Now Playing

The Planetarium
3200 East Cheyenne Avenue
North Las Vegas, NV 89030

Show Info. 702-651-4SKY
Office 651-4505 or 651-4138

Astronaut
Premieres January 11

Show Times:
Astronaut: 6 pm Fri., 7:30 pm Fri. & Sat.
Cardboard Rocket: 3:30 pm Sat.
Sky Watch follows every show.
General admission price: $6.00
Students, children & seniors: $4.00
Gift Shop: Fri.: 5 - 9 pm, Sat.: 3 - 9 pm

Sky Watch
The Student Observatory
Free observing sessions after 7:30 pm
planetarium shows, weather permitting.

Extreme Planets
in SciDome™

Show Times:
It’s About Time: Call for times.
Amazing Caves: Call for times.
General Admission: $6.00
Children and Seniors: $4.00
Open Daily: from 10:30 am

The Alps
in Skydome 8/70™

Telescope Viewing
Free observing sessions on the first Friday of each
month at Rancho San Rafael starting 30 minutes after
sunset. Weather permitting.

775-784-4811 Show Info.
775-784-4812 Office
Word from the Editor

M51: A Classic Beauty

(NASA/CXC) M51, whose name comes from being the 51st entry in Charles Messier’s catalog, is considered to be one of the classic examples of a spiral galaxy. At a distance of about 30 million light years from Earth, it is also one of the brightest spirals in the night sky. A composite image of M51, also known as the Whirlpool Galaxy, shows the majesty of its structure in a dramatic new way through several of NASA’s orbiting observatories. X-ray data from NASA’s Chandra X-ray Observatory reveals point-like sources (purple) that are black holes and neutron stars in binary star systems. Chandra also detects a diffuse glow of hot gas that permeates the space between the stars. Optical data from the Hubble Space Telescope (green) and infrared emission from the Spitzer Space Telescope (red) both highlight long lanes in the spiral arms that consist of stars and gas laced with dust. A view of M51 with the GALEX telescope shows hot, young stars that produce lots of ultraviolet energy (blue).

The textbook spiral structure is thought to be the result of an interac-
tion M51 is experiencing with its close galactic neighbor, NGC 5195, which is seen just above. Some simulations suggest M51’s sharp spiral shape was partially caused when NGC 5195 passed through its main disk about 500 million years ago. This gravitational tug of war may also have triggered an increased level of star formation in M51. The companion galaxy’s pull would be inducing extra starbirth by compressing gas, jump-starting the process by which stars form.
Saturn's Rings May Be Old Timers

(NASA/JPL) New observations by NASA’s Cassini spacecraft indicate the rings of Saturn, once thought to have formed during the age of the dinosaurs, instead may have been created roughly 4.5 billion years ago, when the solar system was still under construction.

Larry Esposito, principal investigator for Cassini’s Ultraviolet Imaging Spectrograph at the University of Colorado, Boulder, said data from NASA’s Voyager spacecraft in the 1970s, and later from NASA’s Hubble Space Telescope, led scientists to believe Saturn's rings were relatively youthful and likely created by a comet that shattered a large moon, perhaps 100 million years ago.

But ring features seen by instruments on Cassini, which arrived at Saturn in 2004, indicate the rings were not formed by a single cataclysmic event. The ages of the different rings appear to vary significantly, and the ring material is continually being recycled, Esposito said.

"The evidence is consistent with the picture that Saturn has had rings all through its history," said Esposito of the University of Colorado’s Laboratory for Atmospheric and Space Physics. "We see extensive, rapid recycling of ring material, in which moons are continually shattered into ring particles, which then gather together and re-form moons."

Esposito and colleague Miodrag Sremcevic, also with the University of Colorado, presented these findings in a news briefing at the meeting of the American Geophysical Union in San Francisco.

"We have discovered that the rings probably were not created just yesterday in cosmic time, and in this scenario, it is not just luck that we are seeing planetary rings now," said Esposito. "They probably were always around but continually changing, and they will be around for many billions of years."

