Starscan

Johnson Space Center Astronomical Society

Volume 25, Number 10 October 2009

FORT MCKAVETT OCT TRIP

ASTRONOMY DAY 2009

OCTOBER'S ACTIVITIES AND EVENTS FOR OUR CLUB

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Un mensaje del Presidente
(A message from the President)

Howdy!
It goes without saying that this will be a busy, busy month for us! As a reminder we are NOT having a meeting this month because of our efforts at the Fort, the All Clubs Meeting, and ADAY. Keep your fingers crossed that the weather will be good for the trip to the Fort and for ADAY. As far as the Fort goes, a reminder that ALL reservations and questions go through Lisa and Ken Lester and feel free to post them to the group as others may have the same questions. All rules at the fort apply concerning our prior posts and notes about alcohol (keep it to yourself and you are responsible for your own disposal thereof) and of course keep in mind the Fort's (THC's, really) policy on our four legged friends (dogs). Remember that on Friday we have the community pot luck, grill your own food that night, also on Friday as a club we are educating the kids at Junction Elementary.

As far as ADAY goes, please consider what you can do. Go to the ADAY website, www.astronomyday.org and follow the link to the volunteer page and see what is available. We need people to man the table to help promote the club among other things. The folks at the LPI will be helping with face painting at the kids table. This is the time to step up to the plate as this is our place to shine.

David Haviland

LETTER FROM THE EDITOR
By Connie Haviland

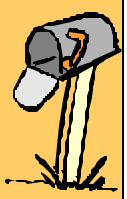
Hi Everyone!!
As all of you know, this is the edition before the busy month of October. We have several things going on and I have those reminders here in the edition. Please note the Message from the Prez up above.

We have several articles this month, sent to us to share with the club. We hope you find them interesting, we did.

Enjoy…..Connie Havialnd

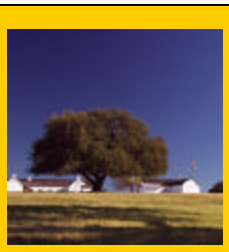
LETTER TO THE EDITOR

NOTHING THIS MONTH!!!



Star Parties for 2009

Bob Taylor



OCTOBER 15-18	FORT McKAVETT
OCTOBER 24	ASTRONOMY DAY 2009
NOVEMBER 6	HAAK WINERY
DECEMBER	OPEN

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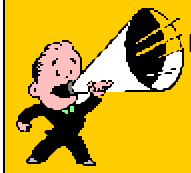


What's Happening at the George!!!

Cynthia Gustava

OCTOBER 2009 GEORGE OBSERVATORY EVENTS

Friday Night Groups – Contact Cynthia Gustava at cynm31@att.net to volunteer:
Oct 02 – Girl Scout Sky Search Overnight (Building Manager: Peggy Halford)
Oct 16 – Girl Scout Sky Search Overnight (Building Manager: Peggy Halford)
Oct 23 – All-Clubs Meeting – HMNS Downtown
Oct 30 – La Joya High School (Building Manager: Cynthia Gustava)

Saturday Night Public Observing – Contact the building managers below to volunteer:
Oct 03 – Dusk to 11:00 p.m. – (Building Managers: Tracy Knauss birdbarn2000@yahoo.com and Keith Rivich icgal-axies@cs.com)

Oct 10 – Dusk to 11:00 p.m. – (Building Managers: Cynthia Gustava cynm31@att.net and Mary Lockwood mplock-wood@att.net)

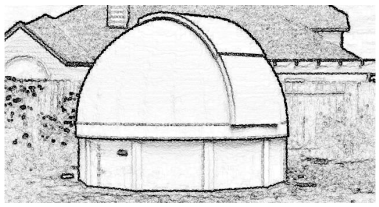
Oct 24 – Astronomy Day 2009 – 3:00 p.m. -11:00 p.m. – (Building Managers: Barbara Wilson and Buster Wilson) – Contact Cynthia Gustava at cynm31@att.net to volunteer for this event.

Oct 31 – Halloween Trick or Treat Event - Dusk to 11:00 p.m. – (Building Managers: Justin McCollum justinmccollum@hotmail.com and Carl Sexton carlsexton@hotmail.com)

October 17, 7 p.m. – Night Viewing of the Moon
November 21, 10 a.m. – 1 p.m. – Near Earth Objects
December – No Family Space Day Scheduled. Enjoy your holidays!
Please note: Each child must be accompanied by a responsible parent or adult the entire time they are visiting the LPI.
For more information e-mail Spaceday@lpi.usra.edu or call 281-486-2106.
For more information, go to
http://www.lpi.usra.edu/education/space_days/
Or call Katy at (281) 486-2106

3600 Bay Area Boulevard, Houston, Texas

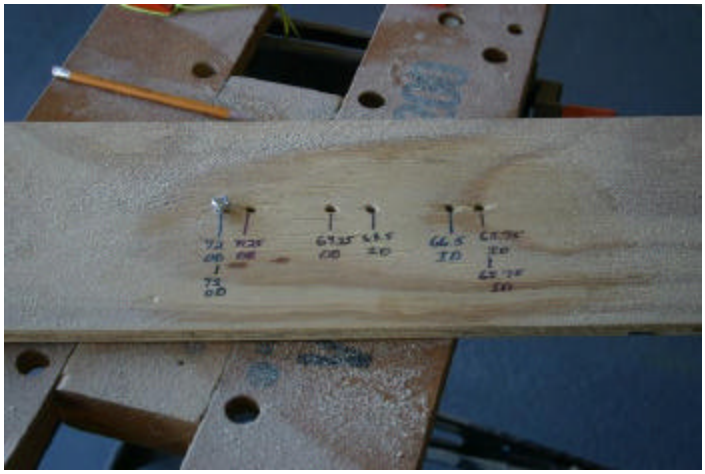
Building Your Own Observatory (Part 2-B)



Cutting Arcs— While the slab cured, my enthusiasm grew and I began to work in earnest. The next task was to cut the arcs for the dome ring and ribs. I estimated it would take me 3-4 weeks to cut the wood and assemble the dome. I also needed to move the family car out of the garage to free up room for construction. Confidently, I told my wife that I would be out of the garage in a month. It took the better part of 10 weeks before the car was back in the garage. Never once did she complain.

Approximately 130 arcs needed to be cut. The ideal tool to cut plywood arcs is a band saw. Band saws are capable of making fast, precise, and efficient (little waste) cuts. With this tool I needed a table that would accept a full sheet of plywood and include an adjustable pivot point. This table would allow the plywood to swing in an arc of the appropriate radius to the band saw blade. Another tool that is capable of cutting arcs is a router. With a router the plywood remains fixed in place while the router is attached to the end of a pivoting arm. This arrangement is capable of precise but slower cuts with a moderate amount of waste. A final option would the use of a hand-guided jigsaw. With a jigsaw, arcs are drawn on the plywood to act as a visual guide for the operator of the jigsaw. The jigsaw option is capable of efficient cuts (little waste) but is imprecise and slow.

I decided against using a band saw because I felt the design and construction of the required pivot table was itself a difficult project. Additionally, I would need to purchase a band saw at considerable cost. I did however own a router, saw horses, a workmate and scrap plywood (for the swing arm). In about an hour, I was able to attach the router to an 8-foot piece of scrap plywood, drill the necessary pivot points, and place the sawhorses and workmate in an arrangement that allowed me to cut arcs with the necessary precision I needed.



Cuttings proved to be a long, monotonous task. I estimate I spent 22-24 hours cutting arcs over the next 3 weeks. I burned-up one router, broke 2 bits (1/4-inch flute) and wore out 2 other bits (1/4-inch spiral) while cutting arcs. The dome ring and slit arches required 4 sheets of ¾-inch plywood. The dome ribs consumed 5 sheets of ½-inch plywood. I found that slow, steady cuts produced consistent arcs. Additionally, it is best to always cut in the same direction. In my case all cuts were made left to right. I did not discover the reason for this (always cutting in the same direction) until cutting the arcs for the slit cover in late June. When, pushing the router through the plywood, the sawhorse legs would deflect a slight distance. This deflection was not an issue as long as I applied a steady pressure when cutting. The steady pressure maintained a consistent deflection throughout the cut. Reversing the direction of a cut would cause the sawhorses to deflect in the opposite direction that in turn caused the resulting cut to no longer be round. Had I recognized the cause of the problem earlier, the best solution would have been to build a rigid table to replace the sawhorses.

