

G*alactic Observer*

John J. McCarthy Observatory

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A View From the Edge

An image of the Moon taken through the lens of the Earth's atmosphere by the crew of the International Space Station (see page 14). On Saturday, October 8, the McCarthy Observatory will celebrate International Observe the Moon Night (see pages 4, 17).

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It is through their efforts that the McCarthy Observatory has established itself as a significant educational and recreational resource within the western Connecticut community.

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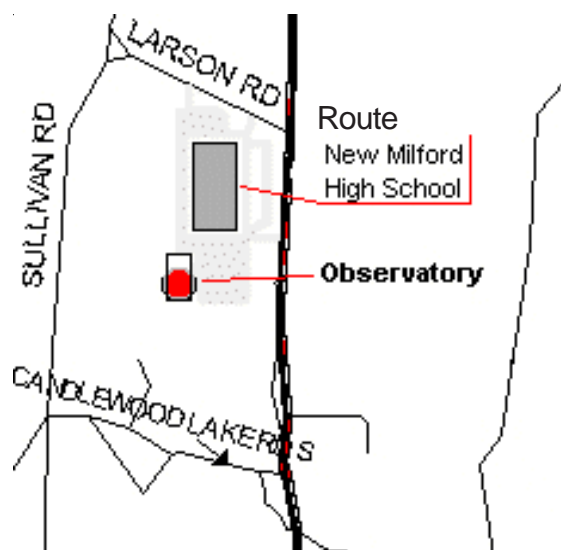
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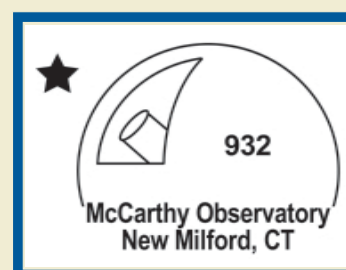
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October Astronomy Calendar and Space Exploration Almanac



International Observe the Moon Night

ON OCTOBER 8th, the McCarthy Observatory will be participating in the *International Observe the Moon Night (InOMN)*.

The event was first inspired by public outreach events held in August 2009 by the Lunar Reconnaissance Orbiter (LRO) and Lunar CRater Observation and Sensing Satellite (LCROSS) educational teams at the Goddard Space Flight Center in Greenbelt, Maryland and at the Ames Research Center in Moffett Field, California, respectively. In 2010, the Lunar and Planetary Institute and Marshall Space Flight Center joined Goddard and Ames in a world-wide event to raise public awareness of lunar science and exploration. This year will be the second annual InOMN. Additional information on scheduled events can be found on the Web at <http://observethemoonnight.org/>.

Activities will begin at the McCarthy Observatory at 7:00 pm (regardless of the weather). If clear skies prevail, visitors will have the opportunity to explore the features

of an 11-day old Moon through the Observatory's suite of telescopes and binoculars. In addition (and in the event of inclement weather), the Observatory staff will present talks on several lunar-related topics and conduct mini-workshops on lunar observing. Visitors will have the opportunity to:

- Sketch the Moon as Galileo did 400 years ago through a telescope (weather permitting)
- View actual fragments of lunar meteorites and learn how we know that they came from the Moon and what they tell us
- See how craters are formed with an interactive exhibit
- Learn about lunar and solar eclipses by visiting the scale model Earth (and model Moon) at the high school
- Learn how the regolith, or "stone blanket", that covers the surface of the Moon differs from soil on Earth. A sample of lunar simulant (mined on Earth for NASA) will be available for visitors to explore the texture and properties of the Moon's regolith
- Enjoy the latest and best images and moonscapes from the LRO spacecraft and learn about some of the discoveries from its two years in orbit
- Learn about NASA's latest mission to the Moon (GRAIL) and how students can participate



The Year of the Solar System

NASA announced on Oct. 7, 2010 that the upcoming year would be “The Year of the Solar System.” The “Year,” however, is a Martian year and, as such, 23 months in length. Some of the highlights of the “Year” of exploration are:

Date	Mission	Status
4 Nov 2010	Deep Impact encounters Comet Hartley 2	Successful rendezvous, see http://www.nasa.gov/mission_pages/epoxi/index.html
19 Nov 2010	Launch of O/OREOS, a shoebox-sized satellite designed to test the durability of life in space	Ground stations receiving data
19 Nov 2010	Launch of an experimental solar sail (NanoSail-D) aboard the Fast Affordable Scientific and Technology Satellite (FASTSAT)	Delayed separation from FASTSAT on 17 Jan 2011, deployment confirmed, sail is operational
7 Dec 2010	Japan's Akatsuki (Venus Climate Orbiter) spacecraft	Spacecraft fails to enter orbit around Venus - now in orbit around the Sun
14 Feb 2011	Stardust NExT encounters Comet Tempel 1	Successful rendezvous; see http://stardustnext.jpl.nasa.gov/
17 Mar 2011	MESSENGER enters orbit around Mercury	First spacecraft to achieve orbit around Mercury; see http://messenger.jhuapl.edu/
18 Mar 2011	New Horizons spacecraft crosses the orbit of Uranus	4+ more years to Pluto; see http://pluto.jhuapl.edu/
16 Jul 2011	Dawn spacecraft arrives at the asteroid Vesta	Orbit achieved; see http://dawn.jpl.nasa.gov/
5 Aug 2011	Launch of the Juno spacecraft to Jupiter	Successful launch/deployment; see http://missionjuno.swri.edu/
10 Sept 2011	Launch of twin GRAIL spacecraft to map Moon's gravitational field	Successful launch/deployment; see http://solarsystem.nasa.gov/grail/
8 Nov 2011	Launch of the Phobos-Grunt sample-return mission	
25 Nov 2011	Launch of Mars Science Laboratory (MSL)	
Aug 2012	MSL lands on Mars	

Other notable events:

- | | |
|-------------------|--|
| • August 9, 2011 | Opportunity reached the rim of Endeavour crater |
| • October 8, 2011 | 2 nd International Observe the Moon Night |
| • March 3, 2012 | Mars at Opposition |
| • May 20, 2012 | Annular Solar Eclipse (visible in southwest U.S.) |
| • June 6, 2012 | Venus Transit |

"Out the Window on Your Left"

It's been 39 years since we left the last footprint on the dusty lunar surface. Sadly, as a nation founded on exploration and the conquest of new frontiers, we appear to have lost our will to lead as a space-faring nation. But, what if the average citizen had the means to visit our only natural satellite; what would they see out the window of their spacecraft as they entered orbit around the Moon? This column may provide some thoughts to ponder when planning your visit (if only in your imagination).

