

## Asteroids

Our solar system is dominated by the Sun in the centre with nine planets in orbit around the Sun. There are also numerous smaller objects in the solar system, and one group of smaller objects is called **asteroids** or **minor planets**. Asteroids are rocky bodies, and they are believed to be debris from a failed planet that tried to form between the orbits of Mars and Jupiter.

The first asteroid was discovered by the Italian astronomer Giuseppe Piazzi in 1801. This asteroid, called 1 Ceres, turned out to be the largest asteroid with a diameter of about 933 kilometres. Within a few years, several more asteroids were discovered. The next largest asteroids are 2 Pallas, 4 Vesta, and 10 Hygiea, with diameters between 400 and 525 kilometers. All other known asteroids have diameters less than 340 kilometres, and most are only a few kilometres or less across. The total mass of all asteroids is less than that of the Moon. More than 15,000 asteroids have been catalogued. It is estimated that there may be as many as a half million to one million asteroids in the solar system.

When a potential asteroid is first discovered, it is given a temporary name using the year of its discovery plus two letters (AA, AB, AC, ... etc.). After the asteroid's orbit has been well defined, it is given a permanent number and a name (e.g. 243 Ida, 253 Mathilde, 433 Eros).

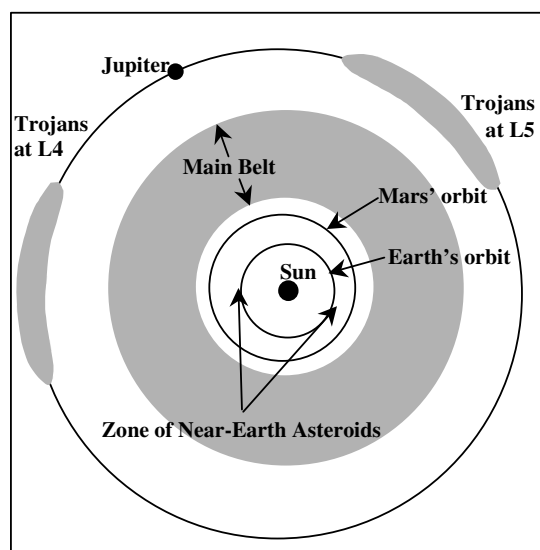
The vast majority of asteroids orbit around the Sun between the orbits of Mars and Jupiter and these are called the **Main Belt** asteroids. The Main Belt is located roughly 2 to 4 astronomical units (AU) from the Sun (1 AU is the average distance from the Sun to Earth and this is about 150 million kilometres). Mars is at 1.5 AU and Jupiter is at 5.2 AU from the Sun (see diagram).

Another group of asteroids are the **Near-Earth Asteroids** (NEA). Though NEA's are fewer in number, they are more important for the inhabitants of Earth. These asteroids closely approach Earth's orbit and pose a collision risk with Earth. This risk is very small. However, there is extensive geological evidence to show that Earth has been struck by asteroids (or

comets) in the past. There is a concerted effort by astronomers to locate all NEA's greater than one kilometre in size. About 1,990 have been identified.

The third major group of asteroids are the **Trojans**, which are located 60 degrees ahead and 60 degrees behind Jupiter in its orbit. These are Jupiter's Lagrange 4 and 5 (L4 and L5) points where objects are relatively stable because of the gravitation balance between Jupiter and the Sun.

The larger and brighter asteroids can be seen using binoculars or small telescopes. Asteroids do not generate their own light, but rather reflect a small portion of sunlight. Through binoculars and telescopes, asteroids appear as faint starlike objects. As asteroids orbit the Sun, they appear to move relative to the star background. You will need current star maps that show the paths of asteroids. Use a detailed star map to locate reference stars and the object that may be the asteroid. To confirm that you have found the asteroid, observe the same star field the next night, and see if the object has moved relative to the rest of the star field. Making a sketch of the star field and asteroid on a piece of paper can help. So next time you are under the stars, check out a minor planet. There are lots to choose from.



Written by Barry Olson

Lethbridge Astronomy Society, P.O. Box 1104, Lethbridge, Alberta, CANADA T1J 4A2

Tele: (403)-381-7827 E-mail: lasa@telusplanet.net Web page: <http://www.lethbridgeastronomysociety.ca/>

Oldman River Observatory, West Lethbridge, Alberta, CANADA