



READING PASSAGE · LEVEL 3 · ADVANCED

JUPITER: A FAILED STAR AND ITS FAMILY

A reading passage for advanced readers (Ages 10–12)

Jupiter is the king of the planets — a colossal world more than twice as massive as all the other planets combined. Its diameter of 142,984 kilometres makes it about 11 times wider than Earth, and it is sometimes described as a "failed star" because if it had been roughly 80 times more massive, the pressure at its core would have been great enough to ignite nuclear fusion.

As a gas giant, Jupiter has no real surface. Its outer layers are made of hydrogen and helium, the same gases that make up the Sun. As you descend, the pressure increases enormously, and roughly 21,000 kilometres beneath the cloud tops, hydrogen begins to behave like a metal — a strange state called metallic hydrogen, which conducts electricity. This metallic hydrogen is responsible for Jupiter's enormous magnetic field, the strongest of any planet.

Jupiter's most famous feature is the Great Red Spot, an anticyclonic storm that has been raging for at least 350 years. Once larger than three Earths across, it has been gradually shrinking and changing colour. Scientists are still working out exactly how it formed and why it has lasted so long.

Jupiter's moon count keeps rising as telescopes improve — over 100 are now known. The four largest, the Galilean moons, are themselves miniature worlds. Io is the most volcanically active body in the solar system, its surface constantly resurfaced by molten lava. Europa is a frozen world with a global ocean of liquid water hidden beneath an icy crust — and many scientists believe it is one of the best places to search for life beyond Earth. Ganymede, the largest moon in the solar system, has its own magnetic field. Callisto is the most heavily cratered, with a surface that has barely changed in billions of years.

NASA's Juno spacecraft has been orbiting Jupiter since 2016, peering beneath its clouds to study its deep interior, magnetic field, and storm systems. A future mission, Europa Clipper, will focus on the moon Europa to investigate its hidden ocean and the possibility of life within.

★ WORDS TO KNOW 5 TERMS

nuclear fusion

The process that powers stars by squeezing atoms together.

anticyclonic

Of a storm that spins in the opposite direction from cyclones.

crust

The outer rocky or icy shell of a planet or moon.

metallic hydrogen

Hydrogen squeezed so hard it acts like a metal that conducts electricity.

volcanic

Involving volcanoes — places where hot melted rock comes up from inside.

★ COMPREHENSION QUESTIONS 6 QUESTIONS

- Why is Jupiter sometimes called a "failed star"?
- What is metallic hydrogen, and why is it important for Jupiter's magnetic field?
- How has the Great Red Spot changed over time?
- Compare Io and Europa. What makes each one unique?
- Why is Europa especially interesting to scientists?
- What is the goal of NASA's Juno spacecraft?