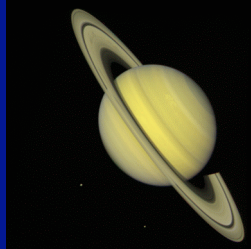
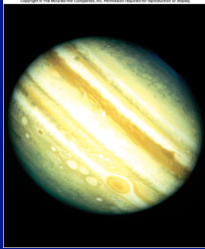
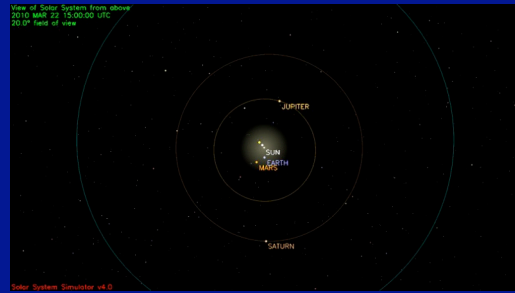


Jupiter and Saturn



Semimajor axes of orbits: 5.2 au (Jupiter) and 9.5 au (Saturn)



Question? (we saw this last night!)

- Jupiter is almost always larger in angular size than Venus and Mars
- Right now, Venus and Mars have angular diameters of about 10 arcseconds, Jupiter is 33 arcseconds
- Saturn is about 19
- What does it mean? ←

Basic properties of Jupiter and Saturn

- Jupiter: 11.2 X diameter of Earth and 318 X mass
- Saturn: 9.5 X diameter of Earth and 95 X the mass
- Jupiter and Saturn: the “giant planets”
- Question: how do we know the masses of Jupiter and Saturn? ←

A visual comparison of Earth, Jupiter, and Saturn

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Jupiter and Saturn are rapid rotators: 9.9 and 10.7 hours

The Chemical Composition of Jupiter and Saturn

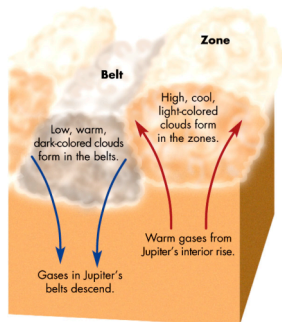
The densities of Jupiter and Saturn are about that of water (Jupiter is 1.33 grams/cc, Saturn is 0.69 grams/cc). Basic physics shows that objects with the mass, size, and density of Jupiter and Saturn must be made of very light elements. Specifically, they must be composed nearly completely of hydrogen and helium.

Although we reach this conclusion on the basis of theoretical physics, this conclusion is borne out by all observations. The spectrum of Jupiter shows absorption lines due to hydrogen-rich molecules such as ammonia (NH₃), methane (CH₄), and water, as well as others hydrocarbons such as acetylene, ethane, and propane. This chemical composition was also verified by the Galileo spacecraft probe, which descended into the atmosphere of Jupiter.

Read the quotation in the text about the fact that Jupiter and Saturn are nearly completely composed of hydrogen and helium. *In this, they have the same*

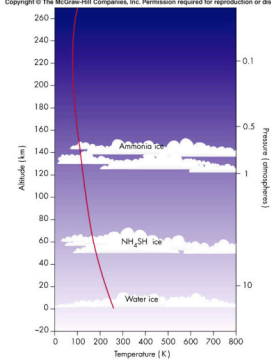
The cloud bands of Jupiter

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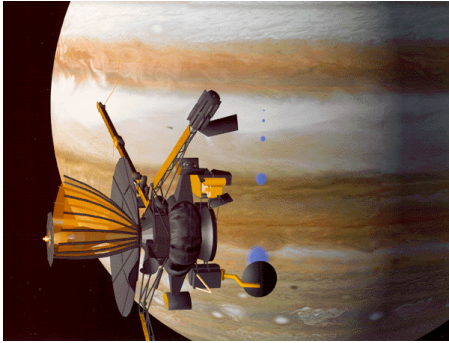


The atmospheric structure of Jupiter

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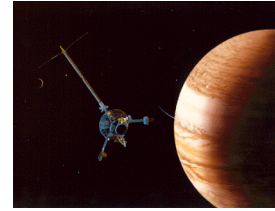


Exploration of Jupiter



The Galileo spacecraft mission

- Launch: October 1989
- Arrival at Jupiter: December 1995
- End of mission (dive into Jupiter): September 2003



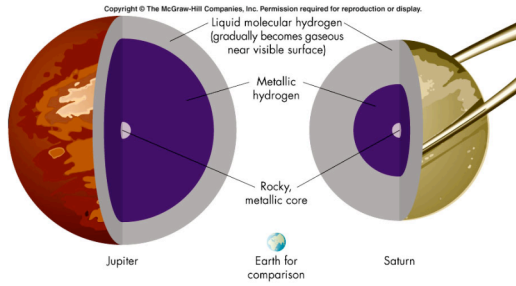
The Galileo Probe



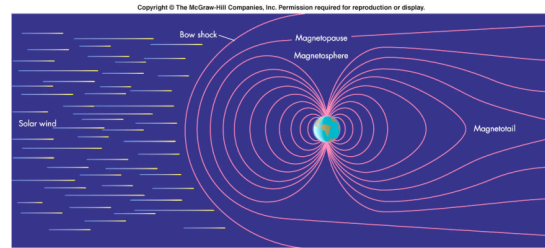
The Galileo Probe

[The Galileo Probe](#)
[What the Probe saw](#)

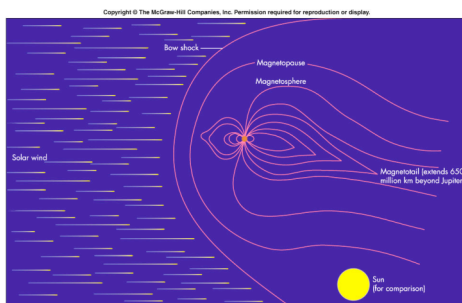
The interior structure of Jupiter (and Saturn)



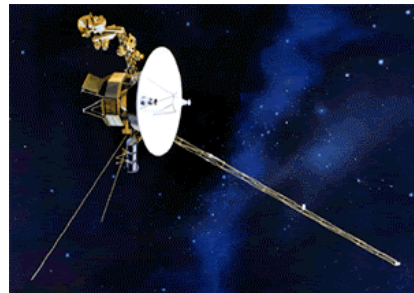
Magnetospheres 1: the Earth and the Van Allen Belts



Magnetospheres 2: the magnetosphere of Jupiter



University of Iowa connection...plasma waves and radio waves with the Voyager spacecraft



Sounds from the Voyager encounter with
the Jovian bow shock

[University of Iowa space plasma waves](#)