

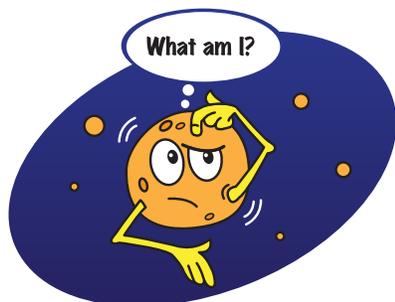


Asteroids: Space Rocks with a Story

What are asteroids?

Many asteroids are hunks of space rock that orbit the Sun like planets; however, they are smaller than planets, often irregularly shaped, and in almost all cases, probably have no atmosphere.

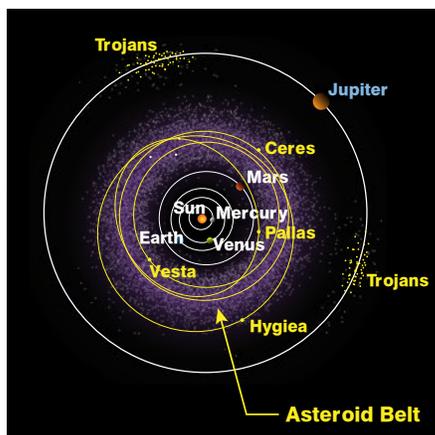
Asteroids range in size from nearly 600 miles in diameter to the size of pebbles. Sometimes, the gravity of nearby planets flings these asteroids out of their regular orbit to elsewhere in the Solar System—sometimes sending them on a collision course with planets.



Where can they be found?

Most asteroids reside in a region known as the main asteroid belt, located between the orbits of Mars and Jupiter. This region is thought to consist of the remains of material that never clumped together to form a planet due to the strong gravity of nearby Jupiter.

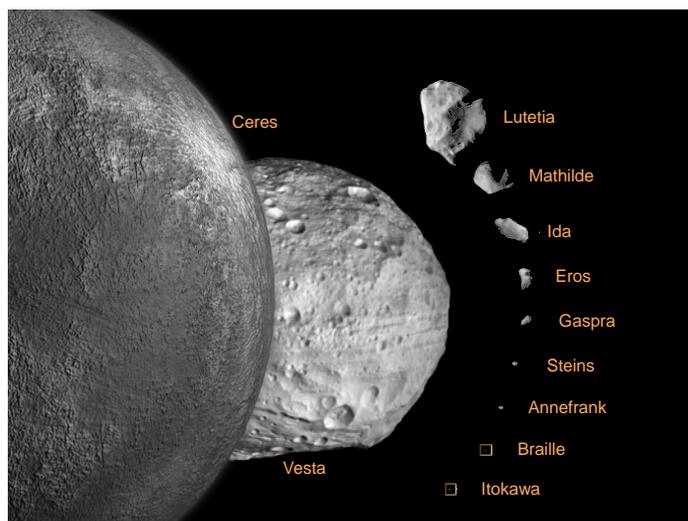
Not all asteroids are in the asteroid belt. Asteroids called trojans share the orbital path of a planet—orbiting at the same speed, never coming into contact with one another. Jupiter has the most trojans, but Neptune, Mars, and Earth have some too. Other planets may have them as well.



Another group of asteroids called near-Earth asteroids are found close to the Sun and Earth. Scientists believe most near-Earth asteroids were jolted out of the asteroid belt by the gravity of nearby objects and planets.

Are all asteroids the same?

Nope. The most common asteroids are dark and probably consist of clay and different kinds of rocks. Others have metals, like nickel and iron. The asteroids have these different characteristics because they formed at different distances from the Sun.



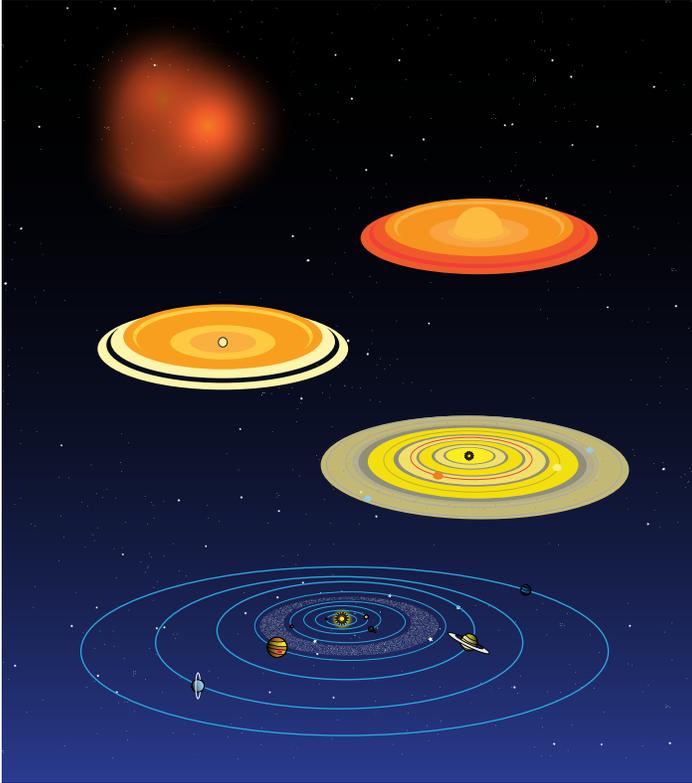
How were asteroids discovered?

