May 2008

Inside this Issue

S*T*A*R
P.O. Box 863
Red Bank, NJ 07701
On the web at:
http://www.starastronomy.org

Edited by: Ahmad & Hanna Jrad

May's Meeting

The next meeting of S*T*A*R will be on Thursday, May 1. Our program will be ***"The Near Side Lunar Megabasin"*** by Charlie Byrne. All are welcome. The meeting will begin promptly at 8:00pm at the Monmouth Museum on the campus of Brookdale Community College. This is not our usual location so take care to come to the right place.

Editor's Corner

Thanks to Gavin Warnes, Steve Fedor, Ernie Rossi & Randy Walton for sending articles to this month's Spectrogram.

Reminder to pay membership dues $25/individual, $35/family. Donations are appreciated. Make payments to Paul Nadolny at the May meeting or mail a check payable to S*T*A*R Astronomy Society Inc to:

S*T*A*R Astronomy Society
P.O. Box 863
Red Bank, NJ 07701

May Issue

Please send articles and contributions by Fri. May 23. stargaze07@verizon.net.

Hubble Space Telescope - Arp 148 is the aftermath of an encounter between two galaxies, resulting in a ring-shaped galaxy and a long-tailed companion. The collision between the two parent galaxies produced a shockwave effect that first drew matter into the center and then caused it to propagate outwards in a ring.

Calendar

Sep 6, 2007 – "***NASA's Deep Impact Mission***" by Elizabeth Warner, University of Maryland

Oct 4, 2007 – ***" Webcam Astrophotography"*** by Clif Ashcraft

Nov 1, 2007 – ***"The Interstellar Medium"*** by Dr Hector Arce, American Museum of Natural History

Dec 6, 2007 – ***"Adventures at Palomar"*** by Alan Midkiff

Jan 3, 2008 - ***"NASA's Dawn Mission"*** by Dennis O'Leary, S*T*A*R Astronomy

Feb 7, 2008 - ***"Moons of the Solar System"*** by David Britz, S*T*A*R Astronomy

Mar 6, 2008 - ***"Remote Control CCD Imaging "*** by Steve Walters, S*T*A*R

Apr 3, 2008 – ***"Our Changing Sun"*** by Ken Legal, S*T*A*R

May 1, 2008 – "***The Near Side Lunar Megabasin***" by Charlie Byrne, S*T*A*R

Jun 5, 2008 – AGM

Announcements:

5/12 – Scout School Party help Fairview School, Middletown. To help contact Rich Gaynor. richg870@aol.com

5/29-6/1 - Cherry Springs Star Party Cherry Springs Park, PA. http://www.astrohbg.org/s4/index.php

5/30-6/1 - AOS Starfest at the Stone Tavern Farm in Delaware Co. NY. http://www.aosny.org/Starfest2008.htm

7/31-8/3 - Stellafane Springfield, VT. http://www.stellafane.com

President's Corner

By Gavin Warnes

This is turning out to be quite a year for S*T*A*R. Last year our membership had dipped to 52 which was too low to sustain us. I'm very happy to say that we have grown tremendously this year – I think we'll finish with 70 members. You've probably noticed that the attendance at the meetings is way up.

This week we held a group observing session at the Bucks Mill Recreation Area in Colts Neck. It was great to see thirty people show up with a variety of different scopes. Despite the somewhat hazy conditions there were some beautiful, crisp views of Saturn to be seen through the refractors brought by John Heidema and George Zanetakos. We brought the 25" along and a long line formed to take a look at M3. Globular clusters are particularly stunning through the club's monster telescope. When the sky is transparent Bucks Mill is a great local site with no glarey lights and good horizons. We'll schedule another night soon. Thanks to Steve Fedor for getting so many people together!

