

9.8: Asteroid Classification

There are three major groups of asteroids, based on where they orbit in the solar system.

Main Asteroid Belt

Asteroids orbiting between Mars and Jupiter. This contains the majority of known asteroids and is estimated to have 1 to 2 million asteroids and a significantly higher number of smaller pieces (meteoroids and dust). These were most likely formed due to the gravitational attraction of Jupiter and experienced many collisions.

Trojan Asteroids

Asteroids share an orbit with a larger planet. The Trojan Asteroids do not collide with the planet because of where the Trojan asteroids orbit the sun in relation to the parent planet. Jupiter has the largest number of Trojan asteroids discovered to date.

Near-Earth Asteroids (NEAs)

Finally, there are the **Near-Earth Asteroids or NEAs** ; these asteroids pass close to Earth. About 10,000 NEAs have been discovered to date. And over 1,400 have been classified as **Potentially Hazardous Asteroids or PHAs** ; those asteroids that could pose a threat to Earth. PHAs come closer to Earth than about 5 million miles.

PHAs are being discovered all of the time, so the number of known PHAs continue to grow. None of the known potentially hazardous asteroids are on a collision course with Earth... **with one possible exception**. Astronomers employ the **Torino Scale** for categorizing the impact hazard associated with PHAs; the scale ranges from 0 to 10, with 0 being no chance and 10 being 100% chance of collision.

Asteroid 99942 Apophis was discovered in 2004, originally it was called 2004 MN4. The diameter of Apophis is approximately 325 meters or 1,066 feet. Apophis will pass dangerously close to Earth in 2029 and 2036. Observations and orbital calculations show there is no chance of impact during either of these close passages.

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