lesson 2 and write an answer to a question after reading a Student Reader Article.

Engage (5 minutes)

1. Ask students which events they would include if they were making a timeline on the history of the solar system and the Earth. Record their observations on the board or on an overhead.

Explore (15 minutes)

1. Point out the timeline that you have prepared and posted on the wall. Explain that approximately 15 billion years have passed since the origin of the universe (the Big Bang), this is represented on the 15-meter timeline.
2. If you have not previously done the Cosmic Module, distribute the  [Planetary Event Cards](#) and  [Representative Event Cards](#) to students. If you have done the Cosmic Module and already have the Representative Event Cards posted on the timeline, distribute the Planetary Event Cards only. Ask students to read the information on their Planetary Event Cards aloud to the class.

3. Allow the class to speculate on the placement of each event, keeping the discussions very brief, then display the image: [Planetary Event Dates](#). Instruct students to align themselves in a "living planetary timeline" under the timeline on the wall, in the order the events occurred.

Planetary Event Dates	
# years ago*	Event
15 billion	The Big Bang
14 billion	Stars and Galaxies Form
4.5 billion	Our Solar System Forms
3.5 billion	Biological Fossil
3.2 billion	Major Rifting in Valles Marineris
2 billion	Banded Iron Formations
1 billion	Multicelled Life
600 million	Venus Resurfaced
420 million	Animals On Land
400 million	Forests

NOTE: The  [Planetary Event Teacher Information Sheet](#) contains detailed information about the events discussed. You may want to share some of this information with your students.

4. Because students will have a quiz at the end of the class, you may wish to postpone taping or tacking the event cards to the wall until the next day.

Explain (10 minutes)

1. If desired, keep the image: [Planetary Event Dates](#) for students to refer to.
2. Distribute a copy of the  [Planetary Timeline Student Activity Sheet](#) to each student. Have students record the dates and events on their activity sheets.

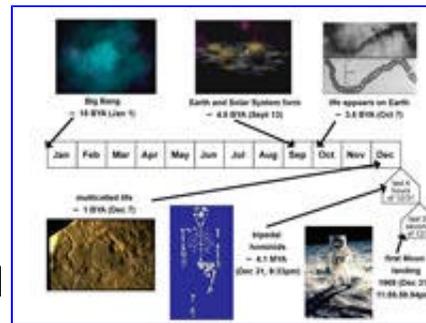
Elaborate (10 minutes)

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.)

- Now have students imagine that the calendar represents the entire span of time since the universe formed (the Big Bang). Point out that scientists think this happened sometime between 13 and 15 billion years ago. For ease of calculation we will use 15 billion years as the age of the universe, thus, each month on the calendar would be equivalent to 1.25 billion years. Mention to your students that research on the age of the universe is an area of active exploration with new information frequently adding to the debate.

- Show the slide show: [Cosmic Calendar](#) to illustrate this analogy. Note that clicking on the arrow keys under the Cosmic Calendar will lead to a series of calendar images with representative events put in their place on the calendar.



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

Ex EXTENSION: Have students calculate the exact date and time of all the planetary events if the events were to be placed on a one-year calendar. See [Ex Cosmic Calendar Math](#) for a complete description.

Evaluate (10 minutes)

- Distribute a copy of [The Planets Take Shape Quiz](#) to each student. Collect quizzes when students have finished.

Ex EXTENSION: Have students write a paragraph commenting on the distribution of planetary events on the timeline. Ask them to address the following questions: What do you notice about events in human history compared to planetary events? Is this different from what you expected? Explain.

- For homework, assign the Student Reader Article, "Supernova Shocks Seattle." If you have not done the Cosmic Module, explain to students that a **supernova** is the explosion of a star much larger and more massive than the Sun. Point out that the article talks about Earth movements that students will study in more detail in the next lesson. Write the following question on the board

What does the author of the article mean when he writes, "It is likely that a single supernova shook Seattle; it just took 4.6 billion years to do so."?

- Instruct students to record the question on their own paper and to answer it in complete sentences after they finish the Student Reader Article.

Ex EXTENSION: Earth's Cousins. If you have chosen to have your students complete the

project Earth's Cousins, this would be a good time to introduce the project and assign its first section, Interiors, as outlined in the [Ex !\[\]\(2bdfe261b986065ee0ac76460d6528c9_img.jpg\) About the Planetary Evolution Module Project Extension Activity: Earth's Cousins](#). Allow time to introduce the project using the [Ex !\[\]\(eebbd3dc1abeccf4c1e5751ec03fc559_img.jpg\) Extension: Earth's Cousins Project Student Activity Sheet](#), and for students to choose teams and project topics. You may also want to distribute a copy of the [Ex !\[\]\(269a46bd9f0c528dd4b0b2018aec306d_img.jpg\) Earth's Cousins Assessment Rubric](#) to each team. **NOTE:** The Earth's Cousins Project is comprised of 4 parts, each of which is on a separate page in the Student Activity Sheet. You may hand out all parts together in one packet, or hand out each part separately, as it is assigned.

Materials	Preparation
<p>For Each Student</p> <ul style="list-style-type: none"> • Pencil or pen • Pushpins (optional) • Tape <p>For Each Student Team</p> <ul style="list-style-type: none"> • None <p>For Teacher</p> <ul style="list-style-type: none"> • Ex  Representative Event Cards • Ex  Planetary Event Cards • One-year calendar (optional) • Materials for Event Timeline (see Setting Up an Event Timeline): <ul style="list-style-type: none"> ◦ Roll of tape ◦ Scissors ◦ Calculator ◦ String ◦ Adding machine tape • Ex  Planetary Timeline Teacher Answer Key • Ex  Cosmic Calendar Math • Ex  The Planets Take Shape Quiz Teacher Answer Key • Ex  About the Planetary 	<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 and cut out the Ex  Representative Event Cards (if this is your first timeline activity). 4. Laminate the cards, if desired. 5. Review the Ex  Planetary Event Teacher Information Sheet for additional information about each event.

[Evolution Module](#)
[Project Extension](#)
[Activity: Earth's Cousins](#)

-  [Earth's Cousins](#)
[Assessment Rubric](#)

Student Handouts

-  [Planetary Timeline](#)
[Student Activity Sheet](#)
-  [The Planets Take](#)
[Shape Quiz](#)
-  [Extention: Earth's](#)
[Cousins Project Student](#)
[Activity Sheet](#)

Student Reader Articles

- "Supernova Shocks
Seattle" by J. Craig
Wheeler, from
SPACE.com, March 5,
2001

Media

- Image: [Planetary Event](#)
[Dates](#)
- Slide show: [Cosmic](#)
[Calendar](#)