We had quite a turn out at Monmouth Museum for the last meeting – at least 60 people, our biggest attendance of the year. Thanks to everybody for coming to take a look. As the room was so full, I have subsequently agreed with the museum director that we would always have access to the kitchen and can meet in the main gallery when they do not have an exhibit taking up floor space. In 2008-2009 there would be three meetings when we would have to use the smaller room. Beyond that it's hard to say - the primary function of the facility is to act as a museum. We'll hold a formal vote on whether to move or not at the AGM in June.

On the evening of Sunday May 25th the Phoenix lander will, fingers crossed, land on Mars. The landing is scheduled for prime time in the evening. I'm sure it will be streamed over the Internet, and some of you may get NASA TV. I watched the Spirit lander land and it was really quite nail biting – hopefully it will be just as successful.

We have a couple of outreach opportunities coming up in May. On May 12th at 8pm Rich Gaynor is arranging a star party at Fairview School, Cooper Road in Middletown. Please contact Rich via the discussion board or richg870@aol.com. On May 17th Vonage is holding a Relay for Life cancer fundraiser at their facility on route 520 in Homldel. The event starts at 3pm and carries on throughout the night. Vonage has asked if we can bring telescopes to help to entertain the walkers and spectators. If you'd like to help, please contact Steve Lewis via the discussion board or at stevelewis@creativerecords.com.

Keep looking up!
Gavin

March Meeting Minutes

By Steve Fedor

The April 2008 meeting of S*T*A*R Astronomy Club began at approximately 8:00 p.m. on 4/3/2008. The meeting was held at the Monmouth Museum on the campus of Brookdale Community College. The meeting was held there because the decision to move there permanently will be voted on at the annual business meeting. An exact count of the attendance was unable to be taken but it is estimated to have been between 60 – 70 people. President Gavin Warnes chaired the meeting and began by greeting the first-time attendees.

The program for the night was by STAR's own Ken Legal who presented a fascinating talk titled "Our Changing Sun." Ken presented a well-rounded talk on many solar topics including various NASA missions, solar ejecta, sunspots, earth and space based solar telescopes, and even touched upon global warming. The presentation ended at 9:15.

After a short break the meeting resumed with the following. Gavin announced the need for members to assist Frank Loso on the nominating committee for board members.

Gavin announced that he would need help with the Earth Day event at Bayonet Farm. Steve Fedor indicated he would assist. This will be a great day to gain publicity for the club and all members are invited to join us.

Steve Fedor announced the club will be holding its first local observing night of the 2008 season. It will be at the Bucks Mill recreation area (the picnic site) on April 24th with a rain/ cloud date of Thursday April 29th.

The meeting ended early to allow members to view a fine exhibit of pictures of objects in our solar system.

Measuring your Eyepiece's FOV

by Dr. Ahmad Jrad

In optical equipment, especially eyepieces, one of the most prominent differentiators between excellent optics versus marginal ones is the field of view. Sure there are other factors as well, like the flatness of the field, the clarity and rendering in focus of the entire visible field, the eye relief, all these are important factors, but they are only important when you have a wide field of view to talk about. Anyone can design a cheap eyepiece that can show you one star at a time and have a flat field and all the rest. But that hardly impresses these days. The true mark of excellent optics is a wide and faithful field of view.

Simply put, the field of view translates into how much one can see looking through a given optical apparatus. The

eyepieces that you use, largely decide a telescope's field of view. Eyepieces are usually marked with a number referred to as the apparent field of view (AFOV). Given that number, with the eyepiece's magnification (or its focal length in mm) and the telescope's focal length you can easily compute how much of the sky you can expect to see, this is also known as the true field of view. This is computed in two easy steps. Let us say we have telescope of 1000 mm focal length, and an eyepiece of 20 mm, and 50 degrees AFOV.

