FIRST IN-ORBIT VIEW | NASA
Juno Spacecraft Sends First Image After Entering Orbit Around Jupiter
OUR JOURNEY CONTINUES

What do you think we’ll learn about humanity’s (arguably) favorite planet now that “we conquered Jupiter”?

A must-read: Ten Things You Need To Know About The Juno Mission.

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CONTACT
Questions, comments, submissions, photos or just to say ‘hello’:
ObjView at NoCoAstro dot org
NOCOASTRO MEETING

Join us for our monthly awesomely-nerdy astro talk:

**Date:** Thursday August 4th, 6:15pm  
**Location:** Fort Collins Museum of Discovery

DID YOU KNOW…? All meetings are FREE & open to the public!  
Just stop by the Fort Collins Museum of Discovery.

NOCOASTRO OUTREACH *

5th and 26th, Friday  
6th, Saturday  
12th, Friday  
13th, Saturday  
20th, Saturday  
27th, Saturday

RMNP Beaver Meadows *(park fee req’d)*  
Hermit Park Open Space *(park fee req’d)*  
Fossil Creek Reservoir, 8:30pm  
Carter Lake *(park fee req’d)*  
Boyd Lake SP *(park fee req’d)*, 8:30pm  
Bobcat Ridge *(free but register)*, 8pm

* more details online at: NoCoAstro.org
Jupiter Readies For A Close-Up

**Origin of Name:** Romans recognized seven bright objects in the sky — sun, moon and the five brightest planets. They named each of these objects after their gods. Jupiter, as the largest planet, was named after the king of the Roman gods.

**Moons:** Jupiter has 67 moons grouped into (1) interior moons, (2) main moons & (3) outer moons. The four interior Galilean moons are the most massive, with the remaining 63 moons (and rings) comprising just 0.003% of the total orbiting mass. Did you know that the Galilean moons were the first objects found orbiting a body that wasn’t Earth or the sun?

**Atmosphere:** Almost exclusively hydrogen & helium... but do you know why? [Compare this to Earth’s atmosphere which is mostly nitrogen & oxygen]. Jupiter has the largest atmosphere in our solar system, reaching 3,000 miles in altitude.

**Magnetosphere:** Deep inside Jupiter hydrogen gas is squeezed into fluid metallic hydrogen by immense pressure. This fluid behaves like electrically-conductive metal & is probably the source of Jupiter's intense magnetic field as well as the brightest auroras in the solar system.

**Size:** Did you know that Jupiter is shrinking? Jupiter radiates more heat than it receives from the sun. This heat is produced inside Jupiter through the Kelvin-Helmholtz mechanism. Jupiter is actually shrinking 2cm every year. This means Jupiter was much hotter & about 2x its current diameter when it formed!

**Equatorial Circumference:** ~272,946 miles [10.97x Earth].

**Volume:** ~343 trillion cubic miles [1321.34x Earth volume]. Interestingly, it is believed that Jupiter’s diameter is as large as a planet of its composition & history can achieve; if Jupiter’s mass were to increase to about 1.6 Jupiter masses, the interior would become more compressed, decreasing its volume despite the increased amount of matter.

**Mass:** ~1.9 x 10^27 kg [317.83x Earth mass]. Is this less massive than you might expect from its volume?

**Mean Density:** ~1.3 g/cm cubed [24% Earth density].

**How To Measure a Gas Giant’s Density:** Gas giants are composed largely of gaseous and liquid matter, so are much less dense than terrestrial planets in general. Of course, even within one gas giant, density can vary considerably between its gaseous layers and core, if it has one. Jupiter’s outermost layer (of hydrogen & helium) is only 0.0002 g/cm cubed dense. Its core, which we hope to discover at the end of Juno’s Jupiter mission is believed to be as dense as 25 g/cm cubed [compare to Earth density 5.51 g/cm cubed]!
**Gravity:** Gas giants in our solar system dwarf their terrestrial neighbors. Yet, because of Jupiter's low density (under 25% that of Earth) you might expect Jupiter's gravitational hold on its gaseous layers to be minimal. However, due to Jupiter's immense size, mass and the sheer amount of material it contains, its 'surface' gravity is actually quite large, 24.79 m/s squared or 2.528 g [2.5x Earth's surface gravity of 9.807 m/s squared or 1 g]!

