Asteroid Bennu

Prelims: *Current events of national and international importance | Science & Technology*

Why in News?

Research on asteroid Bennu by NASA shows it contains life's basic components, supporting the idea that asteroids supplied the ingredients for Earth's first life.

- **Bennu –** It is a small, ***carbon-rich and near-Earth asteroid*** that passes relatively close to Earth about every 6 years.
- **Naming History –** Originally named 1999 RQ36, the asteroid was renamed Bennu in 2013 by a nine-year-old contest winner, Michael Puzio, who drew inspiration from an ***ancient Egyptian god***.
- **Size –** Bennu is very small and about 0.5 km (one-third of a mile) wide at its equator.
- In contrast, Mercury, the smallest planet, is over 3,000 miles (4,800 km) across.
- **Distance from the Sun –** Bennu's average distance from the Sun is 105 million miles (168 million km), which is just a little farther than Earth's average distance of 93 million miles (150 million km).
- **Orbit –** Bennu currently orbits the Sun between Earth and Mars, and it belongs to the ***Apollo group of asteroids*** (over 21,000 members).
- **Formation –** Bennu likely broke off from a much larger carbon-rich asteroid about 700 million to 2 billion years ago.
- It likely formed in the Main Asteroid Belt between Mars and Jupiter, and has drifted much closer to Earth since then.
- **Atmosphere –** Bennu ***doesn't have enough gravity*** to have an atmosphere.
- **Potential for Life –** Bennu's extreme temperatures and lack of atmosphere make it inhospitable to life or liquid water.
    - **Temperature range –** 240°F (116°C) to -100°F (-73°C), because there is no atmospheric pressure, liquid water cannot exist on or under its surface.
- It was the target of NASA's OSIRIS-REx mission to collect an asteroid sample and bring it to Earth.

Quick Fact

Key Findings from Bennu Samples

• **Sugars discovered** – Ribose (RNA sugar) & glucose (metabolism sugar) were found, ***1st time, large sugars*** have been detected on an asteroid.
• **Complete life inventory** – Bennu contains amino acids & all 5 nucleobases (DNA & RNA components).
• **Nitrogen-rich polymers** – Long chains of ***carbamate molecules***, previously unseen in extraterrestrial samples, suggest a **source of nitrogen** crucial for RNA.
• **Pre-solar grains** – Dust from ***ancient supernovae***, 6 times more concentrated than in other asteroid samples, showing Bennu's parent body formed in a star-rich environment.

References

1. The Hindu | Earthlife is made of space stuff, studies of asteroid Bennu hint
2. NASA | Bennu