1. First compute the telescope's magnification. This is computed by dividing the telescopes focal length by the eyepiece's:

Magnification = 1000/20 = 50x

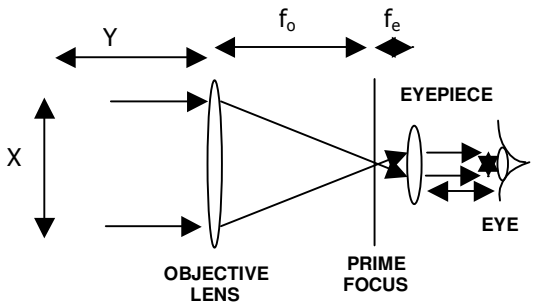
2. Next, divide the AFOV by the magnification to get the TFOV:

TFOV = 50/50 = 1 degree

With this setup, you should be able to see more than the entire disc of the full moon in the night sky. However, you will not be able to fit all of M44 (the Beehive Cluster, 1.2 degrees) at once, some stars will remain outside the visible range, and you must move the telescope to see them.

It turns out that the manufacturer stated number for AFOV is only useful as a guide. It is not always accurate, and in fact your mileage may vary a great deal. So when Plossl eyepieces are advertised to have 52 degree AFOVs, they may in fact range from the low 40's to the high 50's. That is a swing of nearly 20 degrees. That is why it is highly useful to measure where you equipment stands in order to plan better on using the right eyepiece for a given session.

Now if you own a pair of all-purpose binoculars, you may have noticed that they do not tell you their angular FOV, instead, they tell you what is called their linear FOVs. This simply states that you can see a 150-foot wide area at a given distance (1000 yards away). Higher end models usually tell you both numbers, linear and angular FOVs. And it turns out the two are related (obviously). Therefore, if you can measure one, you can compute the other. We can use this simple observation to compute the eyepiece FOV for the eyepieces we use.



There are web sites out there that can covert between Linear FOV and Angular FOV. But they expect as input the number of feet visible a thousand yards away. This may be somewhat complicated for one person to measure handily, especially, if one would like to do so in one's backyard. However, one can easily adapt this to work no matter how far your target of observation is. So if we can see a given linear span (X) at a distance (Y), then we can easily compute the TFOV of the telescope, and the AFOV of the eyepiece.

It turns out, that if you see X inches wide at a distance of Y feet, then you can easily convert that to an equivalent (Z) linear feet at a 1000 yards distance:

$$Z = X*250/Y$$

Note that in the above formula, X is in inches, while Y is in feet. In my case, I taped a ruler to the fence and observed it in the telescope. I could directly read how many inches I could see. In one case, I could see 12.7 inches at 44 feet distance away. This translates into 72 Feet (12.7 * 250 / 44) at 1000 yards distance. To obtain the TFOV, you divide the number of feet by 52.35. In this case, the TFOV is 1.375. That is 1 degree and 22.5 minutes (.376 * 60). That is just about wide enough to fit all of M44. However, to compute the eyepieces AFOV (that is the number we ultimately seek) we need to evaluate the following equation. Given the telescope's main lens' focal length (f_o) and the eyepiece's focal length (f_e), then:

$$AFOV = (Z * f_o) / (f_e * 52.35)$$

In my case, and with my equipment, this worked out as follows:

AFOV = (72 * 800mm) / (25mm * 52.35) = 57600/1309 = 44.01

So for that eyepiece, the AFOV is barely above 44 degrees instead of the advertised 52 degrees.

You can repeat this for all your eyepieces and keep a library of this data which you can use in planning observing sessions and simply in comparing eyepieces.

One thing we did not discuss is the fact that there are many other factors that can play a role in limiting the true field of view of a telescope. So in the case of a refractor, the 90 degree right angle may itself limit the useful FOV that can be achieved. Use of a 2 inch 90 degree right angle will help avoid this problem. In the case of a reflector, collimation and secondary mirror placement also play a role in this as well as the size of the eyepiece barrel.

Stellar Compass for Space Explorers

by Patrick L. Barry

In space, there's no up or down, north or south, east or west. So how can robotic spacecraft know which way they're facing when they fire their thrusters, or when they try to beam scientific data back to Earth?