Scientists had previously believed rings as old as Saturn itself should be darker due to ongoing pollution by the "infall" of meteoric dust, leaving telltale spectral signatures, Esposito said. But the new Cassini observations indicate the churning mass of ice and rock within Saturn's gigantic ring system is likely much larger than previously estimated. This helps explain why the rings overall appear relatively bright to ground-based telescopes and spacecraft.

"The more mass there is in the rings, the more raw material there is for recycling, which essentially spreads this cosmic pollution around," he said. "If this pollution is being shared by a much larger volume of ring material, it becomes diluted and helps explain why the rings appear brighter and more pristine than we expected."

Esposito, who discovered Saturn’s faint F ring in 1979 using data from NASA’s Pioneer 11 spacecraft, said a paper by him and his colleagues appearing in an upcoming issue of the journal Icarus supports the theory that Saturn's ring material is being continually recycled. Observing the flickering of starlight passing through the rings in a process known
as stellar occultation, the researchers discovered 13 objects in the F ring ranging in size from 27 meters to 10 kilometers (30 yards to six miles) across.

Since most of the objects were translucent, indicating at least some starlight was passing through them, the researchers concluded they probably are temporary clumps of icy boulders that are continually collecting and disbanding due to the competing processes of shattering and coming together again. The team tagged the clumpy moonlets with cat names like "Mittens" and "Fluffy" because they appear to come and go unexpectedly over time and have multiple lives, said Esposito.

Esposito stressed that Saturn's rings of the future won't be the same rings we see today, likening them to great cities around the world like San Francisco, Berlin or Beijing. "While the cities themselves will go on for centuries or millennia, the faces of people on the streets will always be changing due to continual birth and aging of new citizens."

The Cassini-Huygens mission is a cooperative project of NASA, the European Space Agency and the Italian Space Agency. The Jet Propulsion Laboratory, a division of the California Institute of Technology in Pasadena, manages the mission for NASA's Science Mission Directorate in Washington, D.C.

Saturn's Small Moons Tell the Story of Their Origins

(NASA/JPL) Imaging scientists on NASA's Cassini mission are telling a tale of how the small moons orbiting near the outer rings of Saturn came to be. The moons began as leftover shards from larger bodies that broke apart and filled out their "figures" with the debris that made the rings.

It has long been suspected that Saturn's rings formed in the disintegration of one or several large icy bodies, perhaps pre-existing moons, by giant impacts. The resulting debris quickly spread and settled into the equatorial plane to form a thin disk surrounding the planet. And the small, irregularly shaped ring-region moons were believed to be the leftover pieces from this breakup.

Now, several years' worth of cosmic images of Saturn's 14 known small moons have been used to derive the sizes and shapes of most of them, and in about half the cases, even masses and densities. This information, published in the December 7 issue of the journal Science,
has led to new insights into how some of these moons may have formed.

The tip-off was the very low density of the inner moons, about half that of pure water ice, and sizes and shapes that suggested they have grown by the accumulation of ring material. The trouble was, these moons are within and near the rings, where it is not possible for small particles to fuse together gravitationally. So how did they do it? They got a jump start.

“We think the only way these moons could have reached the sizes they are now, in the ring environment as we now know it to be, was to start off with a massive core to which the smaller, more porous ring particles could easily become bound,” said Carolyn Porco, Cassini imaging team leader from the Space Science Institute in Boulder, Colo. Porco is the lead author of the first of two related articles published in this week’s issue of Science.

Simple calculations and more complicated computer simulations have shown that ring particles will readily become bound to a larger seed having the density of water ice. By this process, a moon will grow even if it is relatively close to Saturn. The result is a ring-region moon about two to three times the size of its dense ice core, covered with a thick shell of porous, icy ring material. To make a 30-kilometer moon (19 miles) requires a seed of about 10 kilometers (6 miles).

Where did such large cores come from? And when did this all take place?

“The core may in fact be one of the remnants from the original ring-forming event,” said co-author Derek Richardson, professor of astronomy at the University of Maryland, College Park, “which might have been left intact all this time and protected from additional collisional breakup by the mantle of ring particles around it.”

