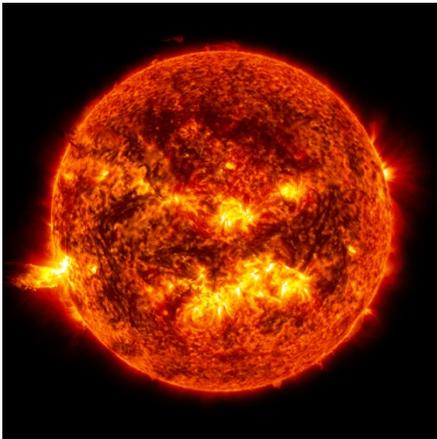




THE SOLAR SYSTEM

by Ken Drummond



THE SUN, at the center of our Solar System, is a G2V stellar class star orbiting in the Orion arm of the Milky Way. Once thought to be a below-average size star, we now know the Sun is larger than 85% of the stars in the Milky Way. Its surface temperature is about 10 thousand degrees Fahrenheit while its upper atmosphere can reach 36 million degrees. The Sun is about 4.57 billion Earth years old and has completed 20-25 galactic orbits. It will be a main sequence star for 5 billion more years and eventually become a red giant, then a white dwarf.

Imprecisely called a “yellow dwarf,” our Sun is actually white. It appears yellow because of the Earth’s atmosphere. It is composed of 74.9% Hydrogen, 23.9% Helium, and other elements.

The Sun has a dynamic magnetic field which flips polarity every 11 years. Magnetic field disturbances affect convection on the Sun’s

surface and lead to cooler, darker areas (about 6400 degrees Fahrenheit) called sunspots. The Magnetic Field-Sunspot cycle may affect Earth’s weather and climate.

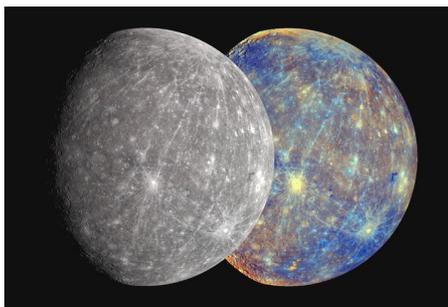


Photo 1: Mercury in color.

MERCURY is the smallest planet at 3,000 miles in diameter and also closest to the Sun at 34 million miles distant. Mercury orbits the Sun every 88 days and takes 58 days to rotate on its axis. This means that a day on Mercury can last 176 Earth days. There is no

atmosphere – which creates a hellish environment. Temperatures in daytime climb to plus 790F degrees and drop to minus 274F degrees at night.

Mercury can be difficult to observe as it is never far from the Sun. The best time for observing is when it is furthest from the Sun as seen from Earth. This is called maximum elongation and is still fairly close to the horizon. It appears as a bright, star-like object. Mercury’s surface is covered with millions of craters, but no surface features can be seen with a telescope.