In preparation of the *International Observe the Moon Night* on the 8th, the view this month is of an eleven day old moon. This will be the phase on the 8th. The view might differ slightly from that depicted below due to our

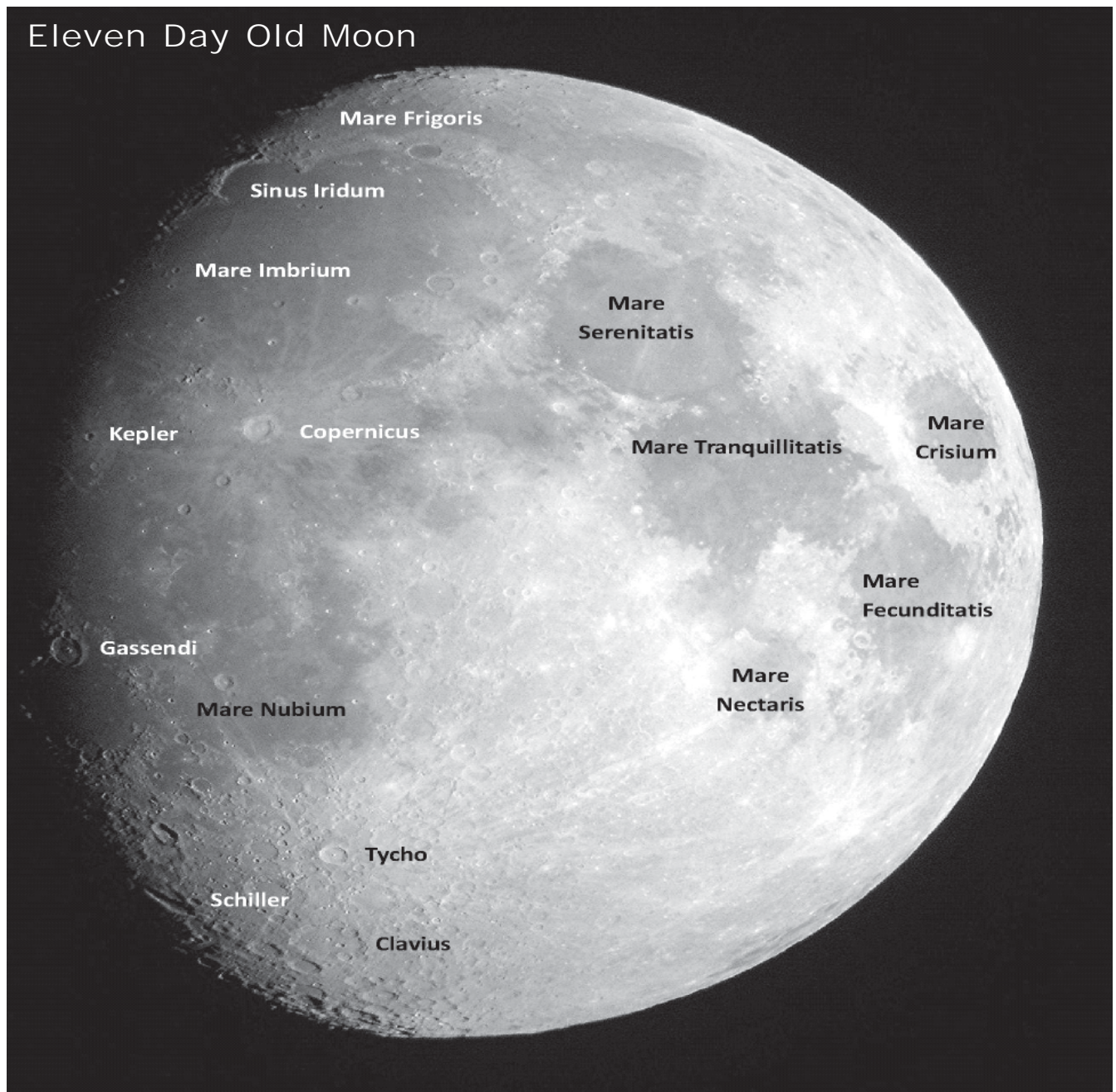
vantage point on Earth, the Moon's axial tilt, and elliptical orbit.

Dark lunar seas set against the bright lunar highlands dominate the eastern limb of the Moon (on the right). While these ancient lava-filled basins are rich in observing targets, the high Sun in the lunar sky washes out much of the detail. Better hunting is found along the terminator that divides the sunlit portion of the Moon from the darkness.



Lunar "seas" are actually expansive low-lying plains formed by ancient lava flows

Eleven Day Old Moon



Starting in the north along the terminator is Sinus Iridum (the Bay of Rainbows). The remnant of a crater, the bay was formed when the southern rim was breached and the crater flooded by ancient lava flows.

The “bay” opens up to Mare Imbrium (the Sea of Showers or Rains), one of the younger impact basins. The Apennine Mountains, some of the highest on the Moon, form the southeast boundary. It was in the foothills of the Apennines that Apollo 15 landed.

South and west of Mare Imbrium is one of the largest, but not nearly so well-defined, impact features: Oceanus Procellarum (the Ocean Storms). Landing site of Apollo 12, the area features the classic complex crater Copernicus with its broad flat floor, terraced ramparts and bright impact rays. The small crater Kepler lies just to the west and on the terminator on the 8th.