Just exactly when the rings formed is not known. “But it is not out of the question that the moons date back to the time of ring formation,” said Porco.

The researchers show that the cores of Pan and Daphnis, which orbit within gaps in the outer A ring, were large enough to open narrow gaps. Accretion, or accumulation of material, they say, probably occurred quickly. The moons grew and their gaps widened.

These high resolution images of Pan and Atlas reveal distinctive "flying saucer" shapes created by prominent equatorial ridges not seen on the other small moons of Saturn.

Saturn’s moon Janus (near side of the rings) and Prometheus (far side). The image shows that Prometheus is more elongated than Janus.
achieving their present sizes before the gaps were completely emptied of material, and probably before the local rings reached their present thickness.

So how did Pan in the main rings, and Atlas, which orbits just beyond the outer edge of the main rings, get the prominent equatorial ridges that make them look like flying saucers? The second paper reports evidence for a secondary stage of accretion that occurred after the moons' growth was completed and after the rings flattened to their present 20-meter (66 feet) thickness.

“Our computer simulations show that the ridges must have accreted rapidly when Saturn's rings were thin, forming small accretion disks around the equators of Pan and Atlas,” said Sebastien Charnoz, lead author and an associate of imaging team member Andre Brahic at the University Paris-Diderot and CEA Saclay, in France. “The ridges might be the remains of 'fossilized' accretion disks, fundamental structures seen at all scales in the universe, from planetary rings to galaxies.”

Cassini Team Recruits Next Generation of Scientists

(NASA/JPL) NASA's Cassini-Huygens Mission to Saturn has some young new participants. A 10th-grade student in Delaware, a high school senior in California, and an 8th-grade American student in France are the winners of this year's Cassini Scientist-for-a-Day contest. Their essays, selected from nearly 200 entries, earned them a spot in a teleconference held this week with members of the Cassini science team.

To participate, students had to select one of four images that Cassini's camera could capture on November 30, 2007, and explain why they believe their chosen target would provide the best scientific results. "This is just the sort of thinking that we have to do on a mission," said JPL's Linda Spilker, Cassini deputy project scientist and one of the contest judges. "We were really impressed by the entries. The proposals were very well researched and well written. I think the future of planetary science is in good hands."

Winners were chosen in two categories. Alexander Sharpe, who is currently living in La Bruguiere, France, captured first prize in the grade five to eight category. "The most fascinating thing about Saturn is its rings," he wrote in his essay on the importance of getting an image of Saturn's tiny moon Prometheus and the F ring.

There was a tie for first place in the grade nine to twelve category with top honors going to Joshua Leviton, a 10th grader at the Wilmington Friends School in Wilmington, Del., and 12th grader Alistair McGregor from Henry Gunn Senior High School in Palo Alto, Calif. Leviton selected Saturn's moon Tethys with its huge impact crater as his target of choice. McGregor also argued for Prometheus and the F ring, writing that "we could gain a wealth of information concerning the interactions between ring particles and larger objects in the Saturnian system."

The Cassini spacecraft entered orbit around Saturn nearly three years ago and has provided a wealth of new information about the ringed planet and its many mysterious moons.

Entries in the Cassini Scientist-for-a-Day contest came from 24 states. Approximately 400 students participated in the contest either...
As individuals or in groups of up to four. Separate contests were also held in the United Kingdom, India and Iran. The U.S. contest winners, along with the semi-finalists joined in a teleconference with Cassini scientists on Tuesday, December 4, and Wednesday, December 5, where they had the opportunity to have their questions answered and contribute to this groundbreaking mission.

The next opportunity for students to participate in the Cassini Scientist-for-a-Day contest will be in May of 2008.


The Cassini-Huygens mission is a cooperative project of NASA, the European Space Agency and the Italian Space Agency. JPL, a division of the California Institute of Technology in Pasadena, manages the Cassini mission for NASA’s Science Mission Directorate, Washington, D.C. The Cassini orbiter was designed, developed and assembled at JPL.