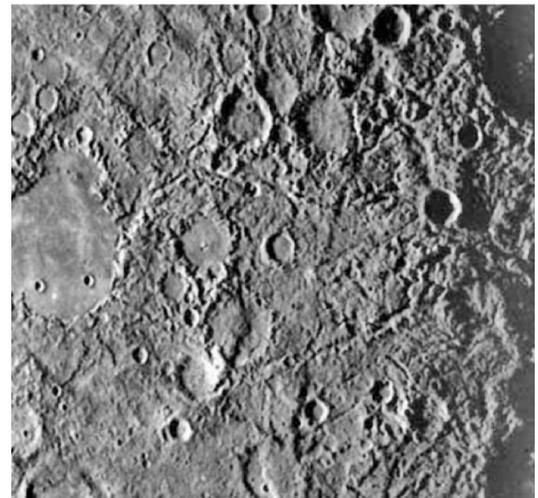


Photo 2: Mercury's Surface

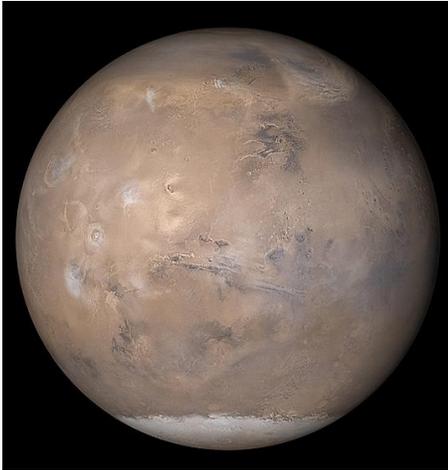


VENUS is our nearest neighbor among the planets and is also the brightest planet in the night sky. If you know exactly where to look, you can see Venus in the daytime. Venus is the closest planet to Earth in size, just slightly smaller than we are. People once thought that Venus was a good candidate for finding life such as we have on the Earth. But now we know it to be very hot – several hundred degrees – and its atmospheric pressure is 92 times that of the Earth.

When you see Venus in the sky it is never more than about 45 degrees above the horizon. It alternates between being an evening sky or a pre-dawn sky object. In the evening look for it in the west, and before dawn look for it in the east. It is easy to find, since when visible it is always the brightest object in the sky after the sun and moon. But if a bright object



is high in the sky, it cannot be Venus. The next brightest object after Venus is Jupiter and occasionally Mars.

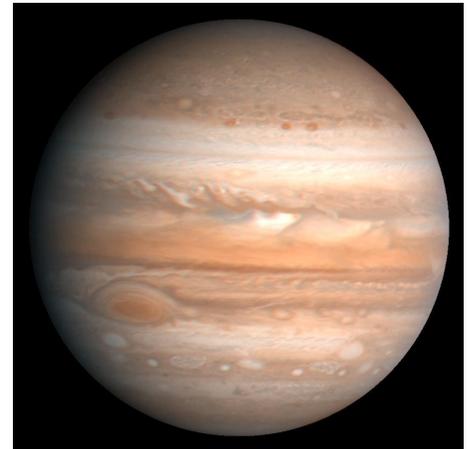


MARS is the last terrestrial planet and orbits just beyond Earth. Though small and dim, Mars is easily observed from Earth when the planets lie in close orbit. Mars has two tiny moons, Phobos and Deimos. Mars is Earth's smaller twin in many ways. The Martian day is just over 24.5 hours long and it is tilted on its axis by 25.2° (Earth is tilted 23.5°). Unlike Earth, Mars was too small to retain enough of its internal heat and quickly cooled, losing most of its atmosphere.

Mars wasn't always dead. It once may have been much like Earth. Mars once had a much denser atmosphere, liquid seas, and monstrous volcanoes. Olympus Mons is not just the largest volcano on Mars but the largest in the solar system. Mars still has a limited atmosphere and carbon dioxide ice at its poles. This ice melts throughout the year, fueling weather changes across the surface. NASA is currently searching for evidence of microbial life on Mars.

JUPITER is the largest planet in the Solar System with a diameter about 11 times that of Earth.

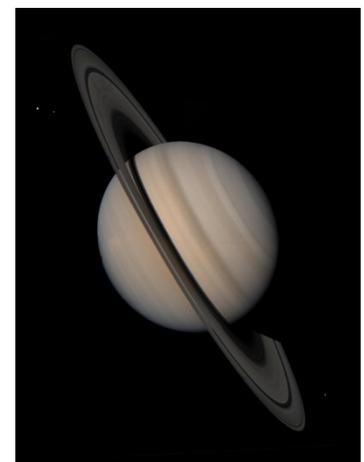
- Jupiter is over five times farther from the Sun than the Earth is.
- It takes Jupiter about 12 years to go around the sun.
- Jupiter is so massive that it weighs two and a half times as much as all the other planets in the Solar System combined.
- Jupiter is a gas giant, composed mostly of hydrogen and helium.
- Jupiter has at least 63 moons. The largest ones were discovered by Galileo in the early 17th century. They are called the Galilean Moons and you can see them with a small telescope. Some people can even see them with a good set of binoculars.
- The moons go around Jupiter quite quickly – in as little as two days – so you can see them in different positions night after night.
- The planet is named after the Greek God, Jupiter. The names of the Galilean moons are Io, Callisto, Europa, and Ganymede. Ganymede has a diameter greater than the planet Mercury.
- The term Jovian is derived from Jupiter and describes the four gas giant planets in the solar system: Jupiter, Saturn, Uranus, and Neptune. They have very large masses and are farther from the Sun than the terrestrial planets.



