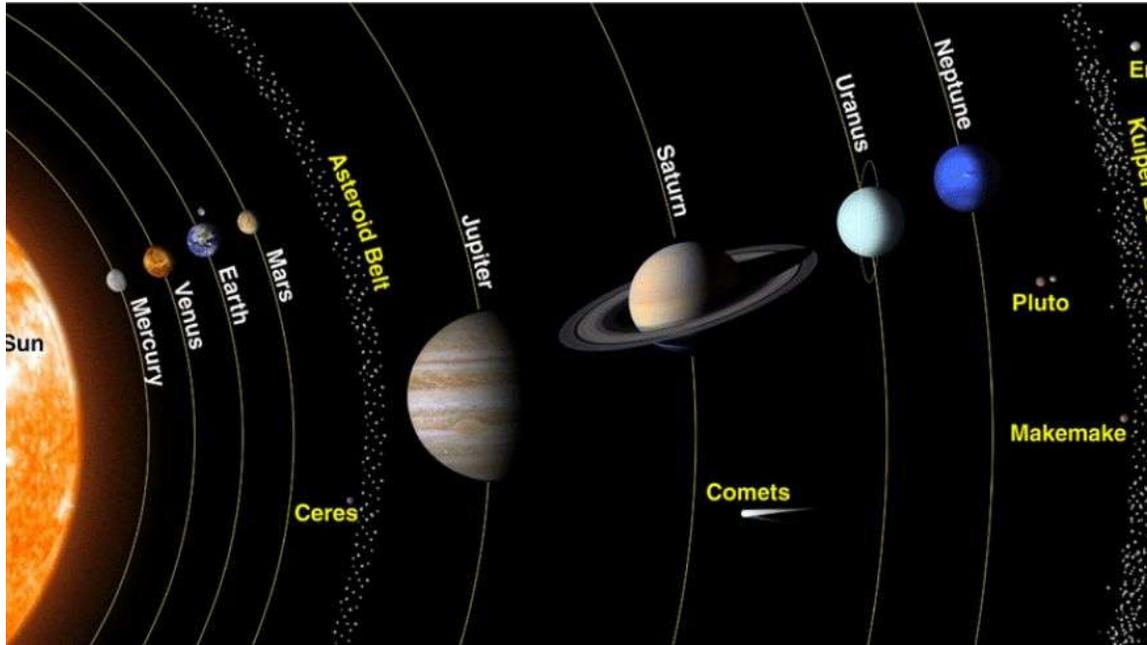


The Asteroid Belt is no place to build a planet!



The Asteroid Belt lies between giant Jupiter and Mars. The rocky bits we now call asteroids could have coalesced into a planet were it not for the gravitational tug-of-war between Jupiter and Mars.

The first thing we should establish is the difference between an asteroid and a comet. In the very simplest terms an asteroid is a chunk of rock that orbits the Sun and is within our solar system. A comet is a giant dirty snowball that is pulled in from a very distant area called the Oort Cloud. This huge cloud of icy debris engulfs our solar system.

Asteroids orbit the Sun on the same plain as the rest of the planets. Comets on the other hand can come at us from all directions including above and below. Comets also can have tails due to the fact that they melt as they get closer to the Sun. What we see is sunlight reflecting off the comet's vapour trail. Other than to show up on radar, an asteroid gives no hints that it is headed in our direction – until it slams into us.

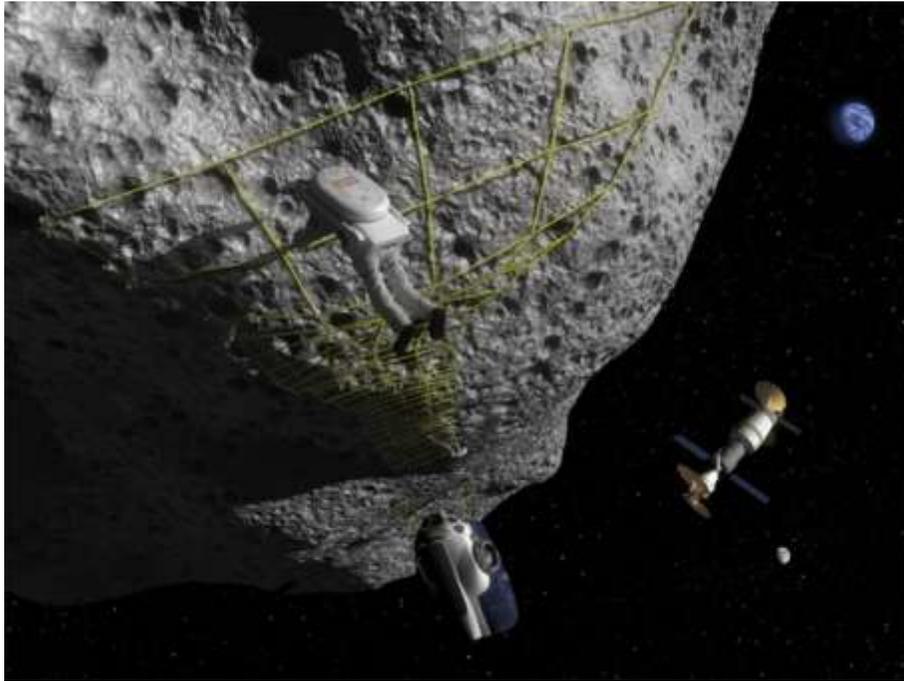
Current thinking holds that there should be a planet filling the gap between Mars and Jupiter. With a bit of imagination there is, only some assembly is required. The problem is the asteroids just can't get together to form a planet when Jupiter's incredible gravitational pull keeps tearing them apart. If they could overcome this they would be able to form a planet four times the size of Earth.

Instead the asteroids continue to orbit the Sun in a ring we call the Asteroid Belt. There are nearly 200 asteroids in this belt that are larger than 100km across and astronomers estimate that there are 750,000 more that are at least one km in diameter.

For the most part the smaller asteroids hold to their orbits. About once in a billion years one gets bumped out of orbit and can head in our direction. That's a bad thing; just ask any dinosaur – if you can find one.

Despite what the science fiction movies show, the average distance between asteroids can be up to a million kilometres. So those images you see of asteroids in big

clusters are highly exaggerated in depicting the Asteroid Belt. In reality navigating a spacecraft between them is child's play for a rocket scientist.



In the near future astronauts could be mining minerals from nearby asteroids and returning the cargo to Earth. It may not be as exciting as aliens or an impending asteroid impact, but it is much more likely.

In addition to harvesting asteroids for rare minerals, we can also harvest them for knowledge. Asteroids have been around for as long as our solar system (4.5 billion years) and are still in pristine condition, they contain secrets to how our solar system formed.

In 2003 JAXA, the Japanese Space Agency launched the Hayabusa mission to asteroid Itokawa. It collected samples of the asteroid and returned them to Earth in 2010.

Hopefully all of our encounters with asteroids will be as peaceful and rewarding.

Shown at the right is asteroid Vesta. It is the brightest and second largest asteroid in the Asteroid Belt. Image was taken by NASA's Dawn Spacecraft.