---

Take a Field Trip to a Planetarium

Shows available for all grade levels are offered Monday thru Friday at both the Fleischmann Planetarium and the CSN Planetarium.

For information, call 702-651-4505 in Las Vegas or 775-784-4812 in Reno.
is sandwiched between two thick disks of dust. An inner thick dusty disk hugs the central star, then, moving outward, there is a gap, followed by another thick doughnut-shaped disk. Other systems with gaps contain very little to no dust near the central star. In other words, those gaps are more like big holes in the centers of disks.

Some scientists suspect that the holes could have been carved out by a process called photoevaporation. Photoevaporation occurs when radiation from the central star heats up the gas and dust around it to the point where it evaporates away. The fact that there is thick disk swirling extremely close to UX Tau A's central star rules out the photoevaporation scenario. If photoevaporation from the star played a role, then large amounts of dust would not be floating so close to the star.

"This finding definitely affects the way astronomers look at planet formation. Spitzer's infrared spectrometer was able to see a gap in this system, but future, more sensitive telescopes maybe able to search for Earth-like planets in UX Tau A," said Espaillat.

Her paper was published in the December 2007 issue of Astrophysical Journal Letters. Other authors on the paper include Nuria Calvet, Jesus Hernández and Lee Hartmann, also from the University of Michigan; Paola D'Alessio of the Universidad Nacional Autónoma de México, Michoacán; Chunhua Qi of the Harvard-Smithsonian Institute for Astrophysics, Cambridge, Mass.; Elise Furlan of the NASA Astrobiology Institute at the University of California at Los Angeles; and Dan Watson of the University of Rochester, N.Y.

The Astronomy Store

The CSN Planetarium
open 5 pm to 9 pm Friday
& 3 pm to 9 pm Saturday

The Astronomy Store features items for sale that are of interest to the patrons of The Planetarium. We carry a wide variety of novelties, toys and observing aids with a space or astronomical theme. When patrons obtain their tickets to planetarium shows, they can also purchase a variety of astronomically oriented items. Friends of The Planetarium receive a 10% discount.

Hazy Red Sunset On Extrasolar Planet

(NASA/ESA/STScI) The NASA/ESA Hubble Space Telescope has given astronomers a fascinating new insight into the atmosphere of a planet in orbit around another star. The observations provide evidence of the presence of hazes in the atmosphere of the planet HD 189733b.

A team of astronomers have used the NASA/ESA Hubble Space Telescope to detect, for the first time, strong evidence of hazes in the atmosphere of a planet orbiting a distant star. The discovery comes after extensive observations made recently with Hubble's Advanced Camera for Surveys (ACS).

The team, led by Frédéric Pont from the Geneva University Observatory in Switzerland, used Hubble's ACS to make the first detection of hazes in the atmosphere of the giant planet. "One of the long-term goals of studying extrasolar planets is to measure the atmosphere of an Earth-like planet, this present result is a step in this direction" says Pont.
"HD 189733b is the first extrasolar planet for which we are piecing together a complete idea of what it really looks like."

The new observations were made as the extrasolar planet, dubbed HD 189733b, passed in front of its parent star in a transit. As the light from the star passes through the atmosphere around the limb of the giant extrasolar planet, the gases in the atmosphere stamp their unique signature on the starlight from HD 189733.

The planet itself, orbiting close to its parent star, is a ‘hot-Jupiter’ type of gas giant slightly larger than Jupiter. The proximity to its star results in an atmospheric temperature of roughly 700° C. Measurements of the way light varies as the planet passes in front of its parent star indicates that HD 189733b has neither Earth-sized moons nor any discernible Saturn-like ring system.

Hubble’s ACS camera, coupled with a grism (a kind of cross between a prism and a diffraction grating) allowed the astronomers to make extremely accurate measurements of the spectrum of HD 189733b, allowing conclusions to be drawn about the composition of the planet’s atmosphere. The exquisite level of precision needed to make this observation can only, at the moment, be achieved from space. The combination of a large planet and relatively small parent star, only 76% of the diameter of our Sun, contributes to the success of this delicate experiment.

