

Summer Skies

June, July, and August 2005

Planet viewing, a good meteor shower, space missions, and the biggest full Moon of the year will be a few of the highlights of this summer's astronomical offerings.

Dance of the planets

During the evening hours this summer there will be numerous opportunities to observe several of the brighter planets as they move along their respective orbits, overtaking and passing one another, performing a planetary dance with the choreography set to orbital speeds. With the exception of Mars, the visible planets will all be in the evening skies for at least the first part of the summer.

Mercury will live up to its mythological namesake's reputation as a swift-moving god, as from our perspective it will complete nearly one orbit around the Sun in the time we typically have off during the summer (Northern Hemisphere) months. At the beginning of June, Mercury will be at superior conjunction, on the opposite side of the Sun. During late June and early July, Mercury will reach eastern elongation and will be visible as an evening planet. Very quickly during August, Mercury will move between the Earth and the Sun to inferior conjunction and then to western elongation and the morning skies. Watch for several evening planetary conjunctions between Mercury and Venus and Saturn throughout June and July.

Venus and Jupiter will spend our summer months over the western horizon at sunset, and Venus will be very close to the planet Mercury at the end of June. The second inner planet will be moving out away from the Sun toward the east, as we view it from Earth, at a much faster rate than the outer planet Jupiter will be moving eastward along its orbital path. By the end of August, Venus will be very close to Jupiter in the evening skies over the western horizon, as both will set shortly after sunset.

Mars will be visible as a "morning star" throughout the summer months as it will slowly move eastward across *Aquarius* and then into the boundaries of *Pisces*. Watch for the Red Planet over the southern horizon in the hours before sunrise.

Jupiter will be high over the southern horizon at sunset during June; however, by late August, Jupiter will be low over the western horizon at sunset. Near to Jupiter throughout the summer months will shine the bluish-white star *Spica*, the bundle of wheat in the hand of *Virgo, the Harvest Maiden*, and much closer to Jupiter will be the slightly dimmer star *Porrina* (the Roman goddess of childbirth).



April 8 partial eclipse of the Sun

Saturn will still be easily seen as one of a trio of bright-looking stars arranged in a short, bent line over the southwestern horizon at sunset. It will share the sky with the two principal stars from the *Gemini Twins*, *Pollux* and *Castor*. Watch for Mercury to zoom up from the western horizon at sunset and come very close to Saturn by the end of June. A couple of weeks after that, Saturn will be too close to the Sun and will not be easily visible again until after it reappears on the other side of the Sun as a morning star after the school year has resumed.

Celestial events

Perseid meteor shower

The Perseid meteor shower will reach its peak, maximum meteors per hour, on August 12. The Moon will be approaching the first quarter phase and will have set by the time the constellation *Perseus, the Hunter*, rises above the northeastern horizon. The Perseid meteor shower owes its existence to Comet 109P/Swift-Tuttle, a periodic comet discovered in 1862 with an orbital period around the Sun of approximately 120 years.

Aphelion

The Earth will be at *aphelion*, its most distant point in the orbit around the Sun, on July 5, when we will be 152,102,400 km from the Sun.

Multiple missions

The manned and robotic exploration of our solar system will continue with a planned launch for the Space Shuttle *Atlantis*, STS-121, on a mission to the Inter-

Tracking the Sun

June, July, and August 2005

The Sun will pass from the constellation *Taurus*, the Bull, across the *Gemini Twins* during June and into the boundaries of *Cancer*, the Crab, in July.



By August, the Sun will have crossed into the boundaries of *Leo*, the Lion.

Tracking the annual Sun

Throughout the previous school year, information and data had been provided through this column so that students could graph the Sun's apparent motion along the ecliptic and relative to the horizon caused by the Earth's real orbital and rotational motions. The table below shows a summary of the approximate monthly distance between the Earth and the Sun in Astronomical Units (1 AU equals the average Earth-to-Sun distance of 147,000,000 km, or 93,000,000 miles), and also shows the apparent angular diameter of the Sun. These values vary as a result of the shape of the Earth's orbit, which is slightly more elliptical than circular. By graphing either the distance data or the apparent angular size data, students can see that the distance between the Earth and the Sun does not correlate with our (Northern Hemisphere) seasons.