Dome Ring, Slit Arch and Rib Assembly - Before I began assembling the dome ring, I needed a 12-foot diameter circular pattern to guide the placement of the arcs as I laminated them with glue and screws. To accomplish this task I placed the piece of plywood used to set the threaded rod into the pier. I used this same piece of wood to help center the slab form. I set the plywood in the center of the garage, marked its location and set weights on top to secure it in place. I then used the 6-foot ruler and a permanent marker to draw the 12-foot circle onto the concrete floor.

Laminating the dome ring and ribs was a straightforward process. The bottom layer was set on the floor with special attention paid to lining up the outside edges of the arcs with the circular template drawn on the floor. Next, a layer of glue (I used the Gorilla brand) was applied to a 4-foot section of the base layer (enough to cover one arc segment). The second layer of wood was offset by 1/3 the length of a segment (see image below) so that the butt joints of each layer never coincided with those of another layer.

Since the dome ring used ¾ inch plywood, I used 1-1/4 inch decking screws to secure each layer to the layer below. I glued and screwed each arc one at a time, working my way around the ring. I paired 2 screws (one near the outside radius of the arc, the other near the inside radius) at an approximate 8-inch spacing. The third layer of the base ring was attached in a similar fashion, once again offsetting the arcs by 1/3 to avoid placing butt joints in the same position as other layers. The slit arches and ribs were assembled in a fashion similar to the dome ring.

The $150 Edge-of-Space Camera: MIT Students Beat NASA On Beer-Money Budget

Meet the $150 (almost to) Space Camera.

Bespoke is old hat. Off-the-shelf is in. Even Google runs the world's biggest and scariest server farms on computers home-made from commodity parts. DIY is cheaper and often better, as Justin Lee and Oliver Yeh found out when they decided to send a camera into space.

The two students (from MIT, of course) put together a low-budget rig to fly a camera high enough to photograph the curvature of the Earth. Instead of rockets, boosters and expensive control systems, they filled a weather balloon with helium and hung a styrofoam beer cooler underneath to carry a cheap Canon A470 compact camera. Instant hand warmers kept things from freezing up and made sure the batteries stayed warm enough to work.

Of course, all this would be pointless if the guys couldn't find the rig when it landed, so they dropped a prepaid GPS-equipped cellphone inside the box for tracking. Total cost, including duct tape? $148.

Launch

Two weeks ago, on Sept. 2, at the leisurely post-breakfast hour of 11:45 a.m., the balloon was launched from Sturbridge, Massachusetts. Lee and Yeh took a road trip in order to compensate for the prevailing winds, which could have otherwise taken the balloon out onto the Atlantic, and checked in on the University of Wyoming's balloon trajectory website to estimate the landing site.

Because of spotty cellphone coverage in central Massachusetts, it was important to keep the rig in the center of the state so it could be found upon landing. Light winds meant the guys got lucky and, although the cellphone's external antenna was buried upon landing, the fix they got as the balloon was coming down was close enough.

If you want to read the rest of this article, go to http://www.wired.com/gadgetlab/2009/09/the-150-space-camera-mit-students-beat-nasa-on-beer-money-budget/

MESSENGER's Final Flyby of Mercury

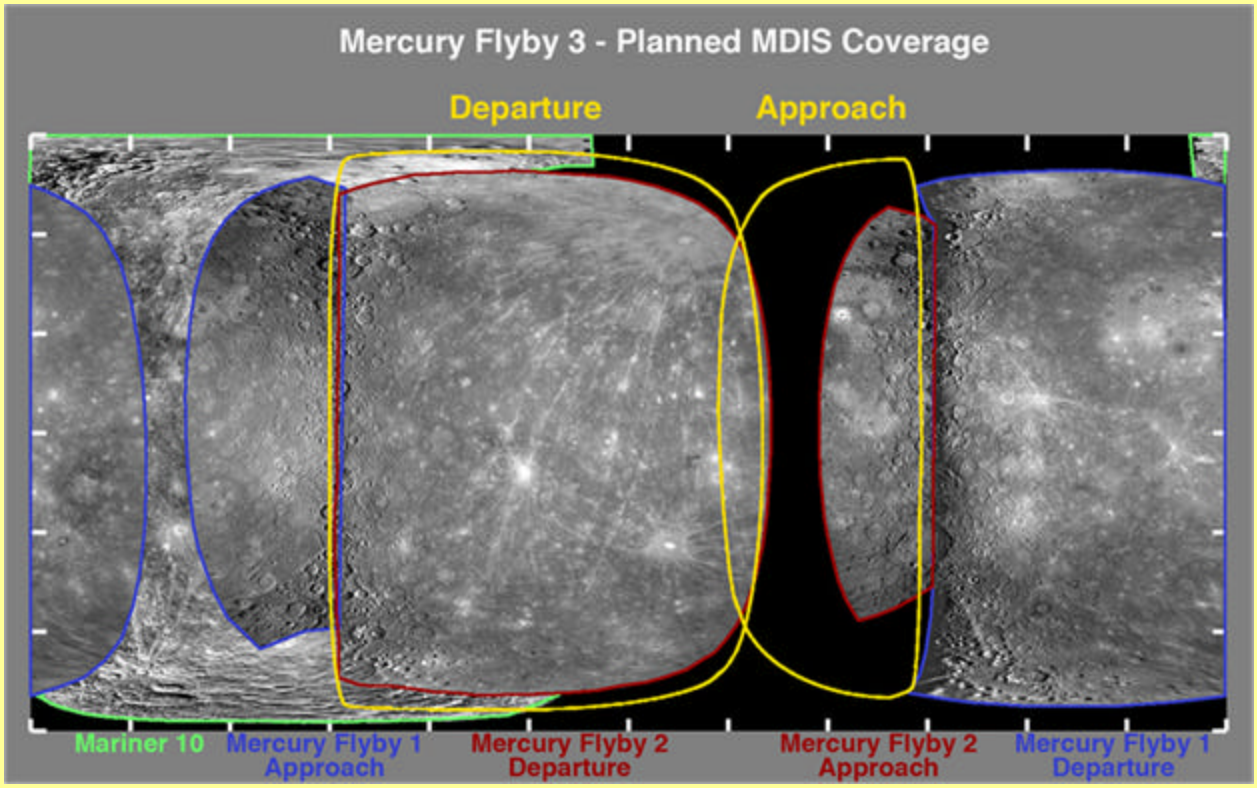
Sept. 23, 2009: NASA's MESSENGER spacecraft will fly by Mercury for the third and final time on Sept. 29. MESSENGER will pass less than 142 miles above the planet's rocky surface for a final gravity assist required to enter Mercury's orbit in 2011.

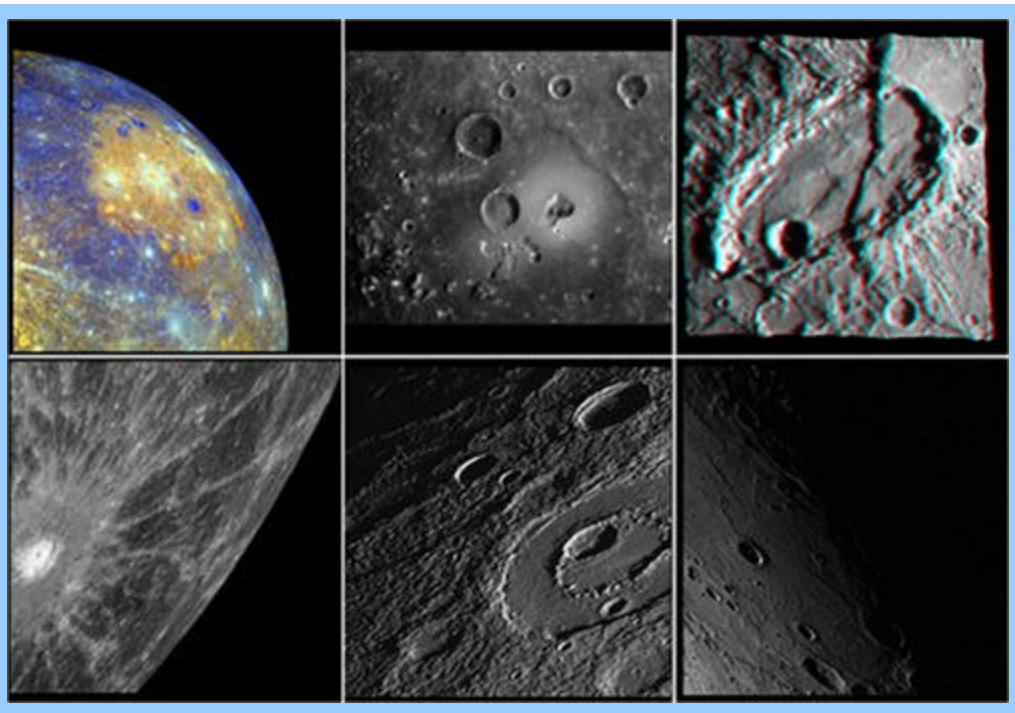
"This flyby is our final planetary gravity assist, so it is important for the entire encounter to be executed as planned," said Sean Solomon, principal investigator at the Carnegie Institution in Washington. "As enticing as these flybys have been for discovering some of Mercury's secrets, they are the hors d'oeuvres to the mission's main course -- observing Mercury from orbit for an entire year."

