

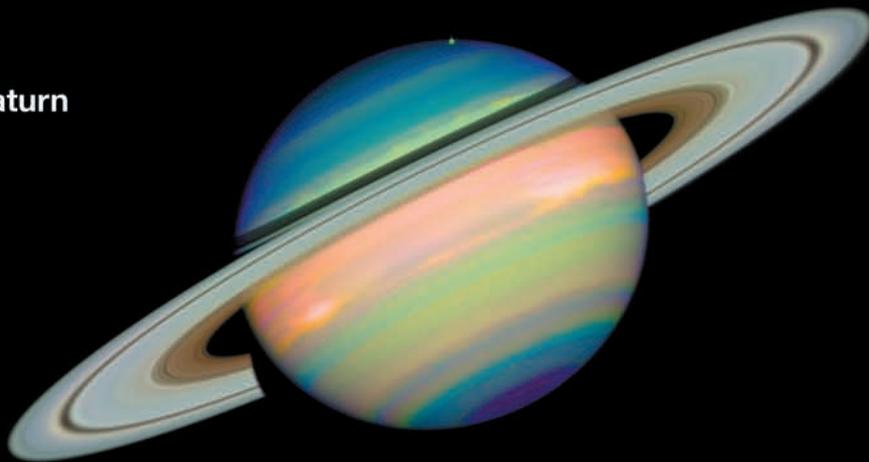
Jupiter



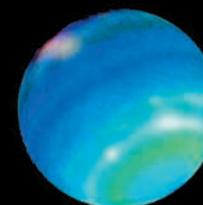
Uranus



Saturn



Neptune



The Jovian Planets

The Jovian Planets

Gas Giants Inhabit the Farthest Reaches

These spectacular images of the four massive Jovian planets — Jupiter, Saturn, Uranus, and Neptune — hint at some of the remarkable attributes that set them apart from the smaller, rocky terrestrial planets. Also called “gas giants,” the Jovian planets occupy orbits in the outer solar system at distances ranging from 5 (Jupiter) to 30 (Neptune) times the Earth’s distance from the Sun.

Unlike the terrestrial planets that make up our inner solar system — Mercury, Venus, Earth, and Mars — the Jovian planets do not have solid surfaces. Instead, they are composed primarily of hydrogen and helium, with traces of methane, ammonia, water, and other gases. These gases are tightly compressed around relatively tiny cores of ice and rock. At great depths within Jupiter, for example, the hydrogen gas is compacted so tightly that it exists in a rare metallic form.

Each of the Jovian planets has characteristic rings. While Saturn’s bright rings are the most visible and well known, fainter and darker rings have been seen around Jupiter, Uranus, and Neptune. The Jovian planets also are distinctive for having many moons — Saturn has more than 50, Jupiter has more than 60, Uranus has more than 20, and Neptune has more than 10 — as well as their deep atmospheres, strong magnetic fields, and rapid rotation.

Massive . . . Yet Lightweight

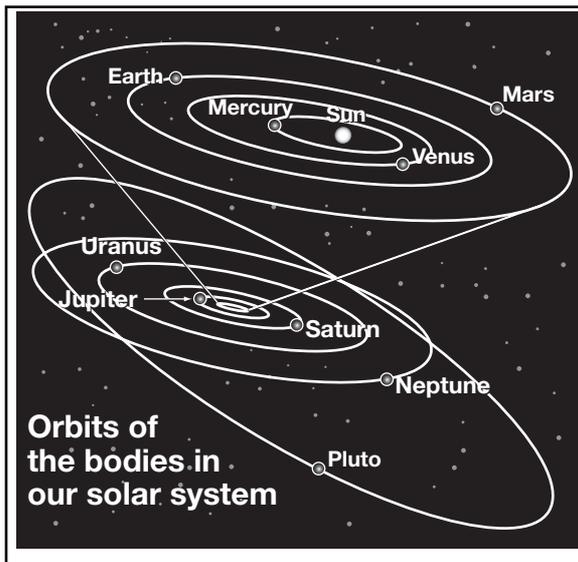
The Jovian planets are enormous by any standard. Jupiter is 11 times greater than Earth in diameter and is by far the largest planet in our solar system. Saturn, at 9 times greater than Earth, is the next largest; Uranus and Neptune are both roughly 4 times greater than Earth.

Despite their size, the Jovian planets have low densities because of their gaseous composition. Saturn, for example, is made of materials lighter than water: if placed in a giant swimming pool, the entire planet would float.

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Atmospheric Conditions Lend Color

What we see when observing the Jovian planets is actually the tops of clouds high in their atmospheres. The colors seen in the clouds correlate with their altitudes: the lowest clouds are blue, followed by browns and whites, and then by reds at the highest level. Sometimes the lower layers can be seen through holes in the upper ones.

Surprisingly, it is the trace gases in the Jovian atmospheres — not the hydrogen or helium — that give the planets’ clouds their color. For example, Uranus and Neptune are blue-green because they have a small amount of methane in their upper atmospheres.

VOCABULARY

Density: The amount of mass per volume in an object or region of space.

Ice: Refers to water, methane, and ammonia, which usually occur as solids in the outer solar system.

About the images on the front of the lithograph: The images on the front of the lithograph show the four Jovian planets in their correct proportions. Jupiter (*top, left*) and Neptune (*bottom, right*) were taken with the Wide Field Planetary Camera 2 in visible wavelengths. Jupiter is closest to “true” color, or what it would look like to our eyes. Neptune’s colors are representative — a bit enhanced, but natural in the sense that what is blue in the image really is blue and red is red.

The images of Saturn (*top, right*) and Uranus (*bottom, left*) were made with the Near Infrared Camera and Multi-Object Spectrometer in light that we can’t see and therefore can’t represent naturally. These images are in “false” color — the colors distinguish different real conditions in the planets’ respective atmospheres.

FAST FACTS

	Diameter		Distance from the Sun	
	miles	km	miles	km
Earth	7,926	12,756	9.296×10^7	1.496×10^8
Jupiter	88,850	142,984	4.836×10^8	7.783×10^8
Saturn	74,900	120,536	8.882×10^8	1.429×10^9
Uranus	31,760	51,118	1.784×10^9	2.871×10^9
Neptune	30,775	49,528	2.799×10^9	4.504×10^9

You can get images and other information about the Hubble Space Telescope on the World Wide Web. Visit <http://www.stsci.edu/outreach> and follow the links.