Monthly approximate Earth to Sun separation and apparent size

Month	Distance (AU)	Apparent angular size (arc minutes)
September	1.0040	32'
October	0.9955	32'
November	0.9879	32'
December	0.9837	33'
January	0.8941	33'
February	0.9889	32'
March	0.9960	32'
April	1.0048	32'
May	1.0120	32'
June	1.0166	31'
July	1.0161	31'

national Space Station; the Deep Impact mission to Comet Tempel 1 that will involve a close flyby of the comet and the release of an impactor to collide with the comet on July 4; the Cassini spacecraft flyby of Saturn's small moon Enceladus and large moon Titan; an Earth flyby with the MESSENGER spacecraft on its way to Mercury; and the launch of the Mars Reconnaissance Orbiter for a March 2006 arrival.

Moon phases	June	July	August
New Moon	6/6	7/6	8/5
First quarter	6/15	7/14	8/13
Full Moon	6/22	7/21	8/19
Last quarter	6/28	7/28	8/26

Calendar of summer celestial events

June

- 3 Mercury at superior conjunction
- 8 Venus near Moon
- 14 Pluto at opposition
- 16 Jupiter near Moon
- 21 Summer solstice (1:46 a.m. EDT)
- 25 Venus near Saturn
- 26 Mercury near Saturn
- 27 Mercury near Venus
- 29 Mars near Moon

Bob Riddle is a science educator living in western Missouri. You can reach him via e-mail at bob-riddle@currentsky.com or visit his website at currentsky.com.

July

- 2 Waning crescent Moon near Pleiades
- 3 Mercury near “beehive” star cluster
- 4 Deep impact at Comet Tempel 1 (impact and flyby)
Venus near “beehive” star cluster
- 5 Earth at aphelion
- 7 Mercury near Venus
- 8 Mercury and Venus near Moon
- 9 Mercury at greatest eastern elongation
- 12 Launch of shuttle Atlantis (STS-121)
- 13 Jupiter near Moon
- 14 Cassini spacecraft flyby of moon Enceladus
- 17 Mars at perihelion
- 23 Saturn–Sun conjunction
- 27 Mars near Moon
- 30 Waning crescent Moon near Pleiades star cluster

August

- 2 MESSENGER spacecraft Earth flyby
- 6 Mercury at inferior conjunction
- 8 Venus near Moon

- 8 Neptune at opposition
- 10 Launch of Mars Reconnaissance Orbiter
Jupiter near Moon
- 12 Peak night for Perseid meteor shower
- 16 Martian solstice (northern hemisphere winter)
- 22 Cassini spacecraft flyby of Titan
- 23 Mercury at greatest western elongation
- 31 Waning crescent Moon near Saturn

Internet resources

- SFA star charts—www.cox-internet.com/ast305/SFAStarCharts.html
- STS121—spaceflight.nasa.gov/shuttle/archives/sts-121/index.html
- Saturn observation campaign—soc.jpl.nasa.gov/index.cfm
- Mars Reconnaissance Orbiter—mars.jpl.nasa.gov/mro
- Cassini/Huygens mission to Saturn—saturn.jpl.nasa.gov/index.cfm
- Deep impact mission—deepimpact.jpl.nasa.gov
- MESSENGER mission to Mercury—messenger.jhuapl.edu
- Perseid meteor shower history—comets.amsmeteors.org/meteors/showers/perseidhistory.html
- Sun shadow investigation project—sunship.currentsky.com



Sixth in the series dips into water, clears the air about air, and more

Thunderstruck by storm fronts? Perplexed about air pressure? Hazy on how weather works?

Get help from best-selling author Bill Robertson, who brings his well-known wisdom and wit to the physics of air and water. This book begins by helping you understand basic properties of air and water. You'll learn about pressure, changes in pressure, the Bernoulli Effect, density, and why hot air doesn't rise by itself and why heating air doesn't necessarily cause it to expand. These concepts form a foundation for explanations of basic weather patterns, including the jet stream, storm fronts, and the formation of tornadoes and hurricanes.

Like the other lighthearted but scientifically accurate *Stop Faking It!* books, this new title was written for teachers who want to teach these important concepts to students in grades 3-8, but may lack the necessary scientific background and confidence.

Air, Water, & Weather

Stop Faking It!

Finally Understanding Science so You Can Teach It

William C. Robertson

Item No. PB169X6
© 2005; Pages: 120
ISBN: 0-87355-236-9

GRADES 3-8
Members: \$15.16
Non-Members: \$18.95



Preview this book online—
for free! <http://store.nsta.org/>

Order it Today! Visit <http://store.nsta.org> or
call 1-800-277-5300