Geography · GS - I

How does the Juno Mission of NASA help to understand the origin and evolution of the Earth?

EXAM YEAR	PAPER	SUBJECT
2017	GS - I	Geography

MARKS	WORD LIMIT
10	~150 words

Answer Hint

Jupiter’s formation; early Solar System; planetary accretion; composition of Jupiter; water abundance; planetary migration; gravitational interactions; comparative planetology; indirect insights into Earth’s formation

Model Answer

Introduction

NASA’s Juno mission, which entered Jupiter’s orbit in 2016, investigates the planet’s origin, internal structure, atmosphere and magnetic field. Its findings help scientists understand the formation of the Solar System and, indirectly, Earth’s evolution.

Contribution to Understanding Earth

1. Early Solar System Conditions: Jupiter formed early and influenced the distribution of gas, dust and planetesimals. Studying it helps reconstruct conditions during planetary formation.

2. Planetary Accretion: Juno’s measurements of Jupiter’s gravity provide insights into its internal structure and the processes through which giant planets accumulated material.

3. Water and Chemical Composition: Measurements of atmospheric water abundance help test theories about where Jupiter formed and how material moved through the early Solar System.

4. Planetary Migration: Understanding Jupiter's formation and movement helps scientists assess how gravitational interactions influenced the distribution of material from which terrestrial planets formed.

5. Comparative Planetology: Comparing Jupiter with Earth helps explain why the two planets developed different atmospheres, interiors and magnetic properties.

6. Solar System Architecture: Jupiter's enormous gravitational influence shaped the environment in which Earth and other planets formed.

Conclusion

Juno does not directly investigate Earth's origin. Rather, its findings about Jupiter provide valuable evidence for reconstructing the early Solar System and understanding the processes that shaped Earth.

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