Where the scientists had expected to see the fingerprints of sodium, potassium and water there were none. This finding, combined with the distinct shape of the planet’s spectrum, infers that high level hazes (with an altitude range of roughly 1000 km) are present. So the atmosphere on HD 189733b would look very similar to a gorgeous red sunset over Athens! Venus and Saturn’s moon Titan, in our own Solar System, are also covered with haze. According to the scientists the haze probably consists of tiny particles (less than 1/1000 mm in size) of condensates of iron, silicates and aluminium oxide dust (the compound on Earth which the mineral sapphire is made of).

As part of the observations of HD 189733, the teams of astronomers also needed to accurately account for the variations in the star’s brightness during the set of observations. ‘Starspots’ like those seen on our own Sun may cover several percent of the star and are thought to be about 1000° C cooler than the rest of HD 189733’s surface. It was found that there is a starspot on the star’s surface which is over 80,000 km across.
Friends of The CSN Planetarium

Be a Star in Our Sky

onOrbit is made possible, in part, by donations from the Friends of The Planetarium. Anyone can become a Friend by sending an annual donation of $25.00 or more (checks made payable to: CSN Foundation, Inc.) to:

The Planetarium - S1A
College of Southern Nevada
3200 E. Cheyenne Avenue
North Las Vegas, NV 89030

Benefits:
• Receive onOrbit each month.
• Discount admission to all shows.
• 10% discount in the Astronomy Store.
• Screen credit in prologue presentations prior to each public performance:
  Star ($25) - three months credit.
  Nova ($50) - six months credit, discount admission for Friend & family.
  Supernova ($100) - year credit, free admission for Friend & discount admission for family.
  Star Cluster ($200) - year large credit, free admission for Friend & family.
  Galaxy ($500) - year unshared credit, free admission for Friend & all guests.

The Astronomical Society of Nevada

The ASN normally meets on the 2nd Tuesday of each month at 6:30 pm at the Fleischmann Planetarium. Call 775-324-4814 for information. http://www.astronomynv.org/
The ASN has a Las Vegas Chapter. For information see: http://vegas.astronomynv.org/

Embryonic Star Captured with Jets Flaring

(NASA/SSC) A developing star wrapped in a black cocoon of dust is seen sprouting giant jets in a new image from NASA’s Spitzer Space Telescope.

The stellar portrait, captured in infrared light, offers the first glimpse at a very early stage in the life of an embryonic sun-like star, a time when the star’s natal envelope is beginning to flatten and collapse, and streams of gas are escaping. The observations will ultimately help astronomers better understand how stars and their planets form.

"This is the first time we’ve clearly seen a flattened envelope around a forming star," said Leslie Looney of the University of Illinois at Urbana-Champaign, lead author of a study about the star, called L1157, appearing Decem-

Infrared image of the embryonic star and forming planetary system L1157 by the Spitzer Space Telescope.
Some theories had predicted that envelopes flatten as they collapse onto their stars and surrounding planet-forming disks, but we hadn’t seen any strong evidence of this until now.

Stars are born out of thick clouds, or envelopes, of gas and dust that condense and collapse inward. As a star grows and feeds off the envelope, it spins faster and faster like a twirling ice skater. A disk of planet-forming material begins to take shape in orbit around the star, and jets of gas shoot up from above and below the disk to relieve the star’s accumulating pressure. Eventually, the original envelope falls onto the spinning disk, and the jets slow to a stop.

The regions where all the action takes place are dark and dusty, letting little visible light escape. For example, the embryonic star L1157 appears black in visible-light views. Spitzer’s infrared view of the star, on the other hand, penetrates the dusty haze, giving us a rare look at what our own solar system might have looked like when it was very young.

The bipolar jets shooting away from L1157 are enormous; light itself would take about nine months to travel the length of one jet. The color white shows the hottest parts of the jets, with temperatures around 100°C. Most of the material in the jets, seen in orange, is roughly 0°C.

The flattened envelope around the fledgling star is perpendicular to the jets and appears deep black. This is because it is so thick with dust that even infrared light cannot escape.

