

## **SKYWATCH: Viewing the planets a treat in August**

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This August will be an excellent opportunity for anyone wanting to observe the planets, all eight of which will be visible sometime during the month.

In early August, just after sunset, look to the southwest and you will find Venus, Mercury and Mars. Venus, being very bright, is the easiest to spot, and can then be used as a guide to find Mars and Mercury, which will be very low in the twilight. You will need a bit of luck and a clear horizon to find them.

Jupiter, Saturn, Uranus and Neptune will also be visible during the month of August – though you will need a telescope to see Uranus and Neptune – making this month one of particular interest to those who love viewing planets.

My two favorite planets, Saturn and Jupiter, are the two largest in our Solar System, and both will reach what we call “opposition” this month. Only those planets which are further from the Sun than Earth can be in opposition: Mars, Jupiter, Saturn, Uranus and Neptune.

When a planet reaches opposition, it rises at sunset and is visible all night long, thus affording plenty of viewing time. At opposition, the Earth is exactly between the Sun and the planet, meaning that the planet is as close to Earth as possible.

On August 2, Saturn will be 831 million miles from Earth. This is a great time to view Saturn in a telescope because it will appear larger in size and reveal more surface details. Similarly, Jupiter will reach opposition on August 19, making its closest approach to Earth at 373 million miles.

While the night of opposition is technically the closest approach to Earth, any clear evening during the months of August and September will be good opportunities to view Jupiter and Saturn. Grab your telescope and go out an hour after sunset and look to the east. You should see two bright “stars” looming above the eastern / southeastern horizon. As you look east, Jupiter will be a very bright “star” on your left and Saturn will be on your right, a little smaller and less bright than Jupiter.

Pointing a telescope at Jupiter and Saturn reveals their true nature. Jupiter, the largest planet in our Solar System, is 11 times larger in diameter than Earth and is 318 times as massive. Saturn is nearly ten times as big and 100 times as massive as Earth.

Both planets are huge, and Saturn’s splendid ring system makes it more immense. The visible rings are approximately 170,000 miles in diameter. If we could magically put

Saturn in place of our Moon, it would completely fill our sky at night. Wouldn't that be something?

Even though Saturn is very massive compared to Earth, it has a density similar to that of balsa wood. If you could find a big enough bathtub to put it in, Saturn would float on water. If you put Earth in the same bathtub, it would sink to the bottom, because our home planet essentially is a chunk of rock with a heavy iron core.

Saturn and Jupiter are known as gas giants because they are mostly composed of a mixture of gasses. Along with being the largest and heaviest planets, they also have the fastest spin rates and so the shortest days, as measured by the time it takes to complete one rotation.

Jupiter's day is slightly less than 9 hours, 56 minutes. This means that it is rotating at 28,000 miles per hour at its equator, compared to about 1,000 miles per hour for Earth. This super-fast spin rate causes Jupiter to noticeably bulge at its equator.

As you marvel at Jupiter and Saturn in your telescope, look carefully at their surfaces. On Jupiter, you should be able to see two or more dark bands that run parallel to its equator. These bands are not surface markings, but darker cloud layers in the atmosphere.

Saturn also has cloud bands, but they are more subtle and subdued in appearance. When looking at these planets, all we actually see are atmospheric clouds which totally blanket their surfaces.

If you have a very good telescope, you might be able to see eddies, swirls and vortices in Jupiter's cloud bands. If you are lucky, you might also be able to see the giant cyclone known as the Red Spot. This cyclonic storm changes in size, shape and color over time and is a fascinating sight.

As you gaze at Jupiter through your telescope, allow your eye to stray slightly to either side of the great planet. Do you see any "stars" lined up nearby? If so, these are not stars, but the four largest moons of Jupiter: Callisto, Europa, Ganymede and Io. Sometimes you can see all four, but at other times, one or two of them might be behind Jupiter or directly in front.

Saturn also has moons, the largest of which is appropriately called Titan. Titan is the second-largest natural satellite in the Solar System, behind only Ganymede, and is nearly 50 percent larger than our Moon. It can easily be seen in a small telescope.

Titan actually has a fairly thick atmosphere consisting of nitrogen, methane and other carbon-rich compounds. At minus 297 degrees Fahrenheit, Titan's surface temperature is much colder than Earth; like Earth, though, it has rain and lakes. Unlike Earth, the rain comes down not as water but liquid methane, which fills Titan's lakes. Cold shower anyone?

If you have a telescope, be sure to take the opportunity to observe these planets this summer. If you have no telescope, no problem: You can join the Popular Astronomy Club on the evening of Saturday, August 21 at Niabi Zoo for a free public observing session.

Weather permitting, club members will provide views of Jupiter, Saturn and other objects, including a nearly full Moon. As we train our telescopes on the Moon, consider that, 50 years ago this month, Apollo astronauts were driving the first “dune buggy” on the lunar surface.

Hope to see you August 21. Meanwhile, keep looking up!