



Young Astronomers

Cosmic Calendar

Classroom Activity – After visiting the Observatory

Overview

Age Range:

13-16 years

Lesson Time:

45 min - 1 h

Cost per activity:

-

Includes the use of:

pen, old wall calendar (any year)

Outline

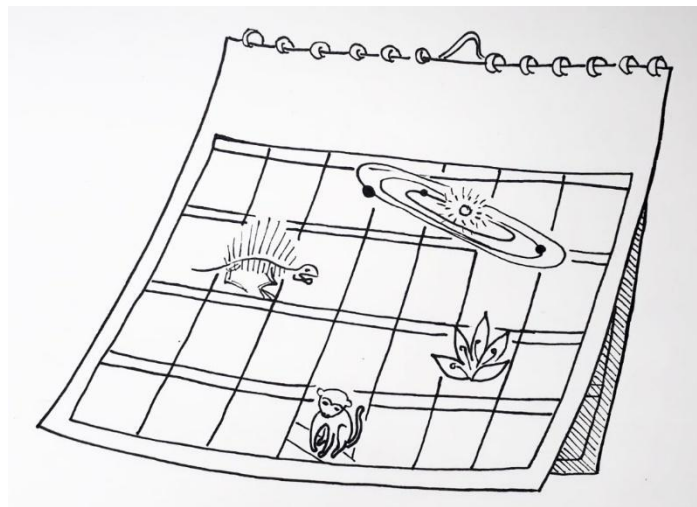
Turn an old wall calendar into a timeline of the universe!

In this assignment, you will try to fit the entire history of the universe from the Big Bang to present day into one calendar year from January to December.

Were you surprised to see how late humans enter the picture?

Pupils will Learn:

- Key events and timescales of our universe, the Earth and the evolution of life.
- Humans only show up in the cosmic story at the very end of the “year”.



The online observatory collaboration consists of the following partners:

Baldone Observatory, Brorfelde Observatory, Cardiff University, Harestua Solar Observatory, Helsinki Observatory



Lesson Plan:

Description	Time	Notes
Introduction to the subject	5 min	
Activity 1	35-50 min	Each pupil (or each pair/group) needs one wall calendar into which the events are marked.
Assessment	5 min	

Introduction to the subject:

When we think about past events in the universe, it may be difficult to understand how huge and ancient the universe is, and how short the time of human existence is.

Introduce the assignment by discussing the following questions with the pupils:

- If you could travel through time, where/when would you go? An important event in human history, the time of the dinosaurs, or even the early Earth? Would you dare to take a peek at the Big Bang? How much would you have to turn the dial in your time machine?

[Think back to history class to remember some historical events! The Earth was created along with the rest of the Solar System from matter floating in space approximately 4,5 billion years ago. All of the universe came to be in the Big Bang 13,7 billion years ago.]

Activity 1:

1. Ask the pupils to take out an old wall calendar or another calendar template. Explain that in this assignment you will imagine that the Big Bang was on January 1 and the calendar ends in present day.
2. The table below features the dates important past events would fall upon if the entire history of the universe were thought of as a single year. Mark them in your calendars on the actual dates! If you want, you can also draw pictures of the events.

Event	How many years ago	Date in your calendar
The Big Bang	13,7 billion years ago	1.1. at 0:00



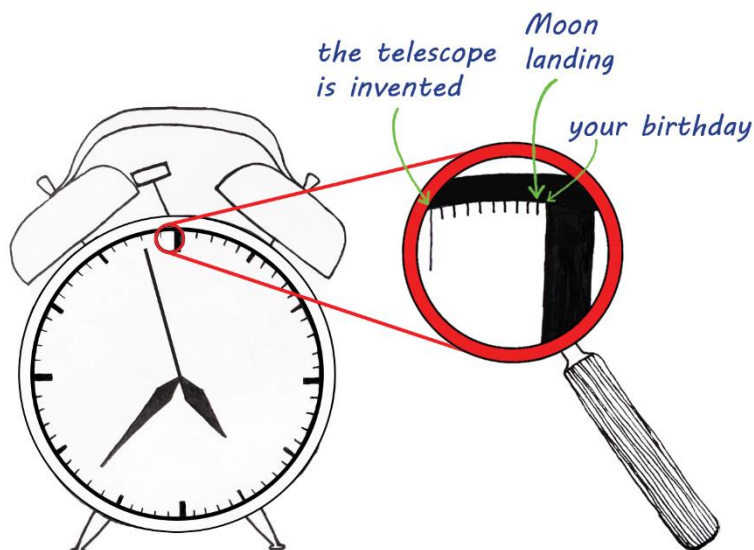
First atoms	about 13,7 billion years ago (380 000 years after the Big Bang)	1.1. at 00:15
First stars	13,5 billion years ago	6.1.
First galaxies	13 billion years ago	22.1.
The Milky Way (the galactic disk) is formed	9 billion years ago	6.5.
The Solar System (and the Earth) is formed	4,56 billion years ago	1.9.
The Moon is formed	4,5 billion years ago	3.9.
Life appears on Earth	3,8 billion years ago	21.9.
Oxygen appears in the atmosphere	2,4 billion years ago	19.10.
First cells develop	2 billion years ago	9.11.
First multicellular organisms	0,8 billion years ago	5.12.
First vertebrates	520 million years ago	18.12.
Life moves from the sea to land	400 million years ago	21.12.
First dinosaurs	230 million years ago	26.12.
First mammals	200 million years ago	27.12.
Asteroid impact ends the time of the dinosaurs	65 million years ago	30.12.
First hominids	15 million years ago	31.12. at 06:05
Early humans invent rudimentary stone tools	2,5 million years ago	31.12. at 22:24

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Humans use fire	400 000 years ago	31.12. at 23:44
First modern humans	200 000 years ago	31.12. at 23:52
Neanderthals die out	40 000 years ago	31.12. at 23:58
End of the last Ice Age, agriculture invented	10 000 years ago	31.12. at 23:59:37
Wheel invented	6500 years ago	31.12. at 23:59:45
Egyptian pyramids, writing	about 5000 years ago	31.12. at 23:59:48
Ancient Roman Empire	about 2000 years ago	31.12. at 23:59:55
Telescope invented	about 400 years ago	31.12. at 23:59:59
First human on the Moon	about 50 years ago	31.12., one tenth of a second before the New Year
You were born	about 10-15 years ago	31.12., a couple of hundredths of a second before the New Year
NOW	0 years ago	Happy New Year!



The magnifying glass shows the final second of the final day in your calendar. In this scale, the last second contains the events from the past 400 years, from the invention of the telescope to now. Credit: Saara Seppälä.

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Further Activities:

If you want, you can collect more events from the history of the universe into your calendar!

Timescale:

- 437,5 years = 1 second in your calendar
- 1,575 million years = 1 hour in your calendar
- 37,8 million years = 1 day in your calendar

Assessment:

- Were you surprised at the timeline for certain events? [For example, how late humans appear?]

Background Material/Knowledge:

- The basic knowledge of clock and calendar
- Large numbers (thousand, million, billion)
- Decimals
- Basic understanding of the events in the universe and historic human events may serve as inspiration.