L1157 is located about 800 light-years away in the constellation Cepheus. It is roughly 10,000 years old, and, according to astronomers’ estimates, will ignite to become a full-fledged star about the mass of our sun in a million years or so.

"Taking baby pictures of stars is not easy to do," said Looney. "Now that we have a good picture, we can begin to ask questions about whether this star system and its potential planets will grow up to become like ours."

Other authors of this study include John J. Tobin of the University of Michigan, Ann Arbor, and Woojin Kwon of the University of Illinois.

NASA’s Jet Propulsion Laboratory, Pasadena, Calif., manages the Spitzer Space Telescope mission for NASA’s Science Mission Directorate, Washington. Science operations are conducted at the Spitzer Science Center at the California Institute of Technology, also in Pasadena. Caltech manages JPL for NASA. Spitzer’s infrared array camera, which took the new picture of L1157, was built by NASA’s Goddard Space Flight Center, Greenbelt, Md. The instrument’s principal investigator is Giovanni Fazio of the Harvard-Smithsonian Center for Astrophysics.
Month in History

February

1: The Space Shuttle Columbia broke up during re-entry due to wing damage in 2003. The vehicle and its crew were lost.

3: Luna 9, launched by the Soviet Union, made the first soft landing on the moon and returned pictures from another world for the first time on this date in 1966.

4: Clyde Tombaugh, the discoverer of Pluto, was born on this date in 1916. See Feb. 18.

5: The US spacecraft, Mariner 10, returned the first close images of our sister planet as it passed Venus on this date in 1974 headed towards Mercury.

5: Apollo 12, the 2nd mission to the moon’s surface landed near Fra Mauro close to the lunar equator on this date in 1971. Alan Shepard and Ed Mitchell visited the surface and Stuart Roosa remained in orbit aboard the command module.

7: American astronauts Bruce McCandless and Robert Stewart accomplished the first untethered space walks with Manned Maneuvering Units (MMU) during the STS-41B shuttle mission in 1984.

11: Japan became the fourth nation to launch an artificial satellite in 1970 with the launch of the 50 pound Ohsumi satellite. They used a newly developed solid fuel, multi-staged rocket similar to the US Scout rocket. The satellite’s battery failed the next day.

14: The US launched Syncom 1, the first geosynchronous satellite, in 1963.

15: Galileo Galilei was born in 1564 in Pisa, Italy. In December, 1609, he was the first person to use a telescope to look at the heavens and report what he saw.

18: Clyde Tombaugh, an observing assistant at the Lowell Observatory, announced the discovery of the planet Pluto in 1930 from photos taken over the previous two months.

19: Nicolaus Copernicus was born in 1473. He was the first modern proponent for a model of the solar system with the sun at the center.

19: The Soviet Union launched the Mir space station into orbit in 1986. This space station was deorbited and burned up in the atmosphere in March 2001.

20: John Glenn became the first American astronaut to orbit the earth in 1962 aboard the Friendship 7 Mercury craft. His mission lasted for three orbits which lasted less than five hours.

24: The discovery of the first pulsar was announced by Jocelyn Bell in 1968 at Cambridge in the United Kingdom.

28: The US launched the first spacecraft into a polar orbit on this date in 1959.

Give a Star

A popular service of The CSN Planetarium lets you dedicate a star to a loved one. For a donation of $35, we will provide an attractive certificate that proclaims your dedication of the star of your choice to any other person. The certificate will have a chart of the constellation containing the star and complete information about the star. A donation of $100 will give you an exclusive dedication. Call 651-4138 or 651-4505 for further information.
Sky Calendar

All times are Pacific Standard Time. Rise and set times are for the astronomical horizon at Las Vegas or Reno as noted. The year 2008 is a leap year causing February to have 29 days.

The Planets

Mercury. Mercury is low in the morning sky before sunrise for last couple of weeks of the month. Greatest western elongation (27°) occurs on March 3.

Venus. Venus is visible in the morning sky rising in the east about 2 hours before the sun. It is the brightest object in the morning sky.