Without the familiar compass points of Earth's magnetic poles, spacecraft use stars and gyros to know their orientation. Thanks to a recently completed test flight, future spacecraft will be able to do so using only an ultra-low-power camera and three silicon wafers as small as your pinky fingernail.

"The wafers are actually very tiny gyros," explains Artur Chmielewski, project manager at JPL for Space Technology 6 (ST6), a part of NASA's New Millennium Program.

Traditional gyros use spinning wheels to detect changes in pitch, yaw, and roll—the three axes of rotation. For ST6's Inertial Stellar Compass, the three gyros instead consist of silicon wafers that resemble microchips. Rotating the wafers distorts microscopic structures on the surfaces of these wafers in a way that generates electric signals. The compass uses these signals—along with images of star positions taken by the camera—to measure rotation.

Because the Inertial Stellar Compass (ISC) is based on this new, radically different technology, NASA needed to flight-test it before using it in important missions. That test flight reached completion in December 2007 after about a year in orbit aboard the Air Force's TacSat-2 satellite.

"It just performed beautifully," Chmielewski says. "The data checked out really well." The engineers had hoped that ISC would measure the spacecraft's rotation with an accuracy of 0.1 degrees. In the flight tests, ISC surpassed this goal, measuring rotation to within about 0.05 degrees.

That success paves the way for using ISC to reduce the cost of future science missions. When launching probes into space, weight equals money. "If you're paying a million dollars per kilogram to send your spacecraft to Mars, you care a lot about weight," Chmielewski says. At less than 3 kilograms, ISC weighs about one-fifth as much as traditional stellar compasses. It also uses about one-tenth as much power, so a spacecraft would be able to use smaller, lighter solar panels.

Engineers at Draper Laboratory, the Cambridge, Massachusetts, company that built the ISC, are already at work on a next-generation design that will improve the compass's accuracy ten-fold, Chmielewski says. So ISC and its successors could soon help costs—and spacecraft—stay on target.

