



Asteroid 2018VP1

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Why In News

According to the **National Aeronautics and Space Administration (NASA)**, an asteroid named **2018VP1** is on a collision course with Earth.

Key Points

Asteroid 2018VP1:

- Asteroid 2018VP1 has a diameter of about **2 metres**, around the size of a small automobile.
- Only **1 in 240** chance that 2018VP1 would impact the Earth. It would **likely burn up into a fireball** after entering the Earth's atmosphere before reaching the ground.
- According to NASA, such an event happens about once every year.

Asteroids

- Asteroids are also known as minor planets.
- They are **rocky remnants** left over from the early formation of our solar system about 4.6 billion years ago.
- Most asteroids are **irregularly shaped**, though a few are nearly spherical.
- Many asteroids are known to have a **small companion moon** (some have two moons).
- There are also **binary** (double) asteroids, in which two rocky bodies of roughly equal size orbit each other, as well as **triple** asteroid systems.

- **Classification of Asteroids:**

- **Main Asteroid Belt:** The majority of known asteroids orbit within the **asteroid belt between Mars and Jupiter.**
- **Trojans:** These asteroids share an **orbit with a larger planet, but do not collide with it** because they gather around two special places in the orbit (called the L4 and L5 Lagrangian points). There, the gravitational pull from the sun and the planet are balanced.

Lagrange Points are positions in space where the gravitational forces of a two body system like the Sun and the Earth produce enhanced regions of attraction and repulsion. These can be used by spacecraft to reduce fuel consumption needed to remain in position.

- **Near-Earth Asteroids:** These objects have orbits that pass close by that of Earth. Asteroids that actually cross Earth's orbital path are known as **Earth-crossers.**

- **Asteroid Collision with Earth:**

- **Cut-off Size:** Objects that can cause significant damage upon impact are larger than 30 metres.
 - As per NASA's **Near-Earth Object Observations Programme**, asteroids that are **140 metres or larger** (bigger than a small football stadium) are of "**the greatest concern**" due to the level of devastation their impact is capable of causing.
 - No asteroid larger than 140 metres has a "significant" chance of hitting the Earth for the **next 100 years.**
- **The Chicxulub Impactor:** It was an asteroid that caused the sudden **extinction** of most **dinosaur** species **66 million years ago**, It had a diameter of over 10 kilometres.

- **Deflecting Asteroids:**

- **Methods to Deflect:** Over the years, scientists have suggested different ways to ward off threats of more serious impact events, such as:
 - **Blowing up** the asteroid before it reaches Earth, or
 - **Deflecting it off its Earth-bound course** by hitting it with a spacecraft.
- **The Asteroid Impact and Deflection Assessment (AIDA):** It is the most drastic measure undertaken so far, which includes NASA's **Double Asteroid Redirection Test (DART) mission** and the **European Space Agency's (ESA) Hera**.
 - **Target:** The target is **Didymos, a binary near-Earth asteroid**, one of whose bodies is of the size that could pose the most likely significant threat to Earth.

Didymos is in orbit between Earth and Mars.
 - **Double Asteroid Redirection Test (DART):** The construction of DART began in 2018, which is scheduled to launch in **2021**.

Aim is to **slam into the smaller asteroid of the Didymos system** at around **6 km per second in 2022**.
 - **Hera:** It is scheduled to launch in **2024**, will arrive at the Didymos system in 2027.

Aim is **to measure the impact crater** produced by the DART collision and study the change in the asteroid's orbital trajectory.

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