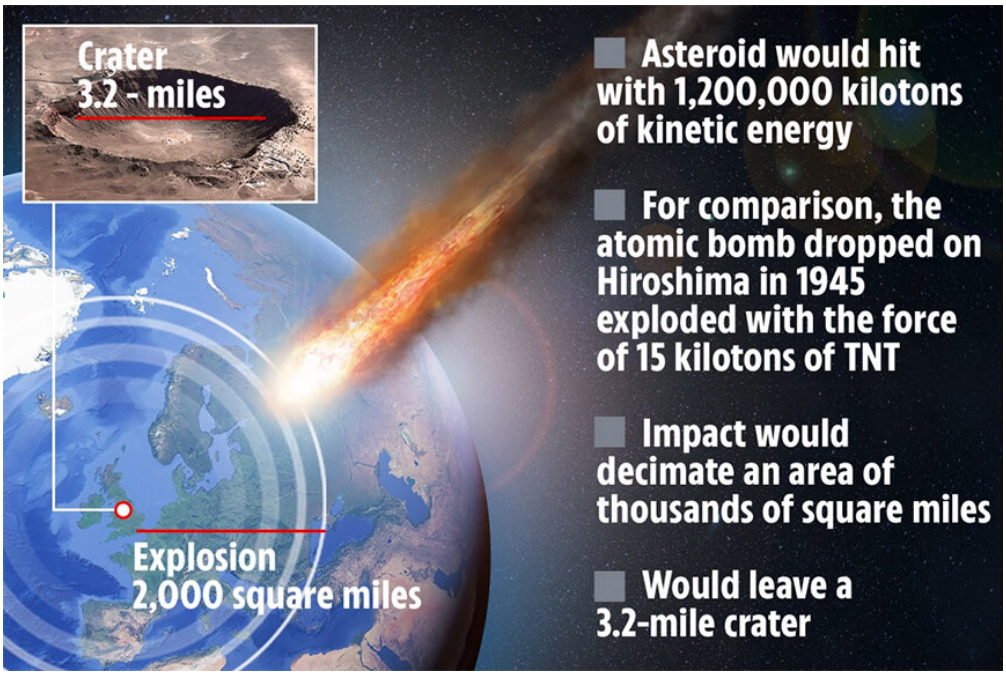
Asteroid Apophis

Why in News

Recently, the **National Aeronautics and Space Administration (NASA)** has ruled out the possibility of the dreaded **asteroid Apophis** causing any damage to the Earth for the next 100 years.

Key Points

- **Size:**
  Apophis is **a near-Earth asteroid** with a relatively **large size** (about 335 meters wide).
- **Name & Discovery:**
  Named after the ancient **Egyptian god of chaos and darkness,** it was **discovered in 2004,** after which NASA had said that it was one of the asteroids that posed the greatest threat to Earth.
  - Apophis was predicted to come threateningly close to us in the years 2029 and 2036, but NASA later ruled these events out.
  - However, there were still **fears about a possible collision in 2068.**
- **Near Earth Flight:**
  Recently, the asteroid flew past Earth on **5th March 2021,** coming **within 17 million km of our planet.** During this approach, scientists used radar observations to study in detail the asteroid's orbit around the sun.
- **Impact if it Hits Earth:**