**Surface Area:** ~23 billion miles [84x Earth SA]. Where is Jupiter's 'surface', anyway?

**Distance from Sun:** ~5.2 AU, which is an average of 778M km or 484M miles [not surprisingly, this equals 5.2x Earth distance of from sun of 1 AU].

**Orbit:** Jupiter completes one elliptical orbit around the sun every twelve Earth years. Also, among Jupiter's many surprising & amazing qualities is that it's the only planet in our solar system whose barycenter lies outside the volume of the sun! This is due to Jupiter's mass… wait, did you miss that physics lesson?

**Equatorial Inclination:** 3.1 degrees [19.5 degrees less than Earth]. This minimal tilt, along with its extreme distance from the sun, gives Jupiter yet another interesting quality: its seasons vary little (if at all) but last **three years each**! Jupiter also spins at an incredible rate — this giant planet makes a complete rotation in under 10 Earth hours, the fastest of any planet in the solar system. But Jupiter is a gas giant with **differential rotation**, so **how is its rotation even measured?**

**Planetary Albedo:** Jupiter's 0.34 bond albedo describes Jupiter's visual brightness when viewed with reflected light. A value of 0 means the object absorbs all light, reflecting none while a value of 1 indicates the object reflects all light, absorbing none [similar to 0.30 Earth bond albedo, 0.37 Earth geometric albedo].

**Temperature Variation:** By now you're realizing that measuring almost every quality of a gas giant planet is at least a little different (& likely more confusing) than how we measure & categorize terrestrial worlds. Yes, temperature variation of gas giants is definitely one of those interesting & confusing qualities. Data from the Galileo mission was able to record temperatures over 570 degrees F and wind speeds over 400 mph before the probe probably melted & vaporized! However, scientists believe that temperature(s) on Jupiter may reach an incredible 64,300 degrees at the planet's core — much hotter than the surface of the sun! Don't forget to follow NASA for updates as the Juno mission greatly improves our knowledge of this mysterious & amazing world.

**Juno Mission Overview:** Jupiter has been shrouded in clouds & mystery — **until now!**
**Jupiter’s Moons:**

So many moons, so little time.

Jupiter's moons can be categorized into two main groups known as **regular and irregular**.

Regular satellites are *prograde* with nearly-circular orbits and are split further into two groups, the (1) inner and (2) main or Galilean. Yes, there are moons nestled inside the orbits of the well-known, larger Galilean moons.

Irregular satellites are small, distant and eccentric by comparison. Scientists believe many formed from collisions of larger bodies that were captured by Jupiter's gravity in the past.

**Watch an amazing animation of Jupiter and its 67 known moons.**

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**More Than You Wanted to Know:**

Originally thought of as god of the sky and worshipped as god of rain, thunder and lightening, the god *Jupiter* was said to cast a veil of clouds around himself (to hide his indiscretions from his wife).

*Juno*, wife (and sister) of Jupiter, remained faithful but was vengeful toward Jupiter's mortal consorts & illegitimate children. She alone could peer through the clouds and truly see Jupiter for who he really was.

Want to know more? [Click here](#). As you can see, this spacecraft was aptly named. Soon, the Juno spacecraft will peek through Jupiter’s clouds, for all to see.

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**Step Back In Time:**

**How will Jupiter teach us about the origins of our solar system?**

Because Jupiter formed early, it likely had a large impact on the formation of the rest of the solar system. So, Juno’s primary mission is to understand Jupiter's origin & evolution — which will in turn help us understand how our entire solar system formed!
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Watch Me: "Hello, Jupiter!" - NASA
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Discovery of the Galilean Satellites | Galileo Galilei

Galileo published his observations in Sidereus Nuncios in March 1610