In 1772, astronomer Johann Elert Bode predicted that a planet existed between the orbits of Mars and Jupiter based on a mathematical pattern that seemed to correctly predict the location of all the other known planets—except in two places. In 1781, one of those places was filled by the discovery of Uranus. With Bode's prediction looking more likely, the hunt was on for Bode's missing planet. In 1801, Guiseppe Piazzi appeared to find it when he discovered a large spherical body that he named Ceres. The only problem? Three more "planets" were discovered between 1801 and 1807 in the same region.

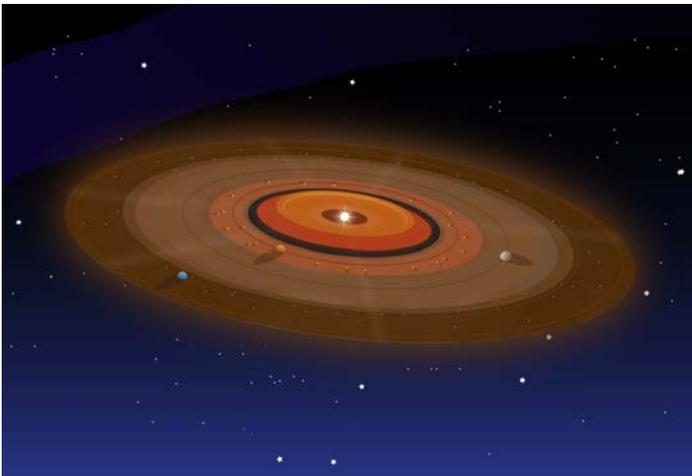
As decades passed, many other objects would continue to be discovered in that area. All these "planets" were much smaller than any other planet. As more of these "minor planets" were found, astronomers realized they had found something new—a belt of many objects tinier than planets. They had discovered asteroids. In a sense, this asteroid belt was the missing planet they were looking for, the remains of material that could have—but never did—become a planet.

How did asteroids form?

Approximately 4.6 billion years ago, a vast cloud of gas and dust collapsed, creating a chain of events leading to the formation of our solar system. Most of the material fell to the center of the cloud and formed the Sun—that's where most of the stuff in our solar system remains to this day.



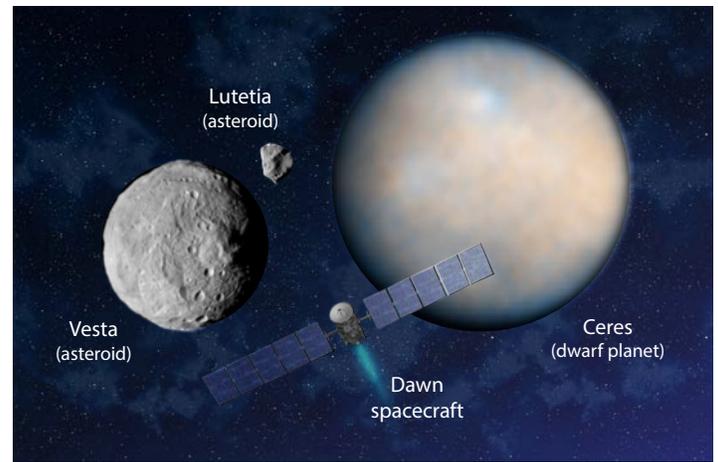
Leftover particles of dust elsewhere in the condensing cloud grew to become rocks and planets, but some of the particles remained in the asteroid belt. If all the material in the asteroid belt were to fit into one planet, that planet would be smaller than the Moon.



What is so interesting about asteroids?

People may think asteroids are just tiny chips of space rock, but some asteroids are large and planet-like with a range of rocky and icy material. These “space rocks” can reveal information about the processes that led to the formation and evolution of our solar system. People want to know more about asteroids because a very small number of them have a tiny chance of crashing into Earth.

NASA is interested in learning all about the location, formation, and composition of asteroids and has already sent a mission called Dawn to study Ceres and Vesta. They are the two largest asteroids. They are quite different from each other. Dawn visited Vesta first, orbiting and studying it for 14 months. It found Vesta to be a dry world. Then, Dawn left Vesta and travelled to Ceres, going into orbit around that icy, possibly watery, world. Vesta and Ceres will give scientists clues about the planet-forming conditions at the “dawn” of our solar system and help us learn more about these fascinating “minor planets.”



More asteroid fun:

Make asteroids you can eat!

<http://spaceplace.nasa.gov/asteroid-potatoes>

Poster: Comets vs. Asteroids. Download it at

<http://spaceplace.nasa.gov/posters/en/#solarsystem>

How did our solar system form? An animated explanation at <http://spaceplace.nasa.gov/solar-system-formation>