Mare Humorum (the Sea of Moisture) is found by following the terminator south from Kepler. The sea is punctuated by the prominent and flooded crater Gassendi. Larger than Copernicus, the crater floor is crisscrossed with clefts and ridges, most likely produced from volcanic activity in and around the mare.

Entering the lunar highlands, comprised of the original lunar crust, you will find a plethora of craters and impact features. Notable during this phase is the crater

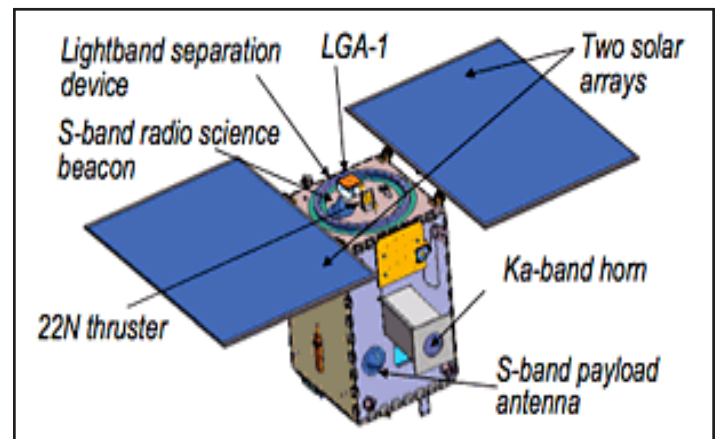
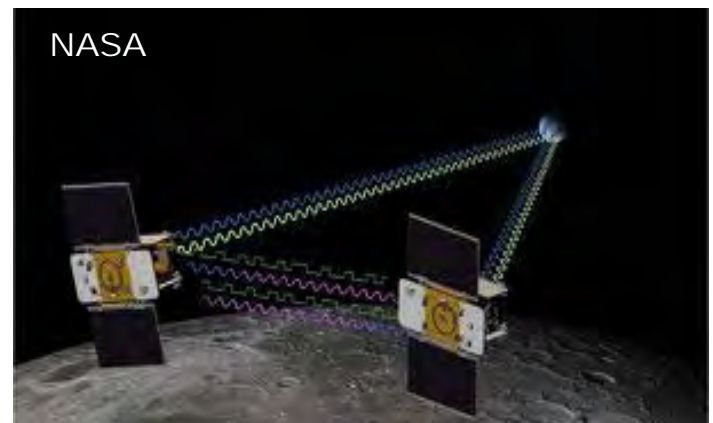
Tycho with its magnificent ray system and the walled plain, Clavius. Along the terminator is the oblong crater Schiller, created eons ago by an oblique impact.

Moon Bound

After a series of weather delays, a Delta II rocket lifted off from Cape Canaveral on Saturday morning, September 10th, carrying with it NASA's two Gravity Recovery and Interior Laboratory (GRAIL) spacecraft. The twin spacecraft are expected to reach the Moon on New Year's Eve and New Year's Day, respectively. Flying in formation, the spacecraft will be used to detect small changes in the Moon's gravity. Scientists will use the information to model the interior of the Moon.

GRAIL MoonKAM

GRAIL MoonKAM (Moon Knowledge Acquired by Middle school students) is an outreach program led by Dr. Sally Ride in collaboration with undergraduate students at the University of California San Diego. The program allows students to select areas of the Moon for imaging. The images will be used to learn about the Moon's surface features. The program will begin in 2012 and last approximately 80 days. Teachers can register at <https://moonkam.ucsd.edu/home>.



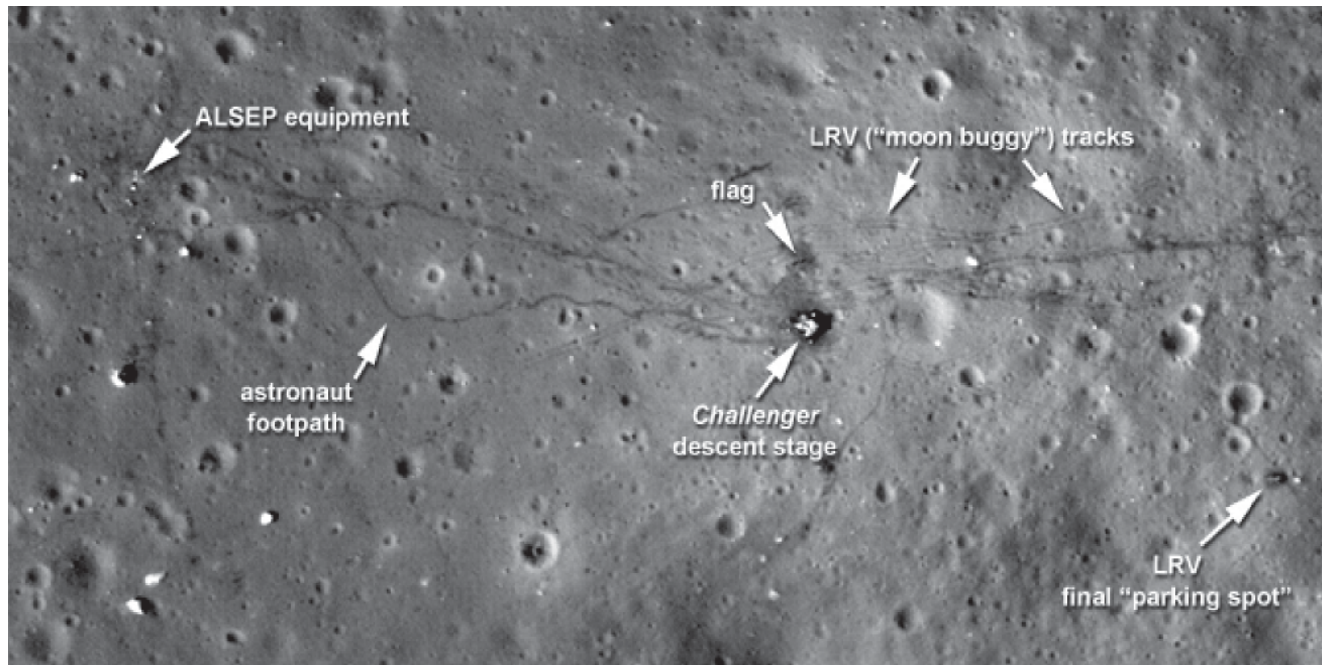
Artist's concept and diagram of GRAIL's Twin Spacecraft (Source: NASA)

New Images of Historic Sites

On September 6th, NASA released new images from the Lunar Reconnaissance Orbiter (LRO) of the Apollo landing sites. The images provide a much higher resolution overview of the sites than were initially acquired in 2009. The improvement was possible because the elliptical orbit of the LRO was temporarily modified so that the low point brought the spacecraft much closer to the surface (from 31 miles to as low as 13 miles).