Right: Yellow lines outline the parts of Mercury to be photographed during MESSENGER's Sept. 29th flyby. Black denotes previously unseen terrain. Click on the image to view a full-sized, annotated map.

As the spacecraft approaches Mercury, cameras will photograph previously unseen terrain, and as the spacecraft departs it will take high-resolution images of the southern hemisphere. Scientists expect the spacecraft's imaging system to take more than 1,500 pictures. So far, more than 90 percent of the planet's surface has been photographed. These new pictures will fill in some of the gaps and provide high-resolution imagery of targets of interest.

"We are going to collect high resolution, color images of scientifically interesting targets that we identified from the second flyby," said Ralph McNutt, a project scientist at the Johns Hopkins University Applied Physics Laboratory. "The spectrometer will make measurements of those targets at the same time."





Above: A gallery of images from MESSENGER's first two flybys of Mercury. Highlights include the great Caloris impact basin, the largest volcano on Mercury, a strangely-elliptical impact scar, and a fresh crater with spider-like rays.

The spacecraft may also observe how the planet interacts with the solar wind. During this encounter, high spectral- and high spatial-resolution measurements will be taken of Mercury's super-thin atmosphere and comet-like tail, which may be strongly influenced by solar activity.

"Scans of the planet's tail will provide important clues regarding the processes that maintain Mercury's fascinating atmosphere," said Noam Izenberg of the Johns Hopkins Applied Physics Lab. "The Mercury Atmospheric and Surface Composition Spectrometer will give us a snapshot of how the distribution of sodium and calcium in Mercury's atmosphere vary with solar and planetary conditions. [We also plan to] look for several new atmospheric constituents."

An altimeter will make a topographic profile of Mercury's surface along the instrument ground track. The data will support ongoing studies of the form and structure of Mercury's craters and large faults. The information also will extend scientists' equatorial view of Mercury's global shape and allow them to confirm the discovery made during the first and second flyby that Mercury's equatorial region is slightly elliptical.

Stay tuned to Science@NASA for results from the flyby

http://science.nasa.gov/headlines/y2009/23sep_mercuryflyby3.htm?list1352372

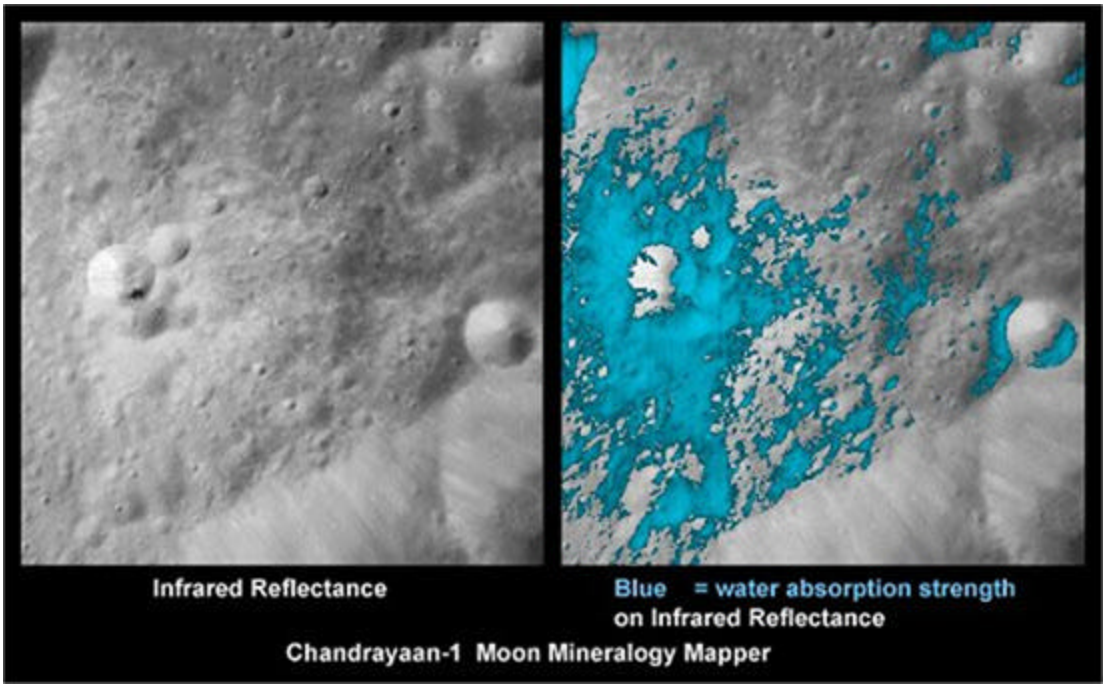
Contributed by James Wessel

Water Molecules Found on the Moon

09.24.2009

NASA scientists have discovered water molecules in the polar regions of the Moon. Instruments aboard three separate spacecraft revealed water molecules in amounts that are greater than predicted, but still relatively small. Hydroxyl, a molecule consisting of one oxygen atom and one hydrogen atom, also was found in the lunar soil. The findings were published in Thursday's edition of the journal Science.

The observations were made by NASA's Moon Mineralogy Mapper, or M^3 ("M-cubed"), aboard the Indian Space Research Organization's Chandrayaan-1 spacecraft. NASA's Cassini spacecraft and NASA's Epoxi spacecraft have confirmed the find.



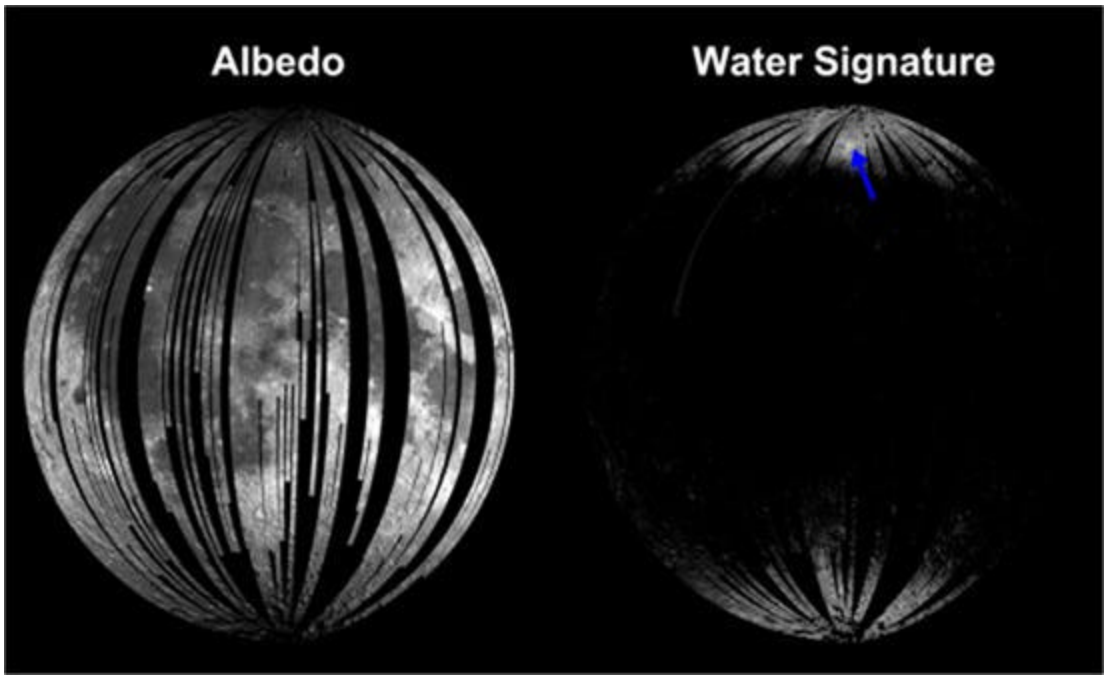
Above: A very young lunar crater as viewed by NASA's Moon Mineralogy Mapper. On the right, the distribution of water-rich minerals is shown in false-color blue. [

"Water ice on the Moon has been something of a holy grail for lunar scientists for a very long time," said Jim Green, director of the Planetary Science Division at NASA Headquarters in Washington. "This surprising finding has come about through the ingenuity, perseverance and international cooperation between NASA and the India Space Research Organization."

