



JANUARY 2013

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
<p>DECEMBER 2012</p> <p>S M T W T F S</p> <p>1</p> <p>2 3 4 5 6 7 8</p> <p>9 10 11 12 13 14 15</p> <p>16 17 18 19 20 21 22</p> <p>23 24 25 26 27 28 29</p> <p>30 31</p>	<p>FEBRUARY 2013</p> <p>S M T W T F S</p> <p>1 2</p> <p>3 4 5 6 7 8 9</p> <p>10 11 12 13 14 15 16</p> <p>17 18 19 20 21 22 23</p> <p>24 25 26 27 28</p>	<p>1</p> <p>0h = JD 2456293.833333</p> <p>9 PM ~ Earth at perihelion (91.4 million miles / 0.98 AU)</p> <p>NEW YEARS DAY</p>	<p>2</p>	<p>3</p> <p>7 PM ~ Mercury at aphelion (0.4667 AU)</p> <p>Quadrantid meteor shower peaks (max ZHR = 120±)</p>	<p>4</p> <p>7:58 PM </p>	<p>5</p>
<p>6</p> <p>4 AM ~ Mercury 4.7° S of Pluto (conjunction in RA, 7.6° W of Sun)</p> <p>7:12:06 AM ~ Latest sunrise of the year for Fresno</p>	<p>7</p> <p>ORTHODOX CHRISTMAS</p>	<p>8</p>	<p>9</p> <p>7 AM ~ Moon at max southerly declination for the year (-20.880°, geocentric)</p>	<p>10</p> <p>2 AM ~ Moon at perigee (223,716 miles)</p> <p>CHINESE NEW YEAR</p>	<p>11</p> <p>11:44 AM </p> <p>Nearest new moon of the year (dia = 33.023 arcmin)</p>	<p>12</p> <p>★ ★ ★ ★ ★ ★ ★ ★ ★ ★</p> <p>CYA Star Party at Eastman Lake</p> <p>★ ★ ★ ★ ★ ★ ★ ★ ★ ★</p>
<p>13</p>	<p>14</p>	<p>15</p>	<p>16</p> <p>1 PM ~ Venus 3.3° S of Pluto (conjunction in RA, 18° W of Sun)</p>	<p>17</p>	<p>18</p> <p>3:45 PM </p> <p>1 AM ~ Mercury at superior conjunction (2° below center of Sun)</p>	<p>19</p>
<p>20</p>	<p>21</p> <p>MARTIN LUTHER KING DAY</p>	<p>22</p> <p>3 AM ~ Moon at apogee (251,868 miles)</p> <p>9 PM ~ Moon at max northerly declination for the year (+20.816°, geocentric)</p>	<p>23</p>	<p>24</p> <p>1 AM ~ Mars at perihelion (1.3815 AU)</p>	<p>25</p> <p>Noon ~ Begin Carrington Solar Rotation number 2133</p>	<p>26</p> <p>8:38 PM </p> <p>Moon dia = 30.135 arcmin</p> <p>7:00 PM ~ CVA meeting at CSUF (East Engr 191) After Xmas Gadget Night</p>
<p>27</p>	<p>28</p>	<p>29</p>	<p>30</p>	<p>31</p>	<p>MOON PHASES</p> <p> New Moon</p> <p> First Quarter</p> <p> Full Moon</p> <p> Third Quarter</p>	<p>SUNRISE/SUNSET for SATURDAYS</p> <p>5: 7:12 AM / 4:58 PM</p> <p>12: 7:12 AM / 5:04 PM</p> <p>19: 7:09 AM / 5:11 PM</p> <p>26: 7:05 AM / 5:19 PM</p>

Dates and times are for the Pacific Time Zone (PST = UT - 8 hr; PDT = UT - 7 hr), specifically Fresno. Some events will not be visible from California. Times next to the Moon symbols indicate when that phase occurs. See www.imo.net/calendar/2012 for details about the major meteor showers shown in the calendar. Most meteor showers are strongest in the early morning hours.



FEBRUARY 2013

Sunday

Monday

Tuesday

Wednesday

Thursday

Friday

Saturday

JANUARY 2013

S	M	T	W	T	F	S
	1	2	3	4	5	
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

MARCH 2013

S	M	T	W	T	F	S
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3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						



Jupiter & the four Galilean Moons by Casey Chumley

1
0h = JD 2456324.833333
Daytime Capricornid-Sagittariid meteor shower peaks (max ZHR = 7±)

2
GROUNDHOG DAY

3 5:56 AM SUPER BOWL XLVII

4 8 AM ~ Mars 0.44° S of Neptune (conjunction in RA, 16° E of Sun)

5

6 1 PM ~ Mercury 0.46° S of Neptune (conjunction in RA, 14° E of Sun)

7 4 AM ~ Moon at perigee (226,984 miles)

8 1 PM ~ Mercury 0.31° N of Mars (conjunction in RA, 15° E of Sun)
Alpha Centaurid meteor shower peaks (max ZHR = 6±)

9 11:20 PM
★★★★★★★★★
CYA Star Party at Eastman Lake
★★★★★★★★★

10 11:14 PM ~ Equation of time at min (sundials 14:22 minutes late)