The new images show the footpaths created by the astronauts in the lunar regolith as well as the twin tracks of the lunar rover on the later missions. With the higher resolution, scientists can now retrace the lunar excursions and validate the locations of the rock samples returned to Earth.

The new images can be found at http://www.nasa.gov/mision_pages/LRO/news/apollo-sites.html. The image (below) shows the exploits of the Apollo 17 astronauts Gene Cernan and Harrison Schmitt. The descent stage of the lunar module (Challenger) is visible as is the instrument package (ALSEP) left behind on the surface. The parallel tracks cut into the regolith 39 years ago by the battery-powered lunar rover's steel-mesh tires are clearly seen as is the rover.



Apollo 17 landing site in the Taurus-Littrow region, located on the southeastern shore of Mare Serenitatis (Sea of Serenity). Credit: NASA's Goddard Space Flight Center/ASU

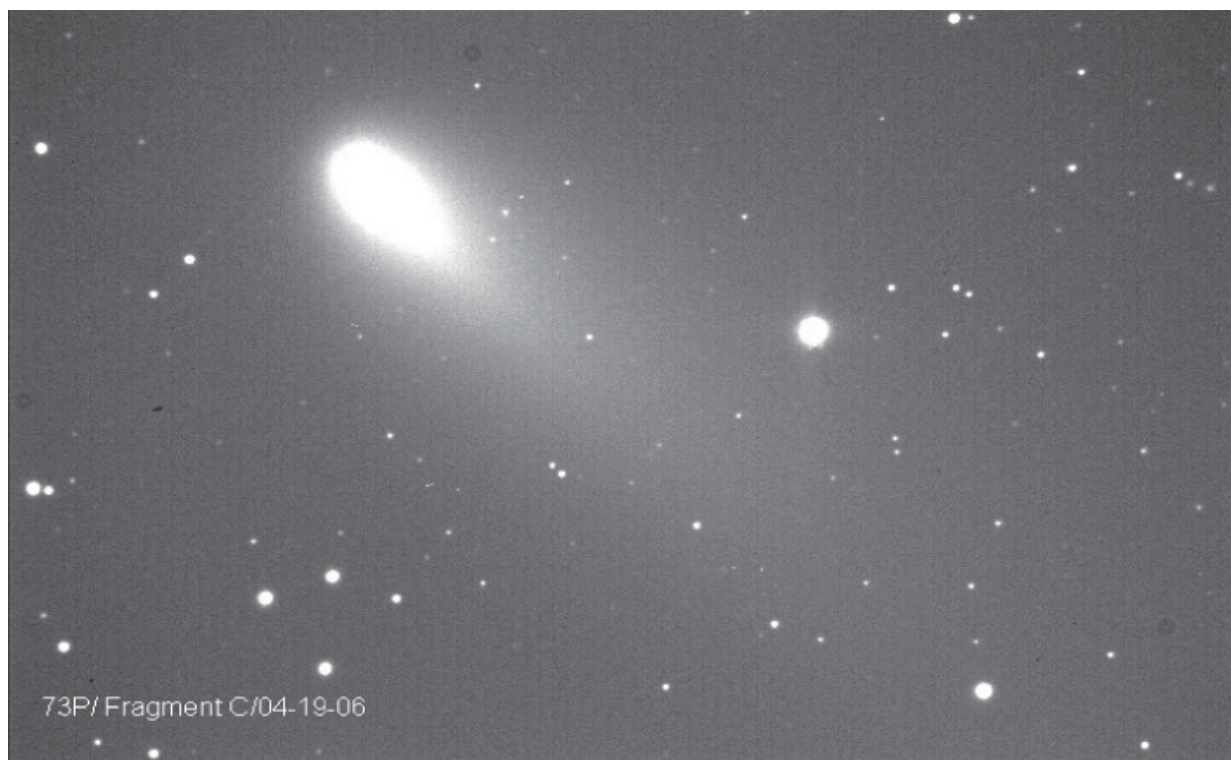
Return of Comet 73P-C/ Schwassmann-Wachmann?

73P/Schwassmann–Wachmann is (or was) a periodic comet that revisited the inner solar system once every 5 years. The comet was first discovered by astronomers Arnold Schwassmann and Arno Arthur Wachmann in 1930. It was the third and last comet found by this pair of astronomers and is also called Comet Schwassmann-Wachmann 3. The comet was lost for almost 50 years when a close approach to Jupiter altered its orbit. The comet was then re-discovered in 1979 by astronomers at the Perth Observatory in Australia.

In 1995, astronomers noticed an increase in the comet's activity. It was found to have broken into five large pieces (designated A, B, C, D and E). When observed in 2006, almost 40 individual pieces were detected. If the breakup continues, this will be the end of 73P. The remains would then be designated as 73D.

No one knows what caused the comet to come apart. The comet may have collided with another object in its travels or, like Shoemaker-Levy 9, a close pass to the planet Jupiter could have been enough to disrupt the comet's core. Another likely explanation is thermal stress. As this icy dirtball travels from the frigid outer solar system to the warmer inner solar system, the heat from the sun causes the frozen gases trapped inside the comet to expand, forcing the fragments apart. Scientists learned from the Deep Impact mission that some comets, like Schwassmann-Wachmann 3, are comprised of loosely packed grains of ice and dust, no stronger than a snow bank and only held together by gravity.