From its perch in lunar orbit, M3's state-of-the-art spectrometer measured light reflecting off the Moon's surface at infrared wavelengths, splitting the spectral colors of the lunar surface into small enough bits to reveal a new level of detail in surface composition. When the M3 science team analyzed data from the instrument, they found the wavelengths of light being absorbed were consistent with the absorption patterns for water molecules and hydroxyl.

"When we say 'water on the Moon,' we are not talking about lakes, oceans or even puddles," explained Carle Pieters, M3's principal investigator from Brown University, Providence, R.I. "Water on the Moon means molecules of water and hydroxyl that interact with molecules of rock and dust specifically in the top millimeters of the Moon's surface.

The M3 team found water molecules and hydroxyl at diverse areas of the sunlit region of the Moon's surface, but the water signature appeared stronger at the Moon's higher latitudes. Water molecules and hydroxyl previously were suspected in data from a Cassini flyby of the Moon in 1999, but the findings were not published until now.



Above: Data from NASA's Moon Mineralogy Mapper. The image on the left shows albedo, or the sunlight reflected from the surface of the Moon. The image on the right shows where infrared light is absorbed by water and hydroxyl molecules. The water signature is strongest at cool, high latitudes near the poles. The blue arrow indicates Goldschmidt crater, a large feldspar-rich region with a higher water and hydroxyl signature. Image credit: ISRO/NASA/JPL-Caltech/Brown Univ

"The data from Cassini's VIMS instrument and M3 closely agree," said Roger Clark, a U.S. Geological Survey scientist in Denver and member of both the VIMS and M3 teams. "We see both water and hydroxyl. While the abundances are not precisely known, as much as 1,000 water molecule parts-per-million could be in the lunar soil. To put that into perspective, if you harvested one ton of the top layer of the Moon's surface, you could get as much as 32 ounces of water."

For additional confirmation, scientists turned to the Epoxi mission while it was flying past the Moon in June 2009 on its way to a November 2010 encounter with comet Hartley 2. The spacecraft not only confirmed the VIMS and M3 findings, but also expanded on them.

"With our extended spectral range and views over the north pole, we were able to explore the distribution of both water and hydroxyl as a function of temperature, latitude, composition, and time of day," said Jessica Sunshine of the University of Maryland. Sunshine is Epoxi's deputy principal investigator and a scientist on the M3 team. "Our analysis unequivocally confirms the presence of these molecules on the Moon's surface and reveals that the entire surface appears to be hydrated during at least some portion of the lunar day."

The discovery of water molecules and hydroxyl on the Moon raises new questions about the origin of "Moon water" and its effect on lunar mineralogy. Answers to these questions will be studied and debated for years to come.

For more on this article and view more pictures, go to http://science.nasa.gov/headlines/y2009/24sep_moonwater.htm?list1352372

Giga Galaxy Zoom' offers tour of Milky Way

Check out this webpage for the CNN article, http://edition.cnn.com/2009/TECH/space/09/16/galaxy.interactive.image/index.html

ESO's GigaGalaxy Zoom: The Sky, from Eye to Telescope

http://www.gigagalaxyzoom.org/about.html

Through three giant images, the GigaGalaxy Zoom project reveals the full sky as it appears with the unaided eye from one of the darkest deserts on Earth, then zooms in on a rich region of the Milky Way using a hobby telescope, and finally uses the power of a professional telescope to reveal the details of an iconic nebula.

In the framework of the International Year of Astronomy 2009 (IYA2009) ESO's GigaGalaxy Zoom project aimed at connecting the sky as seen by the unaided eye with that seen by hobby and professional astronomers. The project reveals three amazing, ultra-high-resolution images of the night sky that online stargazers can zoom in on and explore in an incredible level of detail.
The GigaGalaxy Zoom project thus illustrates the vision of IYA2009, which is to help people rediscover their place in the Universe through the day- and night-time sky.

Most of the photographs comprising the three images were taken from two of ESO's observing sites in Chile, La Silla and Paranal. The wonderful quality of the images is a testament to the splendour of the night sky at these ESO sites, which are the most productive astronomical observatories in the world.
The renowned astrophotographers Serge Brunier and Stéphane Guisard, who are members of the The World at Night (TWAN) IYA2009 project, captured two of the GigaGalaxy Zoom images.
The first image by Brunier aims to present the sky as people have experienced it the world over, though in the far greater detail offered by top-notch stargazing conditions and with the view from both hemispheres. As such, the image provides a magnificent 800-million pixel panorama of the whole Milky Way.

Guisard, an ESO engineer, made the second image of a smaller area of the sky, containing 400 million pixels, using a hobby telescope at Paranal. This second image directly benefits from the quality of Paranal's sky, one of the best on the planet, and from his professional expertise as an optical engineer specialising in telescopes, a unique combination in the world of astrophotographers. This second image will be released on 14 September 2009.

The third GigaGalaxy Zoom image illustrates the power of professional astronomy. It covers a one-degree field of view and was obtained with the Wide Field Imager attached to the MPG/ESO 2.2-metre telescope at La Silla. This camera has already created several of the most iconic pictures produced by ESO. The third image will be released on 21 September 2009.

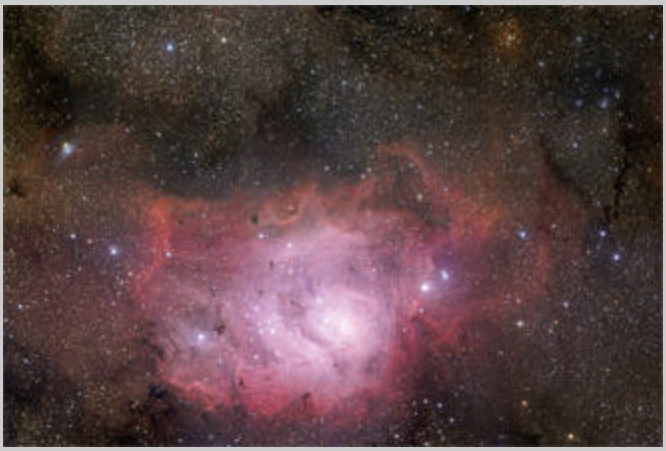
With GigaGalaxy Zoom, users can learn more about the many different exciting objects in the three images, such as multicoloured nebulae and exploding stars, just by clicking on them. They can also delve into the starscapes using a "zoomify" tool and download the images. After all three images have been unveiled, the public will be able to explore a magnificently detailed cosmic environment at many scales. **The reward is the most breathtaking dive ever made into our Galaxy, linking the sky seen by all with the cosmos studied by astronomers.**

ESO and the IYA2009

As part of the IYA2009, ESO is participating in several outstanding outreach activities, in line with its world-leading rank in the field of astronomy. ESO is hosting the IYA2009 Secretariat for the International Astronomical Union, which coordinates the Year globally. ESO is one of the Organisational Associates of IYA2009, and was also closely involved in the resolution submitted to the United Nations (UN) by Italy, which led to the UN's 62nd General Assembly proclaiming 2009 the International Year of Astronomy. In addition to a wide array of activities planned both at the local and international level, ESO is leading three of the eleven global Cornerstone Projects.