Mars. Mars is in Taurus. Look for the red planet in high the eastern sky in the early evening. The waxing gibbous moon passes near Mars on the evening of February 15.

Jupiter. Jupiter, in Sagittarius, is low in the east before sunrise. Look for it in the morning sky where it will be adjacent to Venus at the beginning of the month.

Saturn. Saturn, in the constellation of Leo, is rising near sunset just below the bright star Regulus. Opposition (directly opposite the sun) occurs February 24. Look for the full moon near Saturn on February 20.

Uranus. Uranus is in the constellation of Aquarius where it is too close in direction to the sun to be seen. Conjunction on the far side of the sun occurs on March 8.

Neptune. Neptune, in Capricornus, is too close in direction to the sun to be easily observed. Conjunction on the far side of the sun occurs on February 10.

The Moon

Each day the moon rises about one hour later than the day before. The New Moon (not visible) is in the direction of the sun and rises and sets with the sun. The first quarter moon rises at about noon and sets near midnight. The full moon is opposite the sun in the sky and rises at sunset and sets at sunrise. The last quarter moon rises near midnight and sets near noon. Perigee is when the moon is closest to the earth and apogee is when it is farthest. The distance varies by ±6% from the average.

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Last quarter</td>
<td>Jan. 29</td>
<td>9:03 pm pst</td>
</tr>
<tr>
<td>New Moon</td>
<td>Feb. 6</td>
<td>7:44 pm</td>
</tr>
<tr>
<td>First quarter</td>
<td>Feb. 13</td>
<td>7:33 pm</td>
</tr>
<tr>
<td>Full Moon</td>
<td>Feb. 20</td>
<td>7:30 pm</td>
</tr>
<tr>
<td>Last quarter</td>
<td>Feb. 28</td>
<td>6:18 pm</td>
</tr>
<tr>
<td>Apogee</td>
<td>Jan. 30</td>
<td>8:27 pm pst</td>
</tr>
<tr>
<td>Perigee</td>
<td>Feb. 13</td>
<td>5:09 pm</td>
</tr>
<tr>
<td>Apogee</td>
<td>Feb. 27</td>
<td>5:28 pm</td>
</tr>
</tbody>
</table>

There will be a total eclipse of the moon on the evening of February 20. The moon will start into the umbra of the earth’s shadow at 5:43 pm shortly after moon rise. Totality will begin at 7:00 pm. The center of the eclipse will occur at 7:26 pm. Totality will for this short eclipse end at 7:51 pm. The moon will leave the umbra and the eclipse will be over by 9:09 pm.

Dwarf Planets. (At mid-month - 15th)

<table>
<thead>
<tr>
<th>Planet</th>
<th>Constellation</th>
<th>Transit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pluto</td>
<td>Sagittarius</td>
<td>8:03 am (37°)</td>
</tr>
<tr>
<td>Ceres</td>
<td>Aries</td>
<td>4:58 pm (68°)</td>
</tr>
<tr>
<td>Eris</td>
<td>Cetus</td>
<td>3:36 pm (49°)</td>
</tr>
</tbody>
</table>

All Dwarf Planets require a telescope. Ceres is visible through most amateur telescopes. Pluto usually requires a telescope of at least 12” diameter. Eris ("EE-ris", formerly 2003 UB313), like most Trans-Neptunian objects, requires a professional sized telescope. Transit time and altitude (from Las Vegas) are when the object is at its highest in the southern sky. ☺
The Mid-Winter Sky

High in the south at about 8:00 pm during February is the bright constellation of Orion. Orion has more bright stars in it than most other constellations. Orion is the hourglass figure in the middle of the diagram.

The left shoulder of Orion is marked by the bright red star Betelgeuse. The right foot of Orion is the bright blue star Rigel. These are the two brightest stars of Orion.