The largest remaining piece of the comet (designated 73P-C) will make its closest approach to the Sun on October 16th, 2011. A photo (next page) of fragment C was taken from the McCarthy Observatory on April 19th, 2006.



73P/ Fragment C/04-19-06

The Solar Cycle

The Sun's activity waxes and wanes on an eleven year cycle. One measure of activity is the number of sunspots. The number correlates with the total solar irradiance (brightness summed across all wavelengths), solar wind pressure and solar radio emissions. However, as with weather on Earth, solar weather can be unpredictable.

Solar Cycle 24 was originally expected to begin in 2008. Instead of the activity increasing, the Sun defied expectations and headed into a deeper minimum. There were no sunspots observed on 266 of that year's 366 days (73%) (the least active period since 1913). This was followed by a comparable spotless period (71%) in 2009. Solar activity appeared to be returning in 2010 with only 14% of the days without a visible sunspot and a near continuous parade of sunspots across the solar disk in 2011. Current predictions are for a peak of activity in early 2013; however, this could be the least active sunspot cycle in over 100 years.

Imagination and Vision

One hundred and eleven years ago (1899), on a quiet October afternoon in Worcester, Massachusetts, a 17 year old Robert Goddard climbed a tall cherry tree in the backyard to trim some dead limbs. From high in the tree, he looked out upon the horizon and imagined how wonderful it would be to create a means of traveling to the planet Mars. Twenty-seven years later, in 1926, Goddard would launch the world's first liquid fuel rocket from a field in nearby Auburn. Today

he is considered one of the founding fathers of modern rocketry.

Martian Invasion

In the late 1930s, a critically acclaimed New York drama company was founded by Orson Welles and John Houseman (with total monetary assets of \$100). Together they produced "The Mercury Theatre on the Air." The first show was broadcast on CBS radio in July 1938. Originally without a sponsor, the program was picked up by Campbell's Soup after the October 30th broadcast of H.G. Wells' "War of the Worlds." Orson Welles' adaptation incorporated simulated news bulletins of a Martian invasion during a seemingly ordinary broadcast of a local orchestra. Many listeners panicked, fearing a real Martian invasion and the destruction of Grovers Mill, New Jersey. While the production was strongly denounced for its deceptive tactics, it did propel the 23 year old Welles on his way to fame and fortune.

You can download the complete radio broadcast at <http://www.mercurytheatre.info/>.



Retrospective: Halloween 2008



Venus chases a crescent moon into the deepening pumpkin-colored twilight

Jupiter and its Moons

Jupiter reaches Opposition on October 29th. While relatively low in the evening sky for most of the month,



you might have to wait until midnight (or later) for steady views of the gas giant. As one of the brightest star-like objects in the night sky, Jupiter can be found in the constellation Aries.

One of the more interesting and easier events to observe through a tele-

scope is the projection of a shadow from one of Jupiter's moons on the Jovian disk as the moon passes in front of (or transits) the planet. The photo on the right shows the shadow of Ganymede on the Jovian disk. On nights of good seeing the following events should be visible through a moderately-sized telescope (between approximately 8 pm and midnight).

Date	Moon	Transit Begins	Transit Ends
2 nd	Ganymede	9:40 pm	11:41 pm
4 th	Io	11:07 pm	1:17 am (5 th)
10 th	Europa	7:14 pm	9:42 pm
13 th	Io	7:30 pm	9:40 pm
17 th	Europa	9:50 pm	12:18 am (18 th)
20 th	Io	9:25 pm	11:35 pm
27 th	Io	11:19 pm	1:30 am (28 th)

Transit of Jupiter's Red Spot

The Red Spot is a large cyclone in the upper Jovian atmosphere. The rapid rotation of this gas giant (10 hours) may be responsible for the longevity of this storm, which has been observed for over 300 years. The Red Spot will

cross the center line of the planetary disk on the following evenings during the hours of approximately 8 pm to midnight local time (EDT):

Date	Transit Time	Date	Transit Time
2 nd	10:38 pm	17 th	12:08 am
5 th	12:16 am	19 th	9:37 pm
5 th	8:07 pm	21 st	11:15 pm
7 th	9:45 pm	24 th	8:44 pm
9 th	11:23 pm	26 th	10:22 pm
12 th	8:52 pm	28 th	midnight
14 th	10:30 pm	31 st	9:29 pm

October Nights

As the nights grow longer and cooler our view of the night sky begins to change. Summer evenings showcase our own galaxy, the Milky Way. The center of our spiral galaxy is in the direction of the constellation Sagittarius, which appears in the southern sky throughout the summer. In the autumn, as Sagittarius disappears into the west, the stars forming the Great Square of Pegasus rise in the east. Following Pegasus is the Andromeda Galaxy, one of the most distant objects that can be seen with the unaided eye at approximately 2.5 million light years (14.7 trillion miles). With the rising of Andromeda, we begin to look outward to the outer arms of our own galaxy and to other galaxies far, far away.

Sunrise and Sunset

<u>Sun</u>	<u>Sunrise</u>	<u>Sunset</u>
October 1 st (EDT)	06:50	18:36
October 15 th	07:05	18:13
October 31 st	07:24	17:50

Astronomical and Historical Events

- 1st Mars passes in front of the Beehive star cluster (M44) in the early morning sky
- 1st Flyby of Saturn's moon Enceladus by the Cassini spacecraft
- 1st Distant flyby of Saturn's moons Epimetheus and Calypso by the Cassini spacecraft
- 1st History: NASA created by the National Aeronautics and Space Act (1958)
- 2nd History: Opening of the Hayden Planetarium (1935)
- 3rd First Quarter Moon
- 3rd History: launch of the fifth Mercury flight, piloted by astronaut Walter Schirra (1962)
- 3rd History: Chassigny meteorite fall; determined to originate from the planet Mars (1815)
- 4th History: SpaceShipOne rockets to an altitude of almost 70 miles to win the \$10 million Ansari X Prize (2004)
- 4th History: launch of Luna 3; Soviet spacecraft was first to photograph the far side of the Moon (1959)
- 4th History: launch of Sputnik 1, world's first artificial satellite (1957)

