

# LEARN - What are Potentially Hazardous Asteroids?

## Learning Objective:

Learn why monitoring potentially hazardous asteroids is necessary to confirm or rule out the chances of an impact in the future.

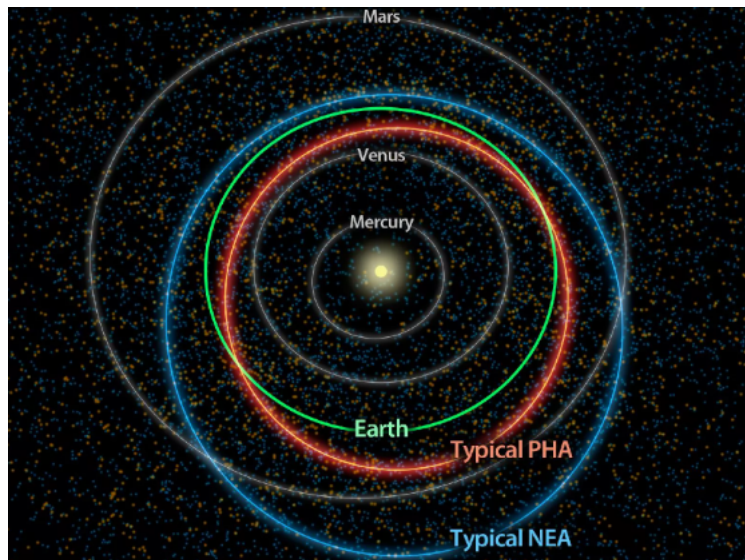
## Overview:

Scientists have created a special category called Potentially Hazardous Asteroids (PHAs) to help them prioritise the observation and monitoring of the space rocks that come very close to Earth. Scientists have ruled out the risk of them impacting Earth in the next century after carefully analysing their orbital data.

## Specifics:

Potentially Hazardous Asteroids (PHA) are a subcategory of [Near-Earth Asteroids](#). British astronomer Brian Marsden coined the term in 1995 during a United Nations conference, with the goal of alerting astronomers about the most important NEAs that need to be observed for refinement of orbital data.

To be classified as a PHA, an asteroid must have a minimum orbit intersection distance of less than 0.05 astronomical units (equivalent to 7.5 million km) or 19.5 lunar distances. One lunar distance equals about 384,400 km.



In addition, an asteroid needs to have an estimated minimum size of 100 metres. This size limit was established because when entering the earth's atmosphere, the asteroid may not completely disintegrate and can consequently cause local or regional damage with its impact on the surface.

Given the impossibility of going to each of these asteroids to measure them precisely, astronomers estimate their size with the help of certain parameters. One of them is the absolute magnitude, which is the measure of brightness that an asteroid would have if it were 1 astronomical unit away from the observer and from the Sun.

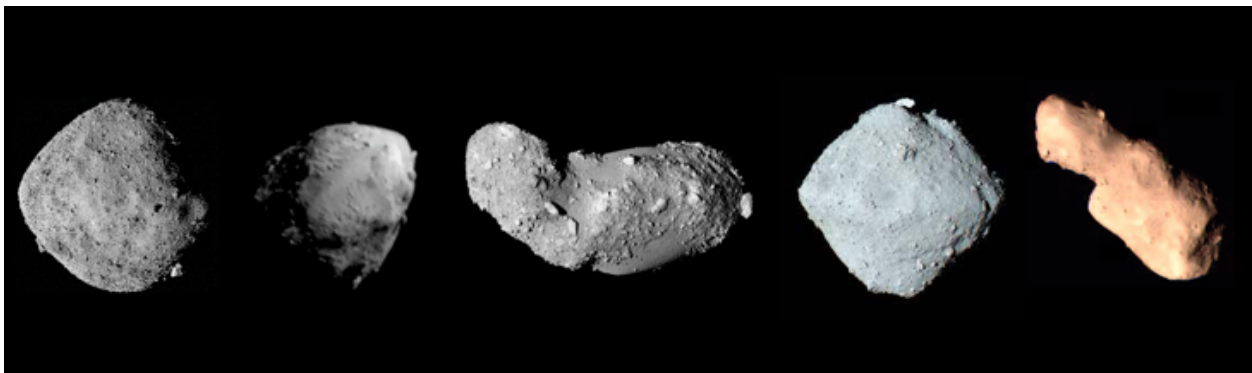
The other parameter is the albedo, defined as the ratio between the light received and reflected by that asteroid. The Minor Planet Center has a [ready-made table](#) with asteroid diameter estimates based on absolute magnitude and albedo. The JPL Center for NEO Studies (CNEOS) has also [created an estimator](#) where one can enter these parameters to get the estimated diameter of the asteroid.

The definition of minimum size is based on visual magnitude of the asteroid since the size is usually not known except very broadly. For a reflectivity (albedo) of 14%, the minimum diameter is around 140 meters.

However, NEAs just 20 meters across (like the Chelyabinsk object that struck in 2013 and sent over a thousand people to the hospital) can be very damaging even though exploding in the atmosphere. The extremely destructive Tunguska impact a little over a century ago was caused by impact of a body roughly 50 meters across. So the technical definition of PHAs was made before the extent of destruction by smaller bodies was appreciated.

**Most known PHAs:** Based on the criteria above, the first PHA was [\(1862\) Apollo](#), discovered in 1932 and its name was later given to [a subgroup of NEOs that cross Earth's orbit](#). (101955) Bennu, (65803) Didymos, (25143) Itokawa, (162173) Ryugu, and (4179) Toutatis are examples of PHAs that were directly explored by space probes. Asteroid (99942) Apophis and [active asteroid](#) (3200) Phaethon are PHA targets for future missions.

Overall, monitoring PHAs is an important task to ensure the safety of our planet. While the concept of potentially hazardous asteroids can be alarming, it's important to understand that astronomers and scientists are actively working to detect and monitor these objects to ensure our safety.



Learn more about this subject by visiting these websites:

[List Of Potentially Hazardous Asteroids \(PHAs\) - Minor Planet Center](#)

[Updated Discovery Statistics - Near-Earth Asteroids \(NEAs\) - CNEOS/JPL](#)

[Potentially Hazardous Asteroids - Space Reference](#)

[How Does NASA Spot a Near-Earth Asteroid? \(VIDEO\)](#)