About ESO

ESO, the European Southern Observatory, is the foremost intergovernmental astronomy organisation in Europe and the world's most productive astronomical observatory. It is supported by 14 countries: Austria, Belgium, the Czech Republic, Denmark, France, Finland, Germany, Italy, the Netherlands, Portugal, Spain, Sweden, Switzerland and the United Kingdom. ESO carries out an ambitious programme focused on the design, construction and operation of powerful ground-based observing facilities enabling astronomers to make important scientific discoveries. ESO also plays a leading role in promoting and organising cooperation in astronomical research. ESO operates three unique world-class observing sites in Chile: La Silla, Paranal and Chajnantor. At Paranal, ESO operates the Very Large Telescope, the world's most advanced visible-light astronomical observatory. ESO is the European partner of a revolutionary astronomical telescope ALMA, the largest astronomical project in existence. ESO is currently planning a 42-metre European Extremely Large optical/near-infrared Telescope, the E-ELT, which will become "the world's biggest eye on the sky".



October 2009

Houston, Texas

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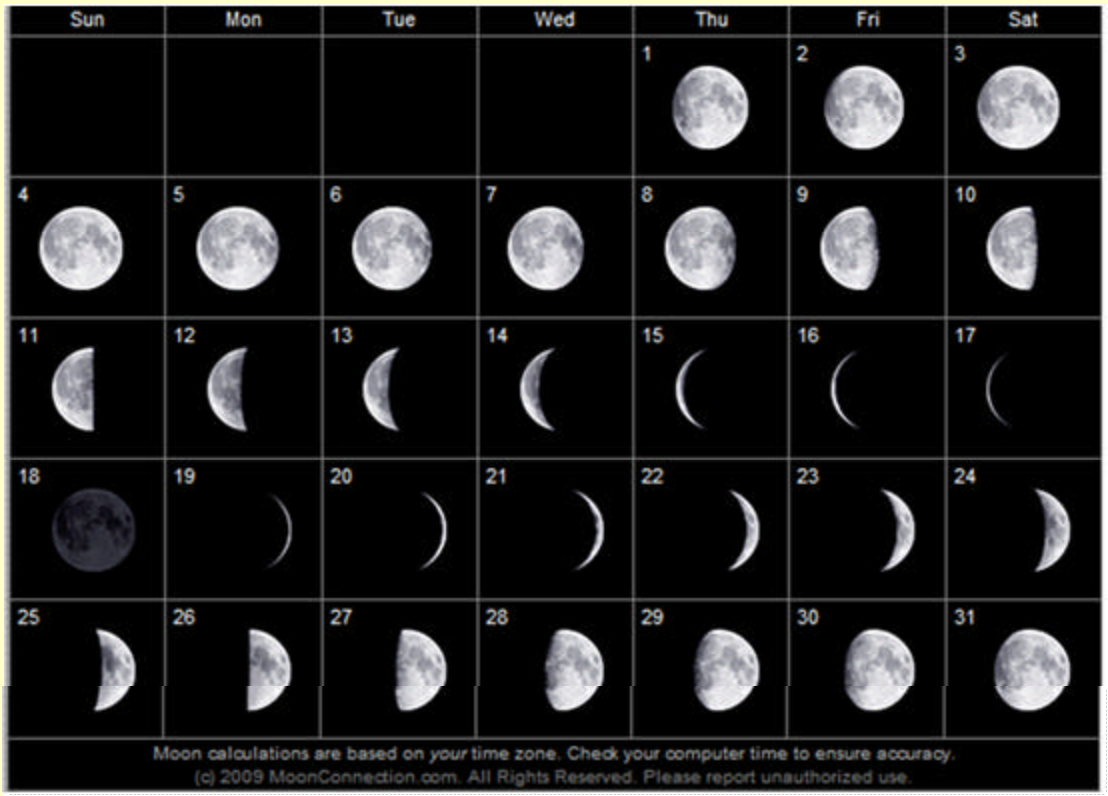
25 Day1: 6:15am Day2: 7:06am Sunrise: 7:29am Sunset: 6:41pm Day1: 7:23pm Day2: 8:07pm Moonrise: 2:01pm Moonset: none FirstQtr: 6:43pm	26 Day1: 6:16am Day2: 7:06am Sunrise: 7:30am Sunset: 6:40pm Day1: 7:22pm Day2: 8:06pm Moonrise: 2:35pm Moonset: 12:09am	27 Day1: 6:17am Day2: 7:06am Sunrise: 7:31am Sunset: 6:39pm Day1: 7:20pm Day2: 8:05pm Moonrise: 3:05pm Moonset: 1:43am	28 Day1: 6:17am Day2: 7:07am Sunrise: 7:32am Sunset: 6:38pm Day1: 7:19pm Day2: 8:03pm Moonrise: 3:33pm Moonset: 2:37am	29 Day1: 6:18am Day2: 7:08am Sunrise: 7:32am Sunset: 6:37pm Day1: 7:18pm Day2: 8:02pm Moonrise: 4:00pm Moonset: 3:32am	30 Day1: 6:19am Day2: 7:08am Sunrise: 7:33am Sunset: 6:37pm Day1: 7:17pm Day2: 8:01pm Moonrise: 4:30pm Moonset: 4:27am	31 Day1: 6:19am Day2: 7:09am Sunrise: 7:34am Sunset: 6:36pm Day1: 7:16pm Day2: 7:59pm Moonrise: 5:04pm Moonset: 5:21am

Daylight Saving/Summer Time is in effect for the entire month.



Folks:
In times past, people that have wanted to take advantage of the club discount have had to write their check, put it in with the renewal slip, and then either mail it to me at my home or chase me down at a meeting. In most cases, within a week, I have sent out the renewal. Sometimes, and I don't really mind, the renewals have gone out at my expense for the postage. Without hesitation, question, or fail, it is not the most efficient means to maintain club subscriptions. So as secretary, I'd like to try something new...

You get all your stuff ready for the subscription, whether it be Astronomy or Sky & Telescope, you keep it - you hang on to it. Email (most reliable) or tell me when you see me that you want to take advantage of the club discount for either or both of these publications and that you need a supporting letter. What I'll do is get the letter together and email the "letter from the treasurer/secretary" back to you as a PDF. You print it off, and enclose it with your renewal. For this to work your computer must have Adobe Reader (which is free) and a means to print it. I would like this procedure to become the "Standard Operating Procedure" for Astronomy/ S&T discounts through JSCAS. For those still not in the computer age, we can process things as we have in the past.

Clear skies,
David Haviland

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Webpage is under construction, but will be up soon and I take PayPal as well.

ACTUAL PICTURES OF WHAT I HAVE DONE BOTH LIGHT AND DARK BACKGROUNDS

REMEMBER, CHRISTMAS IS RIGHT AROUND THE CORNER!!!!!

****

NASA Picks Moon Crater to Slam Into
By Andrea Thompson
Senior Writer
posted: 11 September 2009

02:07 pm ETWhen NASA's LCROSS lunar probe slams into the moon next month as planned to look for signs of water, it will aim for the south polar crater Cabeus A, the agency announced today.

The $79 million moon-impacting spacecraft is carrying an empty Centaur rocket stage, which has about the same mass as a sports utility vehicle and will be hurled into the lunar surface on Oct. 9. Professional astronomers and backyard skywatchers will be watching the spectacle. "The purpose of our missions is to see if there may indeed be some water ice located in some permanently shaded crater positions on the south pole of the moon," said LCROSS project manager Daniel Andrews. Other missions have provided tantalizing but so-far inconclusive evidence for water ice there. At the announcement of the crater target, the LCROSS team dedicated the mission to the late journalist Walter Cronkite.
"It's a great honor, thank you very much. Dad would be pleased to be part of this ongoing process," his son, Chip Cronkite, said at a NASA press briefing.