Astronomical and Historical Events (continued)

- 5th History: Robert Goddard born, founding father of modern rocketry (1882)
- 6th History: Asteroid 2008 TC3 discovered by astronomers on Mt. Lemmon less than 24 hours before exploding over the Sudan. The McCarthy Observatory submitted the last accepted observation. Fragments of the asteroid were eventually recovered. (2008)
- 6th History: launch of the space shuttle Discovery and the solar polar orbiter spacecraft Ulysses (1990)
- 8th **International Observe the Moon Night (and Second Saturday Stars)**. Activities begin at the McCarthy Observatory at 7:00 PM
- 8th History: discovery of Supernova 1604 (Kepler's Nova) (1604)
- 9th Draconids Meteor Shower peak (produced by debris from Comet Giacobini-Zinner)
- 9th History: LCROSS impacts crater Cabeus near the Moon's south pole in search of water (2009)
- 9th History: Peekskill meteorite fall; 27 pound meteorite hits a 1980 Chevy Malibu sitting in its driveway in Peekskill, NY (1992)
- 10th History: inauguration of the Very Large Array, one of the world's premier astronomical radio observatories; located west of Socorro, New Mexico (1980)
- 10th History: enactment of the Outer Space Treaty: 1) prohibited placement of nuclear and other weapons of mass destruction in orbit, on the Moon or other celestial body and 2) limited the use of the Moon and other celestial bodies to peaceful purposes (1967)
- 10th History: discovery of Neptune's moon Triton by William Lassell (1846)
- 11th Full Moon (Full Hunters Moon); visually smallest full moon of 2011 due to its near maximum distance from Earth
- 11th History: NASA's historic 100th space shuttle flight as Discovery carries the Z1 Truss (first piece of the ISS structural backbone) into space (2000)
- 11th History: Magellan spacecraft burns up in the Venusian atmosphere after completing its mission to map the planet with its imaging radar (1994)
- 11th History: launch of first manned Apollo mission (Apollo 7) with astronauts Schirra, Eisele and Cunningham (1968)
- 11th History: launch of WAC Corporal, first man-made object (16 foot rocket) to escape Earth's atmosphere (1945)
- 12th Moon at apogee (furthest distance from Earth in its orbit)
- 12th History: launch of Voskhod 1; Soviet spacecraft was first to carry multiple (3) cosmonauts (a pilot, scientist and physician) into space. Due to the cramped conditions the crew flew without spacesuits, ejection seats, or an escape tower (1964)
- 12th History: first Symposium on Space Flight held at the Hayden Planetarium in New York City; participants included Wernher von Braun, Willy Ley, and Fred L. Whipple; topics included an orbiting astronomical observatory, survival in space, circumlunar flight, a manned orbiting space station, and the question of sovereignty in outer space (1951)
- 13th History: launch of Shenzhou 6, China's second manned spacecraft (2005)
- 13th History: launch of Explorer 7; spacecraft measured solar X-rays, energetic particles, and cosmic rays (1959)
- 13th History: formation of the British Interplanetary Society by Phillip Cleator in Liverpool (1933)
- 14th History: three main belt asteroids discovered by the McCarthy Observatory while searching for NEOs. 2003 TG10 (its provisional name) was subsequently named after Monty Robson (115449 Robson), the founder and current director of the observatory (2003)
- 14th History: launch of Shenzhou 5, first Chinese manned spacecraft (2003)
- 14th History: Air Force Captain Chuck Yeager breaks the sound barrier in the Bell X-1 rocket plane (called "Glamorous Glennis" as a tribute to his wife). The plane reached a speed of 700 miles per hour after being launched from the bomb bay of a Boeing B-29 (1947)
- 15th Dwarf Planet Eris (formally 2003 UB313 and/or Xena) at Opposition; first Kuiper Belt object discovered to be larger than Pluto (95.606 AU)
- 15th Kuiper Belt Object 55636 (2002 TX300), discovered by the Palomar Mountain Near-Earth Asteroid Tracking (NEAT) program in 2002, at Opposition (40.850 AU)
- 15th History: launch of the Cassini spacecraft to the planet Saturn (1997)
- 16th Comet 73P-C/Schwassmann-Wachmann C at Perihelion (closest to the Sun) (0.943 AU)
- 16th History: launch of GOES 1, first weather satellite placed in geosynchronous orbit (1975)

Astronomical and Historical Events (continued)