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

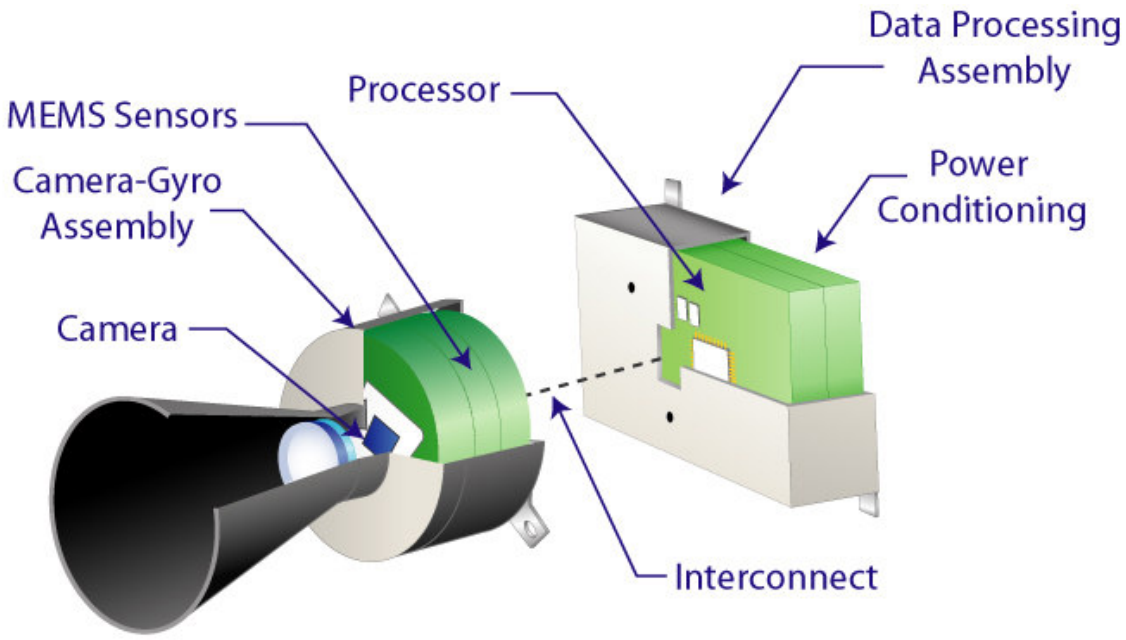


Figure 1. Compass is built as two separate assemblies, the camera-gyro assembly and the data processor assembly, connected by a wiring harness. The technology uses an active pixel sensor in a wide-field-of-view miniature star camera and micro-electromechanical system (MEMS) gyros. Together, they provide extremely accurate information for navigation and control

Are you a S*T*A*R Member?

S*T*A*R is the proud owner of a monstrous 25" Dobsonian Obsession reflector – which members can gain access to!

Meetings are the first Thursday of each month, except July and August, at 8:00 PM at the King of Kings Lutheran Church, 250 Harmony Rd. in Middletown. Meetings generally consist of lectures and discussion by members or guest speakers on a variety of interesting astronomical topics. S*T*A*R is a member of United Astronomy Clubs of New Jersey (UACNJ), the Astronomical League (AL), and the International Dark Sky Association (IDA).

Memberships: ( )Individual....$25 ( ) Family...$35

Name_____

Address_____

City_____State___Zip_____

Phone_____

Email_____

Make checks payable to: S*T*A*R Astronomy Society, Inc. and mail to P.O. Box 863, Red Bank, NJ 07701

2008 May Celestial Events

Supplied by Ahmad Jrad for J. Randolph Walton (Randy)

Day	Date	Time (EDT)	Event
Thu	1	04:24	Mercury within 2° of M45
Fri	2	01:06	Jupiter Rises
		01:35	Mars Sets
		03:18	Saturn Sets
		03:57	Moon Rises
		05:54	Sunrise
		16:46	Moon Set
		19:54	Sunset
		23:00	Pluto Rises
Sat	3	22:40	Ganymede Shadow Transit
Wed	5	08:19	**New Moon**
Fri	6	08:20	M45 within 49' of Moon
Sun	7	22:40	Europa Transit
Tue	8	21:12	Io Shadow Transit
Tue	8	22:22	Io Transit
Thu	9	19:39	Io Occultation
Sat	10	10:19	**Moon occults Mars**
Wed	12	00:27	Jupiter Rises
		01:12	Mars Sets
		02:39	Saturn Sets
		03:48	**First Quarter Moon**
		20:04	Sunset
Sun	14	21:12	Ganymede Occultation
Sun	14	22:53	Europa Shadow Transit
Tue	15	23:05	Io Shadow Transit
Thu	16	20:22	Io Eclipse
Thu	16	21:27	Io Occultation
Fri	20	02:12	Full Moon
Sun	21	20:43	Ganymede Eclipse
Tue	22	18:08	Saturn Eastern Quadrature
Thu	23	00:47	Mars Sets
		01:23	Neptune Rises
		01:56	Saturn Sets
		02:34	Uranus Rises
		21:43	Mercury Sets
		21:57	Europa Occultation
		22:14	Io Eclipse
		23:39	Jupiter Rises
Sat	24	20:26	Io Transit
Wed	26	23:05	Neptune within 34' of Moon
Sun	28	02:56	Last Quarter Moon
Thu	30	22:29	Europa Eclipse

In the Eyepiece

Here is a list of objects for this month. This is reproduced from www.skyhound.com with the kind permission of its creator and author of SkyTools Greg Crinklaw.