What will happen
LCROSS will first release its Centaur stage rocket to impact the crater, then LCROSS itself will impact the lunar surface at about 5,580 mph (8,980 kph), and the resulting ejecta can be examined for signatures of water. "It will kick up whatever is on the floor of the crater; that may very well include water ice," Andrews said. More than a decade ago, the Lunar Prospector mission detected hydrogen deposits around the moon's south polar region, suggesting that some form of water ice may exist where the sun never shines. Finding water on the moon would be a boon for future manned missions because it would eliminate the need to haul it up from Earth. The ice could be melted for drinking water, and hydrogen could be extracted for fuel. Cabeus A was one of several finalist craters — including Shackleton, Shoemaker and Hayworth craters — examined by the team for many months. The crater sits at 81 degrees south on the moon and is relatively large (about 40 kilometers across). The crater also meets other criteria to achieve a successful impact that throws up ejecta in a way that telescopes will be able to see it: "We want to hit a nice flat, fluffy place," said LCROSS principal investigator Anthony Colaprete. Cabeus A seems to fit the bill, with plenty of flat areas for the spacecraft to smash into.
Data from LCROSS's sister craft, the Lunar Reconnaissance Orbiter, and the Lunar Prospector show a spot along the rim of the crater that seems to have a relatively high concentration of hydrogen, and so potentially, water.
"That is where we think the sweet spot exists," Colaprete said.

Who'll be watching

The impact will be observed by LRO, the newly refurbished Hubble Telescope, a few other space-based telescopes, and several ground-based observatories. "This is very observable from earth," Colaprete said. "So we'll have lots of eyes on it."
NASA will even be soliciting amateur observations, said Jennifer Heldmann, lead for the LCROSS observation campaign.
LCROSS was launched in June along with LRO, which will map the lunar surface in unprecedented detail. The team reported that the spacecraft is in good health, despite a malfunction that caused the craft to burn through half of its propellant a few weeks ago, and everything looks good for impact. "At this point, 28 days out, we have every expectation of finishing the mission with full success," Andrews said. Article from: http://www.space.com/missionlaunches/090911-lcross-target.html

Since this article came out there have been more updates. Please consult the news for these updates

Light pollution:

Any adverse effect of artificial light including sky glow, glare, light trespass, light clutter, decreased visibility at night, and energy waste.

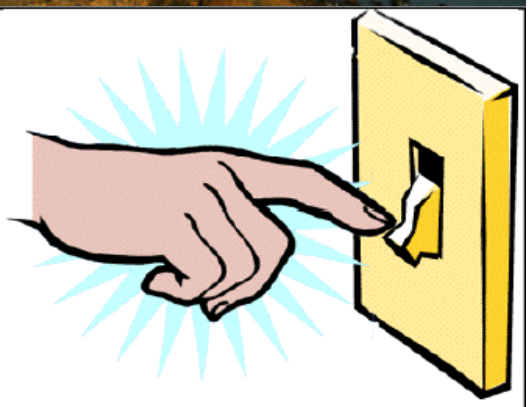
.Do you have a question about light pollution, protecting the night sky, or IDA's resources? **Get Help from IDA** http://www.darksky.org/mc/page.do?sitePageId=56399

Photograph © Phil Hart

IDA
THE LIGHT POLLUTION AUTHORITY

Help turn off the lights...

Join the
International Dark-Sky Association (IDA)
http://www.darksky.org
"To preserve and protect the nighttime environment and our heritage of dark skies through quality outdoor lighting."



Houston Area Astronomy Clubs

Brazosport Astronomy Club
Meets the Third Tuesday of the month, 7:45p.m.
At the Planetarium
400 College Drive
Clute, Texas (For more information, contact Judi James at the Planetarium 979-265-3376)

Fort Bend Astronomy Club http://www.fbac.org
Meets the third Friday of the month, 7:00 p.m.
Houston Community College Southwest Campus—Main Lecture Hall
10141 Cash Rd
Stafford, Texas 77477

Houston Astronomical Society http://spacibm.rice/edu/~has
Meets the first Friday of the month, 8:00 p.m.
University of Houston, University Park
Science and Research Building, Room 117

North Houston Astronomy Club http://www.astronomyclub.org
Meets the fourth Friday of the month, 7:30 p.m.
In the Teaching Theatre at Kingwood College
20000 Kingwood Drive
Kingwood, Texas

Galveston Stargazers
Meets the first Wednesday of the month At Home Cut Donuts, 6807 Stewart Rd, Galveston, TX From 7PM to 9PM.
Contact: Jim Gilliam at Jim.Gilliam@dars.state.tx.us or
At (409)795-3620, M - F, 8AM to 5PM

Starscan Submission Procedures

Original articles of some relation to astronomy will be accepted up to 6 p. m. (18:00 hrs) on the 25th of each month. THE most convenient way to submit articles or a Calendar of Events is by email and is preferred, but hard copies (CD, disk) are also accepted. All articles must include author's name and phone number. Also include any picture credits. Word, WordPerfect, and text files will be accepted. I have set up a special email account so that I can keep all of the Starscan articles, pictures, information, etc, separate from all of the other email I get. This makes is much easier to edit and set up the Starscan

Please send all submissions to:
conniesstarscanaccount@gmail.com

The author of individual articles bears all responsibility for publishing any e-mail addresses in the article on the World Wide Web

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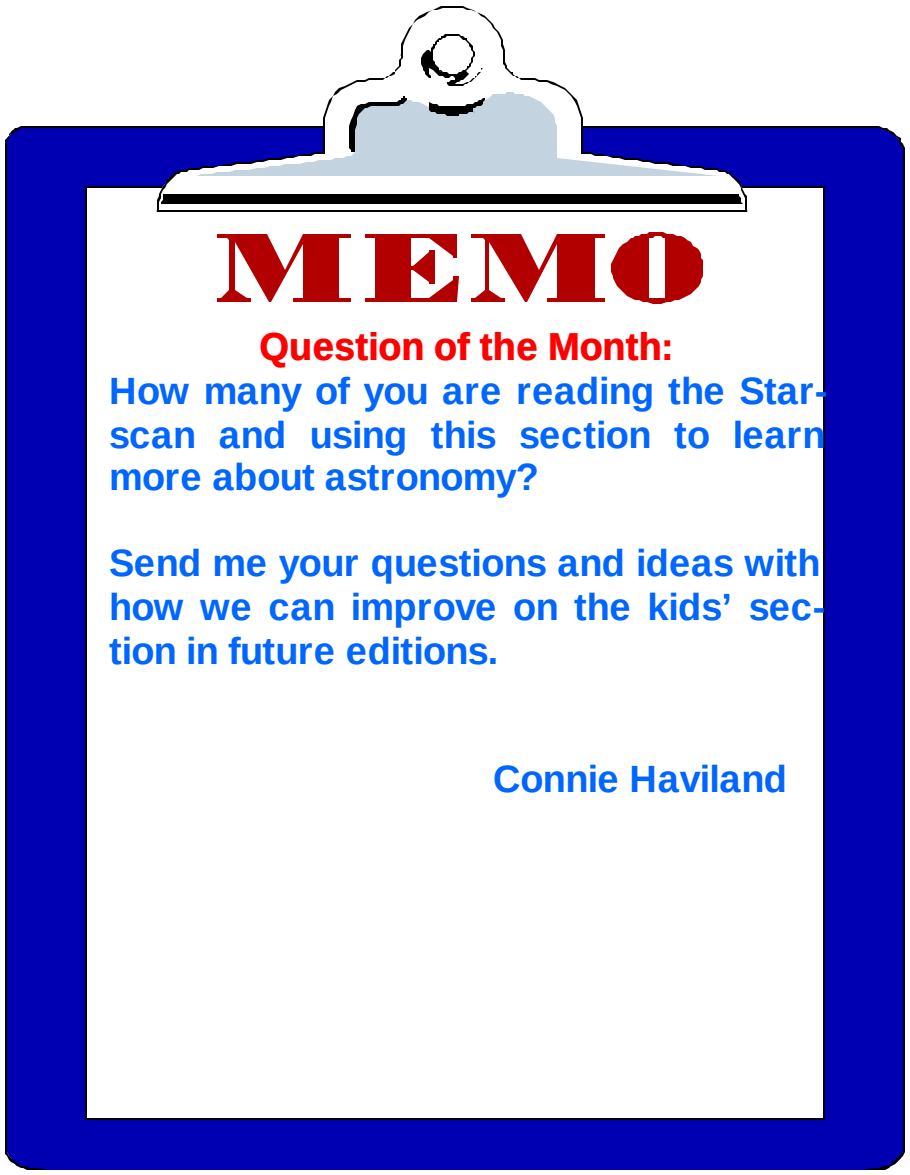
Astronomy 101 — Triple Nickel
CCD Imaging – Al Kelly
Binocular Observing – "OPEN"
Telescope Making – Bob Taylor
Deep Sky Observing – Hernan Contreras

" Admit it..You only invented that thing to ogle at her in number 63 !