The three stars at the waist of the hourglass form the “belt” of Orion. They are called Mintaka, Alnilam and Alnitak. Extending the line formed by the belt stars upward, takes you to the bright red star Aldebaran, the brightest star in Taurus, the Bull. Continuing the line takes you through the “V”-shaped pattern of the Hyades star cluster and eventually to the small “dipper-shaped” pattern of the Pleiades star cluster. The Pleiades are seven sisters kidnapped by Zeus in the form of Taurus.

Extending that same line downward takes you to Sirius, the brightest star in Canis Major, the Big Dog. Sirius is also the brightest appearing star in the sky.

Below the Belt of Orion, in the lower part of the hourglass, are three faint stars in a row. The middle star does not look quite sharp to the eye. This fuzziness is caused by the fact that the middle star is not actually a star, but a nebula. It is the famous Great Nebula of Orion, also known as M42. This cloud of glowing gas can be easily seen with a pair of binoculars. It is a star forming region that is 400 light years across and nearly 1500 light years away. Telescopes have shown evidence of hundreds of new stars being born here.

Above and to the left of Orion is the constellation of Gemini, the Twins. The two brightest stars, along the left side of the diagram, are Castor and Pollux. These stars are very similar in appearance which led to them being called “The Twins”.  

The Sun

<table>
<thead>
<tr>
<th>Date</th>
<th>Sunrise</th>
<th>Sunset</th>
<th>Day</th>
<th>Date</th>
<th>Sunrise</th>
<th>Sunset</th>
<th>Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feb. 1</td>
<td>6:43 am pst</td>
<td>5:06 pm pst</td>
<td>Fri.</td>
<td>Feb. 1</td>
<td>7:08 am pst</td>
<td>5:18 pm pst</td>
<td>Fri.</td>
</tr>
<tr>
<td>Feb. 4</td>
<td>6:40</td>
<td>5:09</td>
<td>Mon.</td>
<td>Feb. 4</td>
<td>7:05</td>
<td>5:21</td>
<td>Mon.</td>
</tr>
</tbody>
</table>

The Sun

<table>
<thead>
<tr>
<th>Date</th>
<th>Sunrise</th>
<th>Sunset</th>
<th>Day</th>
<th>Date</th>
<th>Sunrise</th>
<th>Sunset</th>
<th>Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feb. 1</td>
<td>7:08 am pst</td>
<td>5:18 pm pst</td>
<td>Fri.</td>
<td>Feb. 1</td>
<td>7:08 am pst</td>
<td>5:18 pm pst</td>
<td>Fri.</td>
</tr>
<tr>
<td>Feb. 4</td>
<td>7:05</td>
<td>5:21</td>
<td>Mon.</td>
<td>Feb. 4</td>
<td>7:05</td>
<td>5:21</td>
<td>Mon.</td>
</tr>
<tr>
<td>Feb. 7</td>
<td>7:02</td>
<td>5:25</td>
<td>Thu.</td>
<td>Feb. 7</td>
<td>7:02</td>
<td>5:25</td>
<td>Thu.</td>
</tr>
</tbody>
</table>
Now Playing

In Las Vegas
Starts January 11

Astronaut
and
Sky Watch

Saturday Matinee
Secret of the Cardboard Rocket

In Reno

Extreme Planets
and
The Alps

The CSN Planetarium and The Fleischmann Planetarium are units of the Nevada System of Higher Education.

CSN President: Dr. Michael Richards (Interim)
UNR President: Dr. Milton Glick
NSHE Chancellor: James E. Rogers
NSHE Board of Regents: Michael Wixom - Chair, Howard Rosenberg - Vice Chair, Mark Alden, Dr. Stavros Anthony, Cedric Crear, Thalia Dondero, Dorothy Gallagher, Jason Geddes, Ronald Knecht, James Dean Leavitt, Dr. Jack Lund Schofield, Steve Sisolak and Bret Whipple

Contact us at:

The Planetarium - S1A
College of Southern Nevada
3200 E. Cheyenne Avenue
North Las Vegas, NV 89030-4296
http://www.csn.edu/planetarium/

Fleischmann Planetarium
University of Nevada
1650 N. Virginia Street
Reno, NV 89557-0010
http://planetarium.unr.edu/