Object(s)	Class	Con	RA	Dec	Mag
Y CVn	Variable Star	Canes Venatici	12h45m07.8s	+45°26'25"	4.9
Black Eye	Galaxy	Coma Berenices	12h56m43.9s	+21°41'00"	9.3
Sombrero	Galaxy	Virgo	12h39m59.3s	-11°37'22"	9.1
Focus On Downtown Virgo & the M87 Jet!	Galaxy Cluster	Virgo	12h26m12.2s	+12°56'45"	9+
M 106	Galaxy	Canes Venatici	12h18m57.5s	+47°18'14"	9.1
M 108	Galaxy	Ursa Major	11h11m31.3s	+55°40'31"	10.9
M65	Galaxy	Leo	11h18m55.8s	+13°05'32"	10.2
M 66	Galaxy	Leo	11h20m15.1s	+12°59'22"	9.6
Owl	Planetary Nebula	Ursa Major	11h14m46.1s	+55°01'07"	12.0
NGC 4631 (The Whale)	Galaxy	Canes Venatici	12h42m07.8s	+32°32'27"	9.7
NGC 4656	Galaxy	Canes Venatici	12h43m58.2s	+32°10'09"	11.4
NGC 4244	Galaxy	Canes Venatici	12h17m29.5s	+37°48'26"	10.8
NGC 4013	Galaxy	Ursa Major	11h58m31.5s	+43°56'51"	12.3
NGC 4762	Galaxy	Virgo	12h52m55.9s	+11°13'57"	11.3
NGC 4236	Galaxy	Draco	12h16m41.8s	+69°28'10"	10.1
Hickson 61	Galaxy Group	Coma Berenices	12h12m23.9s	+29°10'40"	11.1
NGC 3607	Galaxy	Leo	11h16m54.8s	+18°03'06"	10.9
Focus On Gliese 433.1	White Dwarf Star	Ursa Major	11h37m05.1s	+29°47'58"	12.5
Antennae/Ring Tail	Galaxy	Corvus	12h01m52.8s	-18°51'54"	10.9
NGC 4490	Galaxy	Canes Venatici	12h30m36.7s	+41°38'27"	10.1
NGC 4361	Planetary Nebula	Corvus	12h24m30.8s	-18°47'05"	10.3
NGC 4027	Galaxy	Corvus	11h59m30.1s	-19°16'05"	11.7
NGC 4094	Galaxy	Corvus	12h05m53.9s	-14°31'36"	12.7
NGC 4782 & 4783	Galaxy	Corvus	12h54m35.8s	-12°34'06"	12.4