- 17th Comet C/2010 X1 (Elenin) closest approach to Earth (0.233 AU)
- 18th History: launch of the space shuttle Atlantis (STS-34) and Galileo spacecraft to Jupiter (1989)
- 18th History: discovery of Chiron by Charles Kowal; Chiron has the characteristics of both a comet and an asteroid. These types of objects are called Centaurs after a mythological being that are half human/half horse (1977)
- 18th History: Soviet spacecraft Venera 4 enters the atmosphere of Venus; first probe to analyze the environment (in-situ) of another planet (1967)
- 18th History: discovery of Asteroid 8 Flora by John Hind (1847)
- 19th Last Quarter Moon
- 19th Flyby of Saturn's moon Enceladus by the Cassini spacecraft
- 19th Distant flyby of Saturn's moon Telesto by the Cassini spacecraft
- 19th History: flyby of the planet Venus by the Mariner 5 spacecraft (1967)
- 19th History: Subrahmanyan Chandrasekhar born; awarded Nobel Prize in Physics (1983) for studies of the structure and evolution of stars; NASA named its premier X-ray observatory the Chandra X-ray telescope in his honor (1910)
- 20th History: launch of the Soviet spacecraft Zond 8; moon flyby mission (1970)
- 20th History: discovery of asteroid 577 Rhea by Max Wolf (1905)
- 21st Orionids meteor shower peak (produced by debris from Comet Halley)
- 21st Kuiper Belt Object 15760 (1992 QB1); first resident of the Kuiper Belt found beyond Pluto makes its closest approach to Earth (40.132 AU)
- 21st History: opening of the Yerkes Observatory in Williams Bay, Wisconsin; home of the world's largest refractor with its 40-inch objective lens manufactured by Alvan Clark and Sons (1897)
- 22nd History launch of Chandrayaan-1, India's first mission to the Moon (2008)
- 22nd History: Soviet spacecraft Venera 9 touches down on Venus and transmits first pictures (black and white) of its surface (1975)
- 22nd History: launch of the Soviet Moon orbiter Luna 12 to take high-resolution photos of the Moon's surface from lunar orbit (1966)
- 23rd History: first time female commanders led orbital missions at the same time: Pamela Melroy commanded space shuttle Discovery (STS-120) to the International Space Station (ISS) while Peggy Whitson led the Expedition 16 team aboard the ISS in the installation of a new orbital node for the ISS (2007)
- 24th Asteroid 230 Athamantis at Opposition (9.9 Magnitude)
- 24th History: launch of Chang'e-1, Chinese lunar orbiter, from the Xichang Satellite Launch Center in the southwestern province of Sichuan (2007)
- 24th History: launch of Deep Space 1; first of a series of technology demonstration probes developed by NASA's New Millennium Program; propulsion was provided by a xenon ion engine that operated for a total of 16,265 hours (1998)
- 24th History: discovery of Uranus' moons Umbriel and Ariel by William Lassell (1851)
- 25th History: launch of the twin Solar Terrestrial Relations Observatories (STEREO A and B); 3-D studies of the Sun and coronal mass ejections (2006)
- 25th History: Soviet spacecraft Venera 10 touches down on Venus 2,200 km from its twin Venera 9; lands on a flat boulder that was determined to be similar in composition to basalt on Earth (1975)
- 25th History: discovery of Saturn's moon Iapetus by Giovanni Cassini (1671)
- 26th New Moon
- 26th Moon at perigee (closest distance to Earth)
- 27th History: first test flight of the Saturn I rocket (1961)
- 27th History: Canon City meteorite fall; hit garage (1973)
- 28th Jupiter at Opposition (EDT), rising with the setting Sun and visible all night
- 28th History: first test flight of the Ares I-X rocket; a two minute powered suborbital flight (2009)
- 28th History: launch of Prospero spacecraft, Great Britain's first space launch (1971)
- 29th Kuiper Belt Object 55637 (2002 UX25) at Opposition; trans-Neptunian object discovered by the Spacewatch program on October 30, 2002 (40.454 AU)

Astronomical and Historical Events (continued)

- 29th Tech Fest: celebration of science and technology at Nonnewaug High School in Woodbury, CT, 11:00 am to 4:00 pm
- 29th History: launch of the space shuttle Discovery (STS-95) with astronaut and then U.S. Senator, John Glenn (1998)
- 29th History: flyby of asteroid Gaspra by the Galileo spacecraft on mission to Jupiter (1991)
- 30th Scheduled launch of a Progress cargo-carrying spacecraft from the Baikonur Cosmodrome in Kazakhstan to the International Space Station
- 30th History: discovery of the Los Angeles (Mars) Meteorite (1999)
- 30th History: launch of Venera 13, Soviet Venus lander; lander survived for 127 minutes on the surface where the temperature was recorded at 855 °F (1981)
- 30th History: Mercury Theatre broadcasts Orson Welles' adaptation of H.G. Wells "War of the Worlds" (1938)
- 31st Kuiper Belt Object 84522 (2002 TC302) at Opposition; large trans-Neptunian object discovered on October 9, 2002 by Mike Brown's team at the Palomar Observatory (45.071 AU)
- 31st History: birthday of Apollo 11 Command Module pilot Michael Collins (1930)
- 31st History: first rocket engine tests by three young rocketeers that would be the beginning of what would become the Jet Propulsion Laboratory (1936)

References on Distances

- The apparent width of the moon (and Sun) is approximately one-half a degree ($1/2^\circ$), less than the width of your little finger at arm's length which covers approximately one degree (1°); three fingers span approximately five degrees (5°)
- One astronomical unit (AU) is the distance from the Sun to the Earth or approximately 93 million miles

International Space Station/Space Shuttle/Iridium Satellites

Visit www.heavens-above.com for the times of visibility and detailed star charts for viewing the International Space Station, the Space Shuttle and the bright flares from Iridium satellites.

Solar Activity

For the latest on what's happening on the Sun and the current forecast for flares and aurora, check out www.spaceweather.com.

Image Credits

Front page and graphic calendars: Allan Ostergren

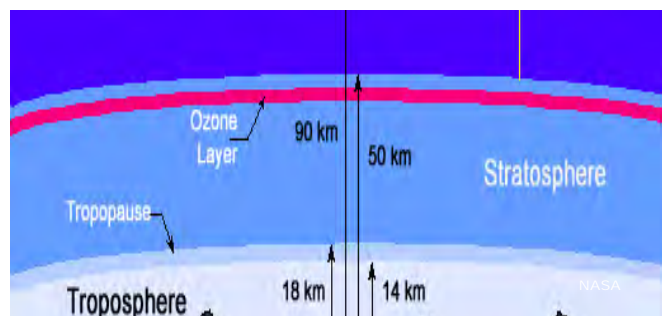
Page 3: An observatory-themed pumpkin designed by McCarthy Observatory volunteer, Ms. Cecilia Page, and displayed at Harrybrooke Park's 2010 "Pumpkins in the Park" event

All other non-credited photos were taken by the author: Bill Cloutier

Front Cover

An image of the moon taken by the Expedition 28 crew of the International Space Station. The dark at the bottom is the limb of the earth, where the curve of our planet meets the blackness of space. The orange band (troposphere) is the densest portion of our atmosphere, separated from the blue stratosphere above by a thin gray line (the tropopause). A detailed image of our atmosphere is at right.

