

About the Activity

In the previous activities, [The Genetic Record](#) and [The Rock and Fossil Record](#), students examined several types of evidence that scientists use to learn about the past — molecular information and the fossil record. Now students see how this information is integrated to form a picture of the past in 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 the origin of life within this vastly longer time scale. In subsequent lessons, students explore in more detail some of the major events noted on the timeline. The activities in this lesson provide the background students need before they begin studying the idea of a universal ancestor in the next lesson, [Life Gets Started](#).

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 Origin of Life module, and includes information on events presented in the Origin of Life activities.

Learning Objectives

After completing this activity, students will be able to:

- Suggest a few of the most important events in the origin and early history of living things on Earth.
- Order the sequence of these major events.

During the Activity

Activity Sequence in Brief

Engage

Students discuss what events to include on a timeline of living things.

Explore

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

Explain

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

Elaborate

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

Evaluate



Students describe their reactions to the time span covered by the

timeline.


Engage (5 minutes)

1. Ask students which events they would include if they were making a timeline of the origin and early history of living things on Earth. Record their observations on the blackboard or overhead projector.

Explore (10 minutes)


1. Point out the timeline that you prepared and posted on the wall in advance. 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 a VTT Module, distribute the  [Representative Event Cards](#) and the  [Origin of Life Event Cards](#) to students. If you have done a previous VTT Module and already have the Representative Event Cards posted on the timeline, distribute the Origin of Life Event Cards only. Ask students to read the information on their Origin event cards aloud to the class.
3. Allow the class to speculate on the placement of each event, keeping the discussions very brief, then reveal the date for each, displaying the image: [Origin of Life Event Dates](#). Instruct students to align themselves in a "living timeline" under the timeline on the wall, in the order the events occurred.

| # years ago* | Event |
|--------------|---------------------------|
| 15 billion | The Big Bang |
| 14 billion | Stars And Galaxies Form |
| 4.5 billion | Our Solar System Forms |
| 4.5 billion | Beginning of Bombardment |
| 4.0 billion | Surface Water |
| 3.85 billion | Chemical Evidence of Life |
| 3.8 billion | End of Bombardment |
| 3.5 billion | Biological Fossil |

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

4. If you have more than one class doing this activity, you may wish to postpone taping or tacking the event cards to the wall until all of your classes have done the activity.

Explain (10 minutes)

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

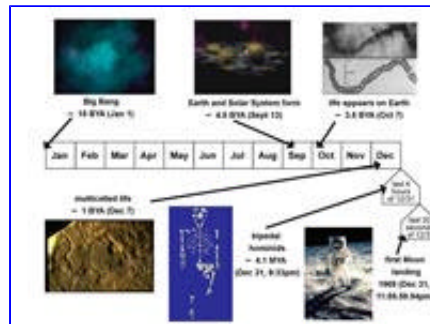
Elaborate (10 minutes)

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 [Origin of Life Timeline Student Activity Sheet](#). Demonstrate the process for one month, using the [Origin of Life 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 a complete description.

Evaluate (5 minutes)

- Write the following assignment on the board. Have students copy it onto their own paper.

"Comment on the distribution of events on the timeline. What do you notice about events in the history of early life on Earth compared to cosmic events? Is this different from what you expected? Explain."

If students don't have time to complete their responses in class, assign it for homework.

| Materials | Preparation |
|---|---|
| <p>For Each Student</p> <ul style="list-style-type: none"> • None <p>For Each Student Team</p> <ul style="list-style-type: none"> • None <p>For Teacher</p> <ul style="list-style-type: none"> •  Representative Event Cards •  Origin of Life Event Cards •  Origin of Life Events Teacher Information Sheet •  Origin of Life Timeline Teacher Answer Key •  Cosmic Calendar Math <p>Student Handouts</p> <ul style="list-style-type: none"> •  Origin of Life Timeline Student Activity Sheet <p>Student Reader Articles</p> <ul style="list-style-type: none"> • None <p>Media</p> <ul style="list-style-type: none"> • Image: Origin of Life Event Dates • Slide Show: Cosmic Calendar | <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  Representative Event Cards (if this is your first timeline activity). Print and cut out the  Origin of Life Event Cards. 4. Laminate all of the event cards, if desired. 5. Review the  Origin of Life Events Teacher Information Sheet for additional information about each event. |