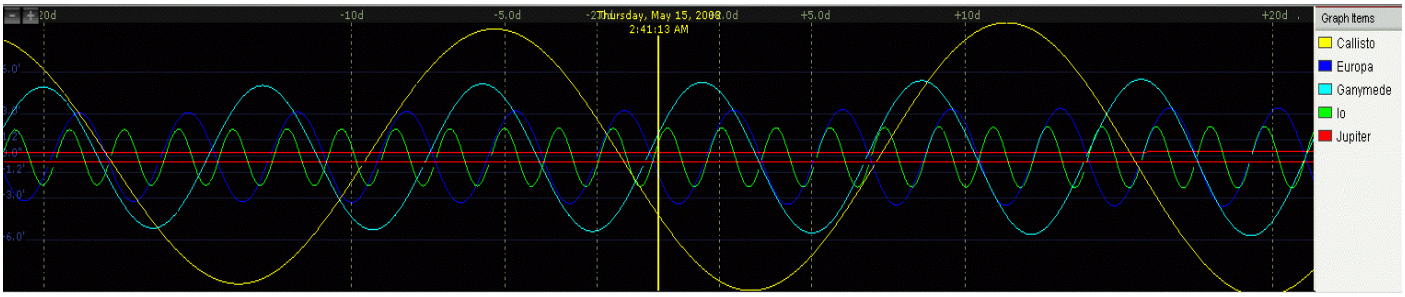
Moon Phases

AstroPuzzle Solution for April 2008

1 I	2 R	3 A	4 N	■	5 C	6 O	7 B	■	8 A	9 S	10 H	■	11 A	12 D	13 E	14 N
15 R	A	R	E	■	16 H	A	L	■	17 D	U	O	■	18 D	U	P	E
19 A	G	E	S	■	20 A	R	E	■	21 I	N	N	■	22 A	N	E	W
23 Q	U	A	S	24 A	R	■	25 U	26 S	E	D	■	27 F	R	E	E	S
■	■	■	■	28 B	T	29 U	■	30 Q	U	A	31 I	L	■	■	■	■
32 S	33 W	34 A	35 P	S	■	36 T	37 A	U	■	38 E	N	A	39 B	40 L	41 E	42 S
43 B	A	L	I	■	44 M	A	N	I	45 C	■	46 C	R	E	A	S	E
47 E	D	E	N	■	48 P	H	O	B	O	49 S	■	50 E	G	Y	P	T
■	■	■	■	51 T	H	A	N	■	52 R	I	53 P	S	■	■	■	■
54 N	55 A	56 D	57 I	R	■	58 N	Y	59 L	O	N	S	■	60 A	61 I	62 D	63 E
64 A	C	A	R	I	65 D	■	66 M	A	N	E	T	■	67 R	O	I	L
68 G	E	N	E	T	I	69 C	■	70 S	A	W	■	71 S	K	U	N	K
■	■	■	■	72 O	D	O	73 R	S	■	74 Y	75 A	K	■	■	■	■
76 S	77 W	78 A	79 I	N	■	80 S	O	O	81 T	■	82 T	Y	83 R	84 A	85 N	86 T
87 W	A	R	F	■	88 E	M	U	■	89 A	90 C	S	■	91 I	D	E	A
92 A	L	I	F	■	93 E	O	N	■	94 R	O	E	■	95 C	A	R	P
96 P	L	A	Y	■	97 L	S	D	■	98 S	P	A	■	99 A	M	O	S

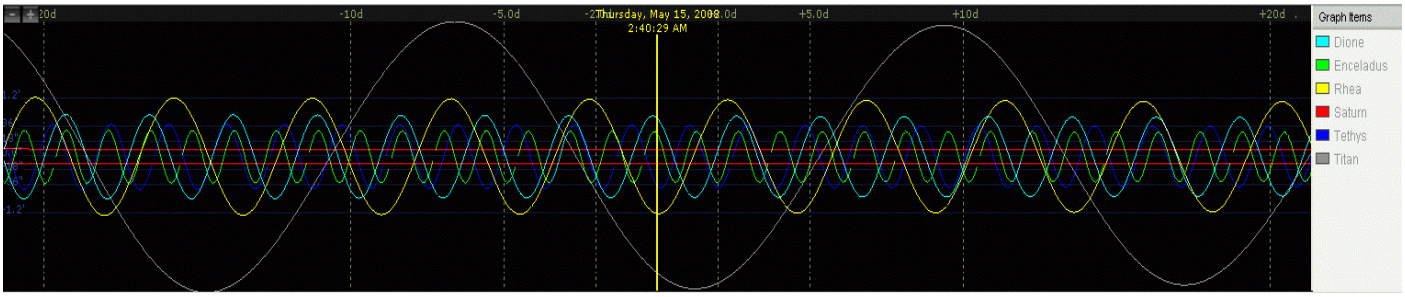
Jupiter Moon Calendar

Here is a graphical depiction of the visible moons of Jupiter for the month of May 2008.