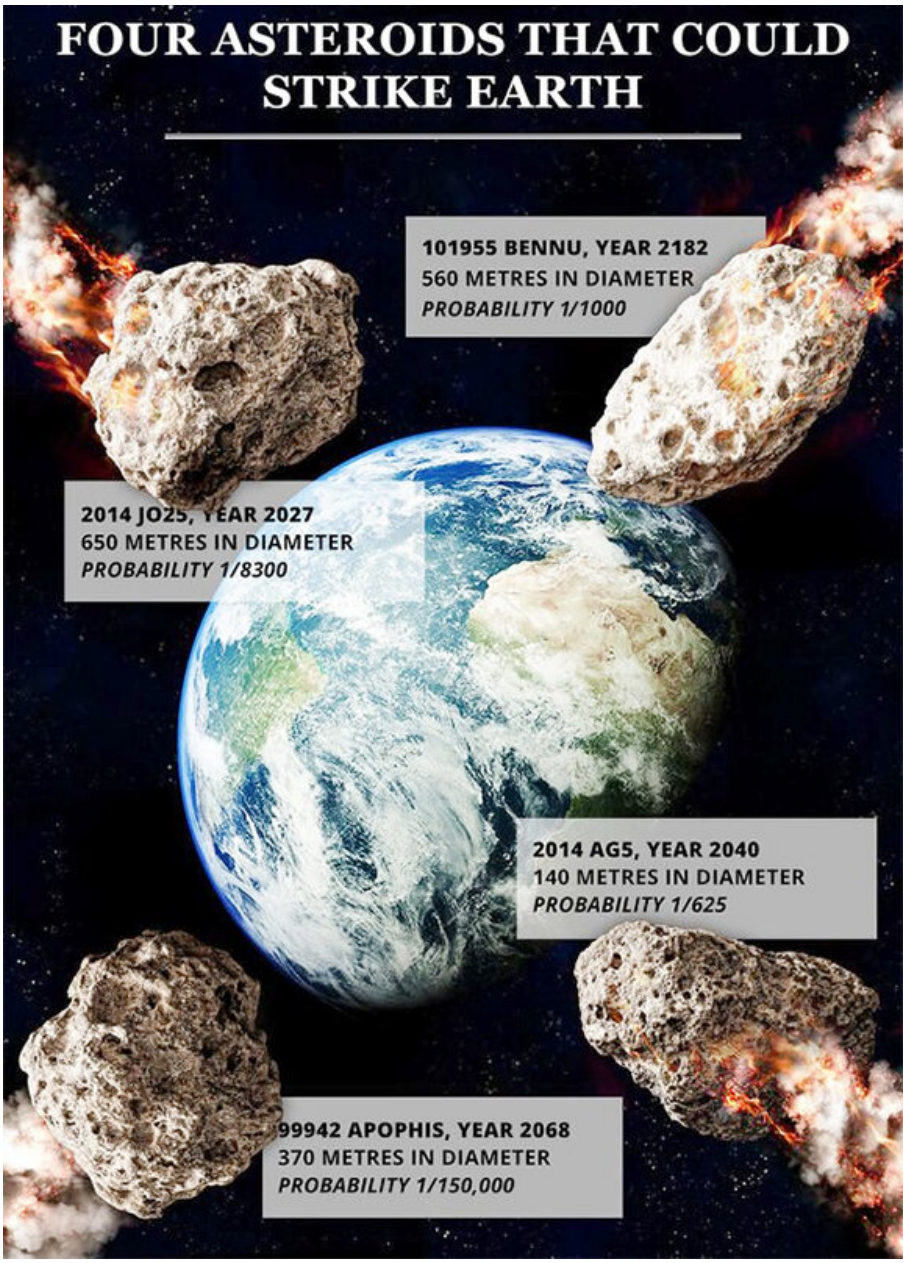


Asteroids

- **About:**
  - Asteroids are **rocky objects that orbit the Sun,** much smaller than planets. They are also called minor planets.
  - According to NASA, **9,94,383 is the count of known asteroids,** the remnants from the formation of the solar system over 4.6 billion years ago.
- **Categorization:** Asteroids are divided into **three classes:**
  - **First Group:**
    Those found in the **main asteroid belt between Mars and Jupiter,** which is estimated to contain somewhere between 1.1-1.9 million asteroids.
  - **Second Group:**
    It is that of trojans, which are **asteroids that share an orbit with a larger planet.** NASA reports the presence of Jupiter, Neptune and Mars trojans. In 2011, they reported an **Earth trojan** as well.
  - **Third Group:**
    - It is **Near-Earth Asteroids (NEA),** which have orbits that pass close by the Earth. Those that cross the Earth's orbit are called Earth-crossers. More than 10,000 such asteroids are known, out of which over 1,400 are classified as **Potentially Hazardous Asteroids (PHAs).**
    - NASA's Center for Near-Earth Object Study (CNEOS) determines the times and distances of these objects, when their approach to the Earth is close, through the Asteroid Watch Widget.

Potentially Hazardous Asteroids

- It means that an **asteroid has the potential to make threatening close approaches to the Earth.**
- Specifically, all asteroids with a **Minimum Orbit Intersection Distance (MOID)** of 0.05 AU (which is about 7,480,000 Km) or less and an Absolute Magnitude (H) of 22.0 (about 150 mt in diameter) or less are considered PHAs.
    - **Minimum Orbit Intersection Distance** is a method for calculating the minimum distance between two almost overlapping elliptical orbits.
    - The **Astronomical Unit (AU)** is the distance between the Earth and the Sun and is roughly 150 million km.
    - The **absolute magnitude** is a measure of the star's luminosity i.e. the total amount of energy radiated by the star every second.
- **Apophis** is categorised as a PHA.



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