Astronomy and Kids

This is the section strictly for kids (or kids at heart). We will be including information, stories, ideas, puzzles or anything that has to do with astronomy. The only difference here is, it will be directed for children. We don't discourage parents or any other adult to get involved. In fact, we encourage it strongly. So we hope you enjoy this section and if it touches a child's interest in astronomy, our goal has been achieved. Enjoy!!



MEMO

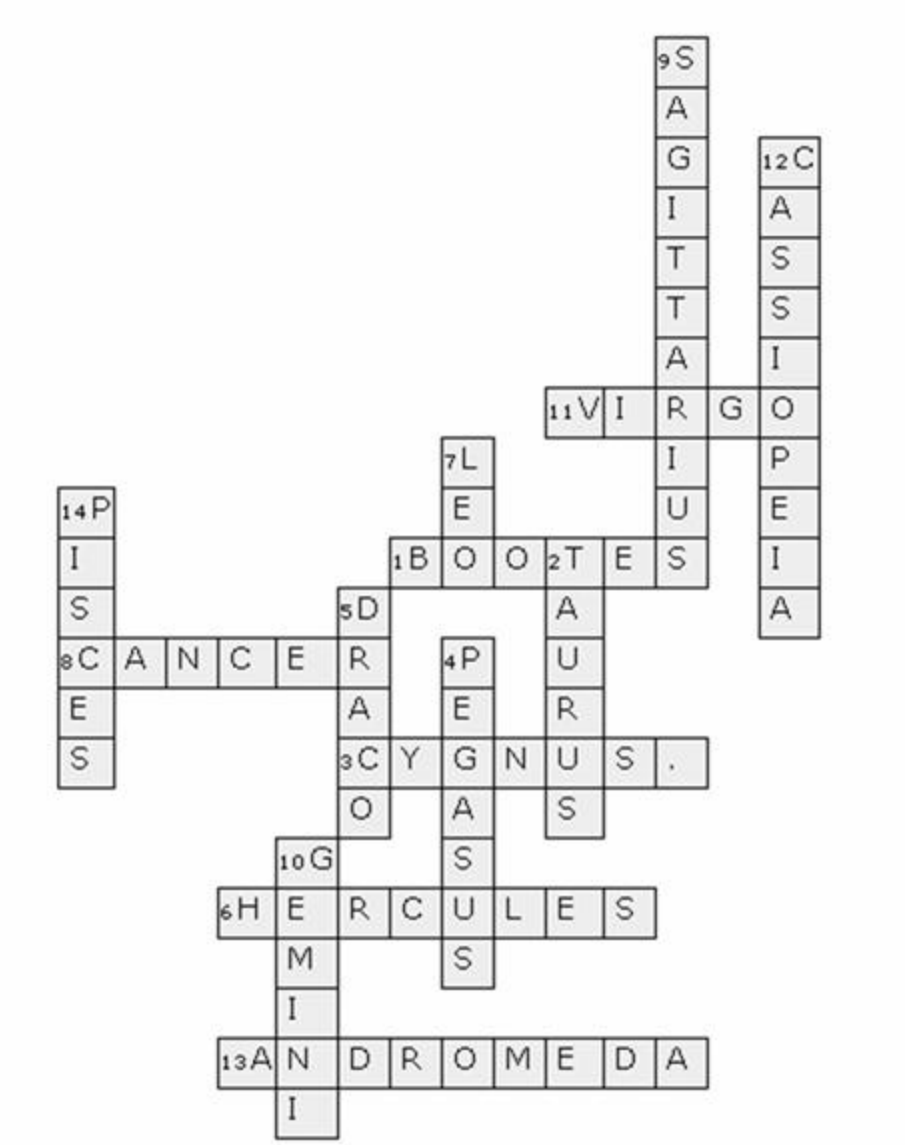
Question of the Month:

How many of you are reading the Starscan and using this section to learn more about astronomy?

Send me your questions and ideas with how we can improve on the kids' section in future editions.

Connie Haviland

SOLUTIONS



Across:

1. You will not find any Messier, but you will find Arcturus
3. You can find M29 & M39 here
6. If you want to find M13 or M92, go here
8. You will see M44 & M67
11. This has 10 Messier and 10 MESSIER, 1 is THE SOMBRERO GALAXY
13. You will find M31. M32 & M110 here

Down:

2. You will find M1 and M45 here
4. If you want to see M15, go to this constellation
5. This constellation was seen in the movie Dragonheart, upside down
7. This constellation has M65, M66, M95, M96 & M105
9. This constellation has 15 Messier located here
10. This constellation has M35 in it
12. You will find M52 & M103 here
14. If I want to find M74, I go here

LEARNING OUR CONSTELLATIONS

See if you can find the constellations and related words

- ANDROMEDA
- CANCER
- CYGNUS
- GEMINI
- LEO
- PISCES
- TAURUS
- RIGHTASCENSION
- BOTES
- CASSIOPEIA
- DRACO
- HERCULES
- PEGASUS
- SAGITTARIUS
- VIRGO
- DECLINATION

QUESTION: DO YOU KNOW THE Right Ascension (RA) and Declination (Dec) WHERE YOU LIVE?
GO TO http://www.census.gov/cgi-bin/gazetteer/ HERE ARE A FEW BASIC ESTIMATIONS

Search for Houston, TX

Placename	State	County	Lat/Long	Elevation	Population	Remark	Postal code
Houston County	Texas	Houston County	31:20:00 N 095:25:00 W				
Sam Houston National Forest	Texas	San Jacinto County	30:32:00 N 095:21:00 W				
Old Houston Place	Texas	Glasscock County	32:01:16 N 101:42:10 W				
South Houston	Texas	Harris County	29:39:46 N 095:14:07 W		13293		77587
Houston	Texas	Harris County	29:45:47 N 095:21:47 W	38	1595138	county seat	77000-99, 77201-13, 77215-31, 77233-8, 77240-5, 77248-63, 77265-75, 77277, 77279-82, 77284, 77287-93, 77297-9
Houston Heights	Texas	Harris County	29:47:52 N 095:23:52 W				
East Houston	Texas	Harris County	29:49:46 N 095:16:11 W				
Mount Houston	Texas	Harris County	29:53:27 N 095:18:20 W				
North Houston	Texas	Harris County	29:55:31 N 095:30:54 W	114			

Placename	State	County	Lat/Long	Elevation	Population	Remark	Postal code
Lake Houston	Texas	Harris County	29:55:09 N 095:07:56 W	44			

Placename	State	County	Lat/Long	Elevation	Population	Remark	Postal code	Natio
Webster	Texas	Harris County	29:32:15 N 095:07:05 W	27			77598	US
Webster	Texas	Wood County	32:55:35 N 095:19:29 W					US

Placename	State	County	Lat/Long	Elevation	Population	Remark	Postal code	Nation
Pearland	Texas	Brazoria County	29:33:48 N 095:17:09 W	54	13248		77581, 77584, 77588	US

Placename	State	County	Lat/Long	Elevation	Population	Remark	Postal code	Nation
Texas City Terminal Junction	Texas	Galveston County	29:19:49 N 094:57:56 W					US
Texas City Junction	Texas	Galveston County	29:20:58 N 094:56:21 W					US
Texas City	Texas	Galveston County	29:23:01 N 094:54:09 W		41403		77590-2	US

FOR OUR KIDDOS IN JUNCTION: HINT..THERE ARE A LOT

Placename	State	County	Lat/Long	Elevation	Population	Remark	Postal code	Nation
Salado Junction	Texas	Bexar County	29:27:01 N 098:25:03 W					US
Panther Junction	Texas	Brewster County	29:19:42 N 103:12:17 W	3729				US
Basin Junction	Texas	Brewster County	29:20:03 N 103:15:22 W	4008				US
Delaware Junction	Texas	Brown County	31:47:11 N 098:52:07 W					US
Kildare Junction	Texas	Cass County	32:54:30 N 094:11:18 W	257				US
Stryker Creek Junction	Texas	Cherokee County	31:53:21 N 095:01:46 W					US
San Angelo Junction	Texas	Coleman County	31:46:34 N 099:22:03 W					US
Boedecker Junction	Texas	Colorado County	29:28:44 N 096:21:33 W					US
Rayner Junction	Texas	Colorado County	29:33:12 N 096:19:43 W					US

