

Internal structure of Uranus and Neptune

Upper atmosphere:

Uranus	Neptune
83% H ₂	74% H ₂
15% He	25% He
2% CH ₄	1% CH ₄

Molecular H₂ + He
CH₄

Ionic 'ocean'
H₃O⁺, NH₄⁺,
OH⁻

Rock (Mg, Si, Fe)

Lower atmosphere:

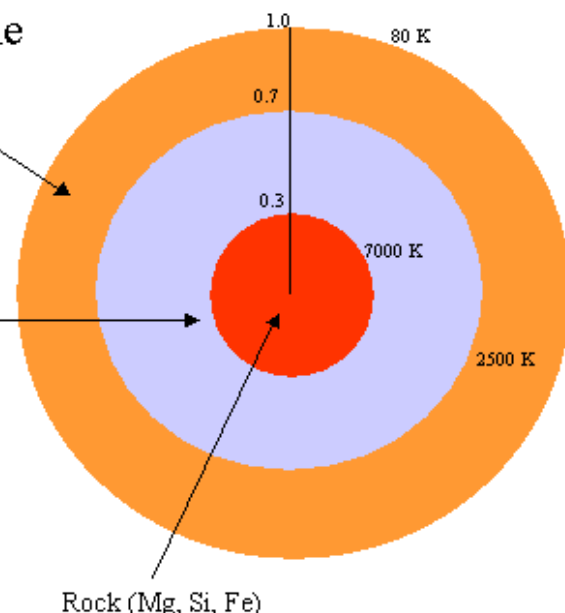
Pressures not high enough to form liquid metallic hydrogen; weaker magnetic field due to ionic 'ocean'

Core:

Dense, 'soup' of rock, also about 13 Earth masses

Internal heating also important – particularly for Neptune (similar surface temperature to Uranus, despite being 1.5 times further from the Sun)

Cores of Uranus and Neptune form much higher (70% to 90%) fraction of total mass, compared with Jupiter (5%) and Saturn (14%)

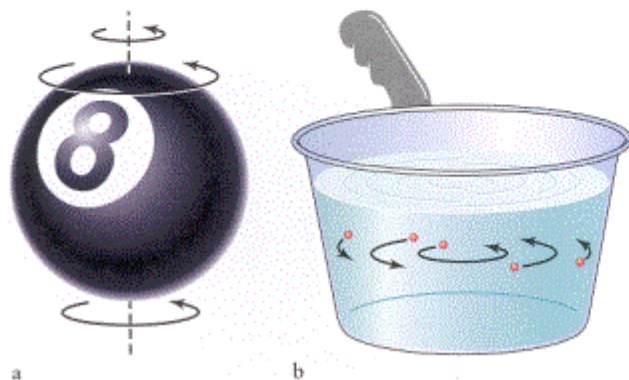


Rotation of the Jovian Planets

Jupiter, Saturn, Uranus and Neptune rotate very rapidly, given their large radii, compared with the terrestrial planets.

Also, the Jovian planets rotate **differentially** – not like a solid body (e.g. a billiard ball) but as a fluid (e.g. grains of rice in a pot of water).

We see this very clearly on Jupiter, where the Distinct cloud bands and belts rotate at different speeds



Planet	Rotation Period *
Mercury	58.6 days
Venus	243 days
Earth	24 hours
Mars	24 h 37 m
Jupiter *	9 h 50 m
Saturn *	10 h 14 m
Uranus	17 h 14 m
Neptune	16 h 7 m
Pluto	6.4 days

* At Equator