Asteroids are rocky fragments left over from the formation of the solar system about 4.6 billion years ago. Most asteroids orbit the Sun in a belt between Mars and Jupiter. Scientists think there are probably millions of asteroids, ranging widely in size from hundreds of kilometers across to less than one kilometer (a little more than one-half mile) wide.

Occasionally, asteroids' orbital paths are influenced by the gravitational tug of planets, which cause their paths to alter. Scientists believe stray asteroids or fragments from earlier collisions have slammed into Earth in the past, playing a major role in the evolution of our planet.

**Near-Earth Objects**

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| --- | --- | --- | --- |
| |  | | --- | | near-Earth Object | | Artist's concept of possible mining and study of near-Earth objects. | | Some asteroids and comets follow orbital paths that take them much closer to the Sun and therefore Earth -- than usual. If a comet or asteroids approach brings it to within 1.3 astronomical units of the Sun, we call it a near-Earth object. [One astronomical unit is close to the mean distance between the Sun and Earth approximately 150 million kilometers (about 93 million miles).] Near-Earth objects may provide needed raw materials for future interplanetary exploration. Some should also be fairly easy to land on for future exploration. |

**Potentially Hazardous Objects**

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| Potentially Hazardous Objects |
| Artist's concept of potentially hazardous object near Earth. |

A relatively small number of near-Earth objects pass close enough to Earth and are large enough in size to warrant close observation. Thats because the gravitational tug of the planets could, over time, cause an objects orbital path to evolve into an Earth-crossing orbit. This allows for the possibility of a future collision.

Potentially hazardous asteroids are about 150 meters (almost 500 feet) or larger, roughly twice as big as the Statue of Liberty is tall. They approach Earth's orbit to within 7.5 million kilometers (about 4.6 million miles). By comparison, when Mars and Earth are at their closest, they are about 53 million kilometers (about 33 million miles) apart.

Potentially hazardous comets also get unusually close to Earth.

Knowing the size, shape, mass, composition and structure of these objects helps determine the best way to divert one, should it have an Earth-threatening path.

<https://cneos.jpl.nasa.gov/ca/>

An **asteroid's absolute magnitude** is the visual **magnitude** an observer would record if the **asteroid** were placed 1 Astronomical Unit (au) away, and 1 au from the Sun and at a zero phase angle.

<https://cneos.jpl.nasa.gov/glossary/>