SATURN is the second largest Jovian planet and orbits the Sun at a distance nearly twice the distance from Jupiter to the Sun. Like all gas giants, Saturn has a deep atmosphere and a small rocky core. The diameter of Saturn is 9.5 times greater than Earth and its core is about the size of Earth. Like Jupiter, Saturn's atmosphere is primarily hydrogen.

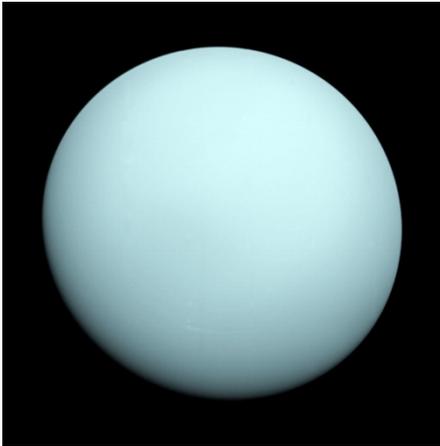
Saturn's most notable features are the gorgeous dust rings that rotate about its equator. Once thought to be a unique feature of Saturn, we now know that all gas giants have ring systems.

Saturn is notable for several truly bizarre and unique features. Wind speeds measured along Saturn's equator can exceed 1,100 mph. Its density is lower than water, meaning it would float on Earth. Saturn has over 50 satellites, the





largest of which is Titan. Titan is larger than Mercury and has a weak, nitrogen-rich atmosphere. Though it takes almost thirty (Earth) years for Saturn to complete one orbit, a day on Saturn is only about 10 hours long.



URANUS is 1,783 million miles from the Sun, so one orbit takes 84 Earth years. Its atmosphere is comprised of hydrogen gas and its surface is solid ice with a temperature of minus 350F degrees. The bluish color comes from a thin layer of methane gas that hovers above the planet's 32,000-mile diameter surface.

Uranus was discovered by the astronomer William Herschel in 1781. Through his telescope, he noticed what looked like a faint star that was not on current star charts. It was a new planet. The planet was named by Johann Bode in 1781 after the ancient Greek deity of the sky Uranus, the father of Kronos (Saturn) and grandfather of Zeus (Jupiter).

Uranus has 27 known moons, most of which are named after characters that are mentioned in the works of William Shakespeare and Alexander Pope. The largest, Titania, is the eighth-largest moon in the Solar

System, about one-twentieth the mass of Earth's Moon.



NEPTUNE is 31,400 miles in diameter and its distance from the Sun is 2,800 million miles. A trip around the Sun takes 165 Earth years. Its surface temperature is minus 364F degrees. Like Uranus, its atmosphere is bluish in color and made up of hydrogen gas with a surface of solid ice.

Neptune is 17 times the mass of Earth, slightly more massive than its near twin Uranus.

Neptune was not initially found with a telescope. In 1846 a French scientist, Urbain Le Verrier, noticed that the orbit of Uranus seemed to be affected by another unseen planet. A telescopic search found Neptune.

Neptune was known to have 13 moons until NASA announced the discovery of Neptune's 14th moon in 2013. The image of the new moon, Neptune's tiniest, was captured by the Hubble Space Telescope.

**Photos from the NASA Image Library*