(Source: NASA)



October 2011

Celestial Calendar

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday																																																																																				
<div><div>Sep 2011</div><table><tr><td>S</td><td>M</td><td>T</td><td>W</td><td>T</td><td>F</td><td>S</td></tr><tr><td></td><td></td><td></td><td></td><td>1</td><td>2</td><td>3</td></tr><tr><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr><tr><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td></tr><tr><td>18</td><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td></tr><tr><td>25</td><td>26</td><td>27</td><td>28</td><td>29</td><td>30</td><td></td></tr></table></div> <div><div>Nov 2011</div><table><tr><td>S</td><td>M</td><td>T</td><td>W</td><td>T</td><td>F</td><td>S</td></tr><tr><td></td><td></td><td></td><td></td><td>1</td><td>2</td><td>3</td></tr><tr><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr><tr><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td></tr><tr><td>18</td><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td></tr><tr><td>25</td><td>26</td><td>27</td><td>28</td><td>29</td><td>30</td><td></td></tr></table></div>						S	M	T	W	T	F	S					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30		S	M	T	W	T	F	S					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30		1 <div></div>
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2 <div></div> <div>Hayden Planetarium founded (1935)</div>	3 <div></div> <div>Launch of Mercury-Atlas 8 with Walter Schirra (1962)</div> <div></div> <div>Chassigny meteorite, determined origin of Mars (1815)</div>	4 <div></div> <div>SpaceShipOne X1, 70 miles up, to win Ansari X Prize (2004)</div> <div></div> <div>World Space Week, Oct. 4-10</div> <div></div> <div>Sputnik 1 first artificial satellite (1957)</div>	5 <div></div> <div>Robert Goddard born, rocket pioneer (1882)</div>	6 <div></div> <div>Launch of space shuttle Discovery and solar poler orbiter spacecraft Ulysses (1990)</div> <div></div> <div>Asteroid 2008 TC3, tracked by McCarthy Observatory, explodes over Sudan (2008)</div>	7 <div></div> <div>Launch of Explorer 6, with "paddlewheel satellite," a photocell scanner transmitting a crude picture of the earth's surface and cloud cover (1959))</div>	8 <div></div> <div>Discovery of Supernova 1604 (Kepler's Nova) (1604)</div> <div></div> <div>International Observe the Moon Night and 2nd Saturday Stars Open House McCarthy Observatory</div>																																																																																				
9 <div></div> <div>Draconids meteor shower peak</div> <div></div> <div>LCROSS impacts Moon's south pole (2009)</div> <div></div> <div>Peekskill meteorite hits Chevy Malibu (1992)</div>	10 <div></div> <div>Inauguration of the Very Large array in New Mexico (1980)</div> <div></div> <div>Discovery of Uranus' moon Triton by William Lassell (1846)</div>	11 <div></div> <div>WAC Corporal, first rocket to escape Earth's atmosphere (1945)</div> <div></div> <div>100th space shuttle flight carries Z1 Truss, backbone of the ISS (2000)</div> <div></div> <div>Launch of first manned Apollo mission (1968)</div>	12 <div></div> <div>Moon at apogee (farthest from Earth)</div> <div></div> <div>Launch of Voskhod 1, Soviet spacecraft, first to carry multiple cosmonauts (1964)</div> <div></div> <div>1st symposium on space travel, held at Hayden Planetarium (1951)</div>	13 <div></div> <div>British Interplanetary Society founded (1933)</div> <div></div> <div>Launch of Shenzhou 6, China's 2nd manned spacecraft (2005)</div> <div></div> <div>Launch of Explorer 7 spacecraft (1959)</div>	14 <div></div> <div>Chuck Yeager breaks sound barrier (1947)</div> <div></div> <div>Three main belt asteroids discovered by McCarthy Observatory (2003)</div>	15 <div></div> <div>Launch of Cassini spacecraft to planet Saturn (1997)</div>																																																																																				
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23 <div></div> <div>Pamela Melroy and Peggy Whitson first women to lead two missions at same time (shuttle and space station) (2007)</div>	24 <div></div> <div>Launch of Chang'e-1, Chinese lunar orbiter (2007)</div> <div></div> <div>Discovery of Uranus' moons Umbriel and Ariel by William Lassell (1851)</div>	25 <div></div> <div>Launch of twin Solar Terrestrial Relations Observatories (STEREO A&B) for 3-D studies of Sun (2006)</div> <div></div> <div>Discovery of Saturn's moon Iapetus by Giovanni Cassini (1671)</div>	26 <div></div> <div>Moon at perigee (closest distance to Earth)</div>	27 <div></div> <div>Cañon City, Colorado meteor hits garage - 1973</div> <div></div> <div>Jupiter at Opposition (EDT), rising with the setting Sun and visible all night</div>	28 <div></div> <div>First test flight of the Ares I-X rocket; a two minute powered suborbital flight (2009)</div> <div></div> <div>Launch of Prospero, Britain's first space mission (1971)</div>	29 <div></div> <div>Launch of space shuttle Discovery (STS-95) with astronaut and former senator John Glenn (1998)</div> <div></div> <div>JJMO at TechFest 2011</div>																																																																																				
30 <div></div> <div>Mercury Theatre War of Worlds broadcast with Orson Welles produces panic (1938)</div> <div></div> <div>Discovery of the Los Angeles (Mars) Meteorite (1999)</div>	31 <div></div> <div>Apollo 11 Command module pilot Michael Collins born (1930)</div> <div></div> <div>First rocket engine tests that spawned the Jet Propulsion Laboratory (1936)</div>	Phases of the Moon <div></div> <div>Sep 3 Sep 11 Sep 19 Sep 26</div>																																																																																								

Second Saturday Series

FREE EVENT
Every Month at the
John J. McCarthy Observatory
Behind the New Milford High School
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www.mccarthyobservatory.org

October 8th
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INTERNATIONAL OBSERVE THE MOON NIGHT

*What's New With
the Moon?*

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Family Entertainment
Activity Center
Interactive Crater Making
Meteorite Samples
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