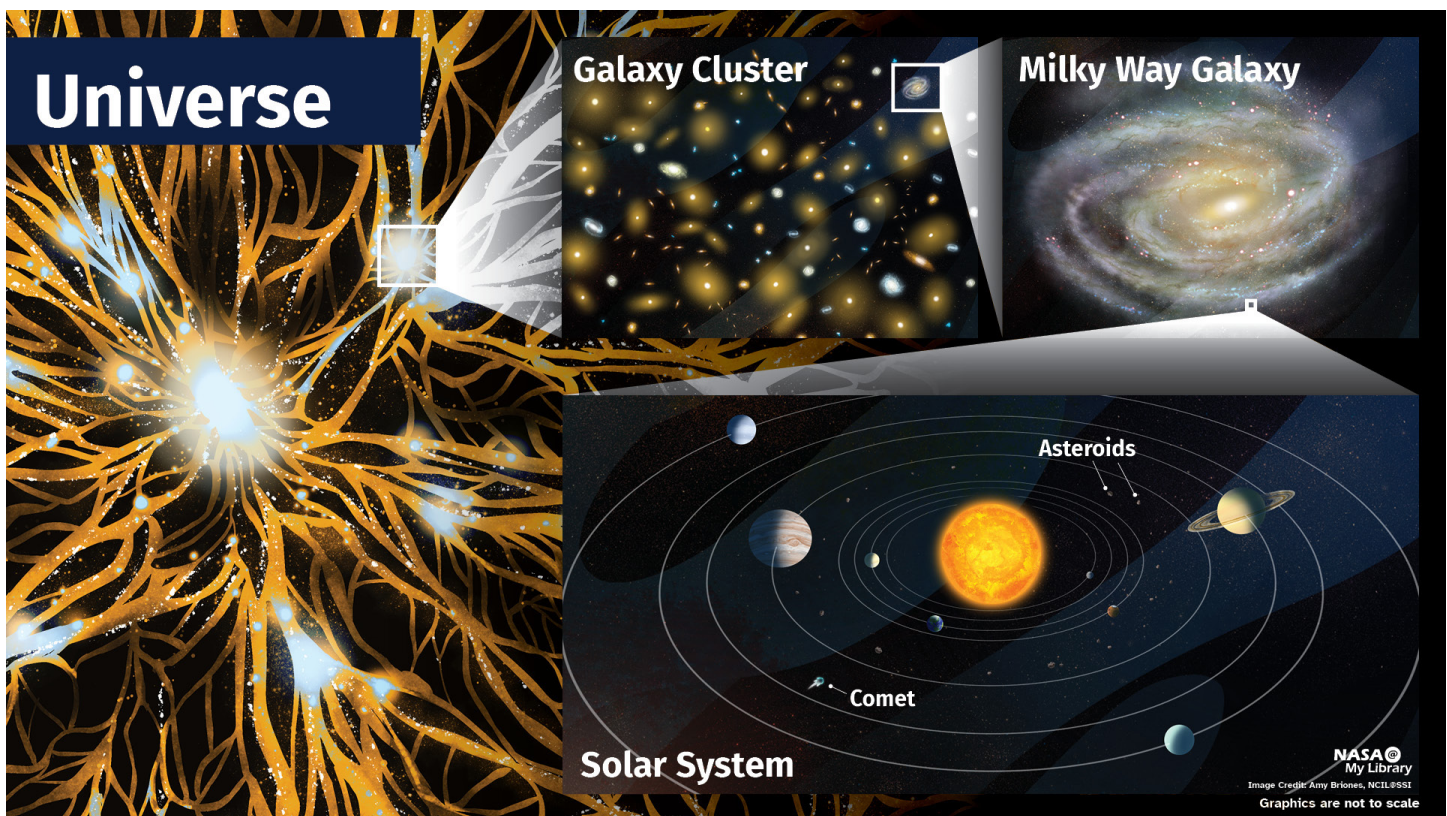


Common Confusions in Astronomy

Misconceptions and Educational Research

- Many people confuse the terms [solar system](#), our [galaxy](#), and the [universe](#). They may think that items in our galaxy (such as black holes and star clusters) exist in our solar system, or that these all formed at the same time. (In actuality, our [solar system formed 4.56 billion years ago](#), while our universe was born from the Big Bang about 13.5 billion years ago.)
- Some people may confuse the terms [star](#), [Sun](#), [planet](#), and galaxy. These terms should not be used interchangeably.
- Many people are confused with scale and distances; they may think that a rocket trip to Mars would take a few days (it takes many months), or that other stars or galaxies are much closer than they really are.
- Many people are confused about our universe. They may think that it has a center and an edge and is expanding into existing space. In reality, the universe incorporates all space, including the space that is expanding.
- Most people do not know much about the planets and other objects in our solar system, and may be confused about their sizes, distances, and characteristics. Consider this [scale model](#) to visualize the relative size and distance of objects in our solar system.

Graphic showing universe, galaxy cluster, milky way galaxy, and solar system in relation to one another. Click the image below for letter and tabloid sized prints of the graphic.



Other resources on this topic:



[The James Webb Space Telescope and the Big Bang: A Q&A with Nobel Laureate Dr. John Mather](#)

M. Masetti (2016) NASA Goddard Space Flight Center, Astrophysics Science Division Blueshift

[Imagine the Universe: Big Questions Website](#)

This site for students and adults by the High Energy Astrophysics Science Archive Research Center at NASA Goddard Space Flight Center includes a variety of answers using common language to complex astronomical questions.

[Beyond the Solar System Video Series](#)

A video series, produced by the Harvard-Smithsonian Center for Astrophysics for NASA, to provide resources to science educators looking to explore the Earth and space with their students.

[The Solar System in Its Universal Context: Ideas, Misconceptions, Strategies, and Programs to Enhance Learning](#)

J.A. Grier, E.L. Reinfeld, M.E. Dussault, S.J. Steel and R.Gould, Universe Forum, LPSC XXXVI

The study's data suggests that some of the misconceptions relating to the size of the solar system, placement, distance, scale and hierarchy of astronomical objects are introduced or reinforced by not including the solar system in a consistent, coherent picture within the rest of the galaxy and universe.

[The Astronomy and Space Science Concept Inventory: Development and Validation of Assessment Instruments Aligned with the K-12 National Science Standards](#)

P. Sadler, H. Coyle, J. Miller, N. Cook-Smith, M. Dussault, R. Gould (2010) Astronomy Education Review. This report outlines the development of an item test bank and instruments on astronomy and space science concepts.