Placename	State	County	Lat/Long	Elevation	Population	Remark	Postal code	Nation
Leon Junction	Texas	Coryell County	31:20:27 N 097:35:38 W	675			76552	US
Zacha Junction	Texas	Dallas County	32:51:53 N 096:40:08 W					US
Arcola Junction	Texas	Fort Bend County	29:30:10 N 095:27:44 W					US
Texas City Terminal Junction	Texas	Galveston County	29:19:49 N 094:57:56 W					US
Texas City Junction	Texas	Galveston County	29:20:58 N 094:56:21 W					US
Old Junction School	Texas	Gillespie County	30:14:36 N 098:36:22 W					US
Sherman Junction	Texas	Grayson County	33:39:18 N 096:33:04 W					US
North Sherman Junction	Texas	Grayson County	33:39:43 N 096:35:25 W					US
Plains Junction	Texas	Hall County	34:33:29 N 100:26:10 W					US
Pierce Junction	Texas	Harris County	29:40:13 N 095:23:46 W	52				US

Placename	State	County	Lat/Long	Elevation	Population	Remark	Postal code	Nation
Bellaire Junction	Texas	Harris County	29:43:37 N 095:26:51 W					US
White Oak Junction	Texas	Hopkins County	33:08:48 N 095:27:25 W					US
Morse Junction	Texas	Hutchinson County	36:01:56 N 101:28:25 W					US
Call Junction	Texas	Jasper County	30:35:32 N 093:54:56 W	101				US
J and E Junction	Texas	Jasper County	30:40:08 N 093:53:22 W					US
Junction Windmill	Texas	Kerr County	30:16:10 N 099:42:00 W	2274				US
Junction	Texas	Kimble County	30:29:21 N 099:46:18 W		2593	county seat	76849	US
Broadway Junction	Texas	Lamar County	33:31:21 N 095:35:22 W	462				US
Radio Junction	Texas	Lampasas County	31:04:36 N 098:10:06 W					US
Paul Junction	Texas	McCulloch County	31:09:24 N 099:16:21 W	1721				US

Placename	State	County	Lat/Long	Elevation	Population	Remark	Postal code	Nation
Homer Junction	Texas	McCulloch County	31:09:53 N 099:30:35 W					US
Barnar Junction	Texas	McLennan County	31:36:11 N 097:11:40 W					US
Peel Junction	Texas	Montgomery County	30:22:48 N 095:42:36 W					US
Sheerin Junction	Texas	Moore County	36:01:27 N 101:52:56 W	3543				US
Hayward Junction	Texas	Nacogdoches County	31:35:20 N 094:38:56 W					US
Bonita Junction	Texas	Nacogdoches County	31:38:58 N 094:39:48 W					US
Flour Bluff Junction	Texas	Nueces County	27:47:06 N 097:29:33 W					US
Gordon Junction	Texas	Palo Pinto County	32:32:04 N 098:19:04 W	987				US
Brock Junction	Texas	Parker County	32:42:10 N 097:57:23 W	888				US
Dumas Junction	Texas	Potter County	35:12:46 N 101:48:07 W					US
Placename	**State**	**County**	**Lat/Long**	**Elevation**	**Population**	**Remark**	**Postal code**	**Nation**
Valley Junction	Texas	Robertson County	30:50:30 N 096:38:15 W	277				US
Calvert Junction	Texas	Robertson County	30:56:31 N 096:44:14 W					US
Pitner Junction	Texas	Rusk County	32:17:22 N 094:52:06 W	366				US
Belt Junction	Texas	Tarrant County	32:42:00 N 097:21:12 W					US
S N Junction	Texas	Tom Green County	31:25:17 N 100:27:45 W					US
Alvery Junction	Texas	Tom Green County	31:28:53 N 100:25:01 W					US
Cane Junction	Texas	Wharton County	29:10:28 N 095:59:55 W					US
Newgulf Junction	Texas	Wharton County	29:14:02 N 095:55:10 W	75				US
Seward Junction	Texas	Williamson County	30:39:13 N 097:52:31 W					US

Explanation of Constellation Position Notation
The coordinates given in the description are from the appendix of "Explorations: an Introduction to Astronomy" by Thomas T. Arny.

Short Instructions
- Is your latitude in the range listed? You can look up the latitude of various cities at MIT's Geography Page.
- What time are you looking? For every hour after 9:00 PM, the best date to see a constellation moves ahead half a month. For every hour before 9:00 PM, the best date moves back half a month.
- Northern Hemisphere: The larger the Declination of a constellation (the closer it is to 90 degrees), the larger the fraction of the year it will be visible. For example, Polaris (Dec=89 degrees) is visible all year.
- Southern Hemisphere: The smaller the Declination of a constellation (the closer it is to -90 degrees), the larger the fraction of the year it will be visible.

Long(er) Instructions
Right Ascension (RA) and Declination (Dec)
These are the coordinates that astronomers use to precisely locate stars in the sky. They are very similar to longitude and latitude on the Earth, except that RA is measured from 0 to 24 hours instead of 0 to 360 degrees, like longitude.
Almost all astronomy textbooks explain RA and Dec, but if you aren't interested in the technical details, just use the explanations below.

When is the best time to look for a particular constellation?

For each constellation, I have included where on the Earth it is visible from and what month is beast for viewing it. First of all, some constellations are never visible from certain places on the Earth. For example, people in the Southern Hemisphere can't see the North Star (Polaris) because the Earth is always in the way. If your latitude is between the two numbers listed on the constellation pages, then that constellation will be visible at SOME time during the year. (If you don't know your latitude, you can look it up by city on MIT's geography page).
Technical Note: It is easy to figure out which constellations are visible for you. The Declination is very closely related to your latitude on the Earth. All I have done to figure out the maximum and minimum latitudes is add and subtract 80 degrees from the declination.

Andromeda…YOU FIND M31, M32, M110 IN THIS CONSTELLATION
Boötes…YOU FIND
* ARCTURUS (Alpha Boo)
* Nekkar (Beta Boo)
* Seginus (Gamma Boo)
* IZAR (Epsilon Boo)
* Mufrid (Eta Boo)
* Asellus Primus (Theta Boo)
* Asellus Secondus (Iota Boo)
* Asellus Tertius (Kappa 2 Boo)
* Alkalurops (Mu 1 Boo)
* Merga (38 Boo)

Cassiopeia…YOU FIND M52 & M103
Cancer..YOU FIND M44 & M67
Cygnus..YOU FIND M29 & M39
Draco..THIS CONSTELLATION WAS SEEN IN THE MOVIE, DRAGONHEART, UPSIDE DOWN
Gemini…YOU FIND M35 HERE
Hercules YOU FIND M13 AND M92
Leo..YOU FIND M65, M66, M95, M96 & M105
Pegasus…YOU FIND M15
Pisces YOU FIND M74
Sagittarius..THIS CONSTELLATION IS LOADED WITH MESSIER (15)
- M8 The Lagoon Nebula (diffuse nebula)
- M17 The Omega, Swan, or Horseshoe Nebula (diffuse nebula)
- M18 (open cluster)
- M20 The Triffid Nebula (diffuse nebula)
- M21 (open cluster)
- M22 (globular cluster)
- M23 (open cluster)
- M24 Milky Way Patch (star cloud with open cluster)
- M25 (open cluster)
- M28 (globular cluster)
- M54 (globular cluster)
- M55 (globular cluster)
- M69 (globular cluster)
- M70 (globular cluster)
- M75 (globular cluster)

Taurus..YOU FIND M1 AND M 45
- Virgo..YOU WILL FIND 10 MESSIER, 1 IS THE SOMBRERO GALAXY
- M49 (elliptical galaxy)
- M58 (spiral galaxy)
- M59 (elliptical galaxy)
- M60 (elliptical galaxy)
- M61 (spiral galaxy)
- M84 (elliptical galaxy)
- M86 (elliptical galaxy)
- M87 Virgo A (elliptical galaxy)
- M89 (elliptical galaxy)
- M90 (spiral galaxy)
- M104 The Sombrero Galaxy (spiral galaxy)

LEARN YOUR CONSTELLATIONS

Snoopy says, never stop looking up..reach for the stars and may you always have clear skies!!!!