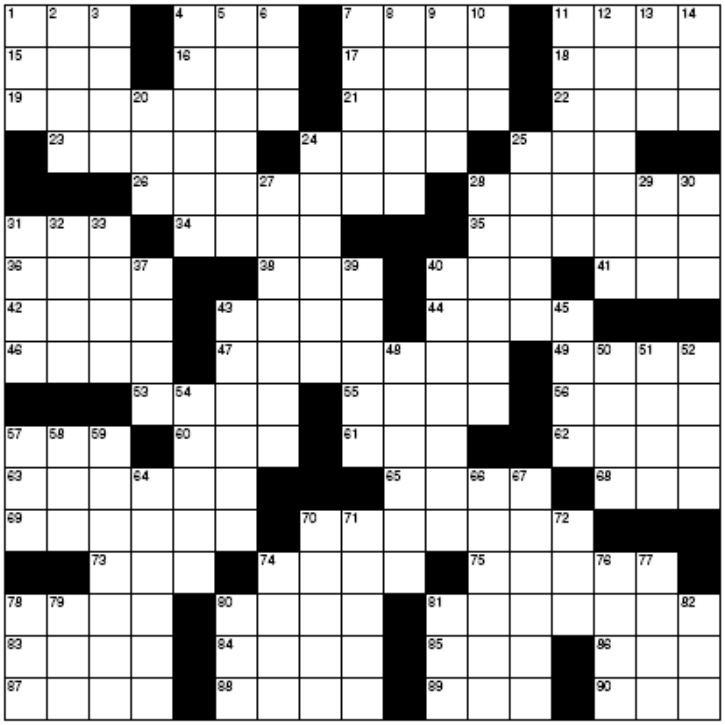


Saturn Moon Calendar

Here is a graphical depiction of the visible moons of Saturn for the month of May 2008.



AstroPuzzle - May 2008



www.CrosswordWeaver.com

ACROSS

1 West southwest
4 By way of
7 Syllables used in songs (2 wds.)
11 Eye infection
15 Environmental protection agency (abbr)
16 Rascal
17 Chilled
18 Victim
19 Undress
21 Prepare for an exam
22 Dirt road
23 Texas stew
24 French cook
25 Can metal
26 *When the Moon is more than half full, but less than completely full.*
28 Diplomat
31 Tax agency
34 Not far
35 Complete
36 *The hazy-looking patch surrounding the nucleus of a comet.*
38 Speak softly
40 School group
41 Explosive
42 Part of the "KKK"
43 Gritty paper
44 Depend
46 Yoga practicer
47 Benedict Arnold
49 Dimension
53 Scoot
55 __ Minor (Little Dipper)
56 Earring need
57 Mist
60 Kimono sash
61 Wipe
62 Sinister
63 Equanimity
65 Riches
68 American sign language
69 Floor
70 Coils
73 Rested
74 Artist Chagall
75 Grabs
78 Dirt
80 *Any deposit of sand-sized (1/16 to 2 mm in diameter) windblown material.*
81 *the point at which an object in orbit around the Earth makes its closest approach to the Earth.*
83 Leg joint
84 Brews
85 South southeast
86 Vapor
87 Poles
88 Not his
89 __ A Small World...
90 Supersonic transport

DOWN

1 Newly ___, Nearly Dead
2 __ and span (very clean)
3 Cleanse
4 Orchestra piece
5 Consume
6 Baboon
7 Sheer, triangular scarf
8 Real estate
9 Sheet of paper
10 High naval rank (abbr.)
11 Treatment for a broken bone
12 Passage
13 Shekel
14 Leer
20 Cheat
24 *The outermost part of the Sun's atmosphere.*
25 Sounds
27 Alcoholic Brand
28 Et __
29 Vase
30 Rent
31 Yucky
32 Rolled chocolate candy brand
33 Self-righteous
37 *An imaginary straight line on which an object rotates.*
39 Abhorrence
40 Thrive
43 Squat
45 Christmas
48 __ of Capricorn
50 *A star that exhibits a sudden, temporary increase in brightness thousands of times it s normal appearance.*
51 Wading bird
52 Say
54 *A small, frozen mass of dust and gas revolving around the sun.*
57 Foreign Agricultural Service
58 Choose
59 Polished
64 Talks
66 Most recent
67 *Beautiful eruptions in the outer part of the Sun's atmosphere.*
70 Not as insane
71 Make flatter
72 Slide on snow
74 Very slow horse
76 Chicken product
77 Salty water masses
78 Danish krone (abbr.)
79 Spanish "one"
80 Telegraphic signal
81 Pounds per square inch
82 Eastern Time