# Jupiter:

**Specific details:**

Mass: 1,898,130,000,000,000,000,000,000,000kg

Density: 1.326g/cm3

Average Orbit Distance: 778,340,821km

Mean Orbit Velocity: 47,002km/h

Orbit Eccentricity: 0.04838624

Equatorial Inclination: 3.1 degrees

Equatorial Radius: 69,911km

Equatorial Circumference: 439,263.8km

Surface Area: 61,418,738,571km2

Surface Gravity: 24.79m/s2

Escape Velocity: 216,720km/h

## Water Percentage:

Water makes up about 0.25% of the molecules in Jupiter’s atmosphere.

## Orbital Parameters:

|  |  |  |  |
| --- | --- | --- | --- |
| **Semimajor axis (106 km)** | 778.57 |  |  |
| **Sidereal orbit period (days)** | 4,332.589 |  |  |
| **Tropical orbit period (days)** | 4,330.595 |  |  |
| **Perihelion (106 km)** | 740.52 |  |  |
| **Aphelion (106 km)** | 816.62 |  |  |
| **Synodic period (days)** | 398.88 |  |  |
| **Mean orbital velocity (km/s)** | 13.06 |  |  |
| **Max. orbital velocity (km/s)** | 13.72 |  |  |
| **Min. orbital velocity (km/s)** | 12.44 |  |  |
| **Orbit inclination (deg)** | 1.304 |  |  |
| **Orbit eccentricity** | 0.0489 |  |  |
| **Sidereal rotation period (hrs)** | 9.9250\* |  |  |
| **Length of day (hrs)** | 9.9259 |  |  |
| **Obliquity to orbit (deg)** | 3.13 |  |  |
| **Inclination of equator (deg)** | 3.13 |  |  |

\* System III (1965.0) coordinates

## Gaseous composition:

* Jupiter's stripes and swirls are actually cold, windy clouds of ammonia and water, floating in an atmosphere of hydrogen and helium.
* Major: Molecular hydrogen (H2) - 89.8% (2.0%); Helium (He) - 10.2% (2.0%)
* Minor (ppm): Methane (CH4) - 3000 (1000);

Ammonia (NH3) - 260 (40);

Hydrogen Deuteride (HD) - 28 (10);

Ethane (C2H6) - 5.8 (1.5);

Water (H2O) - 4 (varies with pressure)

* Aerosols: Ammonia ice, water ice, ammonia hydrosulfide

## Structure:

* Jupiter’s iconic Great Red Spot is a giant storm bigger than Earth that has raged for hundreds of years.
* The composition of Jupiter is similar to that of the Sun—mostly hydrogen and helium.
* Deep in the atmosphere, pressure and temperature increase, compressing the hydrogen gas into a liquid. This gives Jupiter the largest ocean in the solar system—an ocean made of hydrogen instead of water.
* It could be up to 90,032 degrees Fahrenheit (50,000 degrees Celsius) down there, made mostly of iron and silicate minerals (similar to quartz).

## Atmosphere:

* Surface Pressure: >>1000 bars
* Temperature at 1 bar: 165 K (-108 C)
* Temperature at 0.1 bar: 112 K (-161 C)
* Density at 1 bar: 0.16 kg/m3
* Wind speeds

Up to 150 m/s (<30 degrees latitude)

Up to 40 m/s (>30 degrees latitude)

* Scale height: 27 km
* Mean molecular weight: 2.22

### Surface

As a gas giant, Jupiter doesn’t have a true surface. The planet is mostly swirling gases and liquids. While a spacecraft would have nowhere to land on Jupiter, it wouldn’t be able to fly through unscathed either. The extreme pressures and temperatures deep inside the planet crush, melt and vaporize spacecraft trying to fly into the planet.

## Magnetic Field:

The Jovian magnetosphere is the region of space influenced by Jupiter's powerful magnetic field. It balloons 600,000 to 2 million miles (1 to 3 million kilometers) toward the Sun (seven to 21 times the diameter or Jupiter itself) and tapers into a tadpole-shaped tail extending more than 600 million miles (1 billion kilometers) behind Jupiter, as far as Saturn's orbit. Jupiter's enormous magnetic field is 16 to 54 times as powerful as that of the Earth. It rotates with the planet and sweeps up particles that have an electric charge. Near the planet, the magnetic field traps swarms of charged particles and accelerates them to very high energies, creating intense radiation that bombards the innermost moons and can damage spacecraft.

Jupiter's magnetic field also causes some of the solar system's most spectacular aurorae at the planet's poles.

* Dipole field strength: 4.30 Gauss-Rj3
* Dipole tilt to rotational axis: 9.4 degrees
* Longitude of tilt: 200.1 degrees
* Dipole offset: 0.119 Rj
* Surface (1 Rj) field strength: 4.0 - 13.0 Gauss

Rj denotes Jovian model radius, defined here to be 71,398 km

## Reflective Properties:

|  |  |  |  |
| --- | --- | --- | --- |
| * Bond albedo: 0.343 |  |  |  |
| * Geometric albedo: 0.538 |  |  |  |
| * V-band magnitude V(1,0): -9.40 |  |  |  |
| * Solar irradiance (W/m2): 50.26 |  |  |  |
| * Black-body temperature (K): 109.9 |  |  |  |

https://nssdc.gsfc.nasa.gov/planetary/factsheet/jupiterfact.html