11

12 MARDI GRAS LINCOLN'S BIRTHDAY

13 ASH WEDNESDAY

14 ST. VALENTINE'S DAY

15

16 1 PM ~ Mercury at eastern elongation (18.1°, evening)
6 PM ~ Mercury at perihellion (0.3075 AU)

17 12:31 PM

18 10 PM ~ Moon at apogee (251,351 miles)
PRESIDENT'S DAY

19 Mercury dims to Mv 0.0

20 11 PM ~ Venus at aphelion (0.7282 AU)
Neptune at solar conjunction (0.6° below center of Sun)

21 8 PM ~ Begin Carrington Solar Rotation number 2134
Jupiter shrinks to 40 arcsec apparent dia (Mv -2.4)

22 WASHINGTON'S BIRTHDAY

23 1 AM ~ Mars' winter solstice (northern hemisphere)
7:00 PM ~ CYA meeting at CSUF (East Engr 191)

24 3 PM ~ Mercury 4.2° N of Mars (conjunction in RA, 11° E of Sun)

25 12:26 PM
Moon dia = 30.958 arcmin

26

27

28 0:05 AM ~ Venus 0.77° S of Neptune (conjunction in RA, 6° W of Sun)

MOON PHASES
 New Moon
 First Quarter
 Full Moon
 Third Quarter

SUNRISE/SUNSET for SATURDAYS
2: 7:00 AM / 5:26 PM
9: 6:53 AM / 5:34 PM
16: 6:46 AM / 5:41 PM
23: 6:37 AM / 5:48 PM

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MARCH 2013


Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
FEBRUARY 2013 S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28	APRIL 2013 S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	MOON PHASES New Moon First Quarter Full Moon Third Quarter	<p>@ Venus Transit by Fred Lusk</p>	SUNRISE/SUNSET for SATURDAYS 2: 6:28 AM / 5:55 PM 9: 6:18 AM / 6:01 PM 16: 7:08 AM / 7:08 PM 23: 6:58 AM / 7:14 PM 30: 6:47 AM / 7:20 PM	1	2
3	4 1:53 PM	5 3 PM ~ Moon at perigee (229,858 miles) 11 PM ~ Mercury 5.3° N of Venus (conjunction in RA, 4.7° W of Sun) Comet C/2011 L4 (PanSTARRS) 1.1 AU from Earth (Mv 0.8±)	6	7	8	9 8 PM ~ Comet C/2011 L4 (PanSTARRS) at perihelion (0.302 AU from Sun) ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ MESSIER MARATHON #1 at Eastman Lake ★ ★ ★ ★ ★ ★ ★ ★ ★ ★
10 2:00 AM ~ Daylight Saving Time begins	11 12:51 PM	12	13	14 Gamma Normid meteor shower peaks (max ZHR = 6±)	15	16 6 PM ~ 15 Eumonia at opposition (2.0 AU, Mv 9.6) ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ CYA Public Star Party at Riverpark ★ ★ ★ ★ ★ ★ ★ ★ ★ ★
17 ST. PATRICK'S DAY	18 8 PM ~ Moon at apogee (251,221 miles)	19 10:27 AM	20 4:02 AM ~ Vernal Equinox	21 5 AM ~ Begin Carrington Solar Rotation number 2135 Comet C/2012 F6 (Lemmon) 1.4 AU from Earth (Mv 9.4±)	22 11:26 PM ~ Mars 40 arcsec N of Uranus (conjunction in RA, 5.6° E of Sun)	23
24 PALM SUNDAY Comet C/2012 F6 (Lemmon) at perihelion (0.7 AU) 3 PM ~ Mercury at western elongation (28°) EASTER 31	25 PASSOVER begins at sunset	26	27 2:27 AM Moon dia = 31.875 arcmin	28 10:06 AM ~ Venus at superior conjunction (1.3° below center of Sun) 10:16 AM ~ Venus 0.72° S of Uranus (conjunction in RA) Uranus at solar conjunction (0.7° below center of Sun)	29 GOOD FRIDAY	30 9 PM ~ Moon at perigee (228,339 miles) 7:00 PM ~ CYA meeting at CSUF (East Engr 191)

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APRIL 2013

★★★★★★
 April 20
 CVA Public Star Party
 at Riverpark
 ★★★★★★

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday																																																																																											
<p>MOON PHASES</p> <p>☉ New Moon</p> <p>☽ First Quarter</p> <p>☾ Full Moon</p> <p>☾ Third Quarter</p>	<p>1</p> <p>0h = JD 2456383.791667 7 PM ~ Mercury at aphellon (0.4667 AU) APRIL FOOLS' DAY</p>	<p>2</p> <p>9:36 PM ☾</p>	<p>3</p>	<p>4</p>	<p>5</p> <p>Kappa Serpentid meteor shower peaks (max ZHR = 4±)</p>	<p>6</p> <p>9 AM ~ Venus 0.70° S of Mars (conjunction in RA, 2.6° E of Sun)</p>																																																																																											
7	8	9	10	11	12	13																																																																																											
			2:35 AM ☉			<p>★★★★★★</p> <p>MESSIER MARATHON #2 at Eastman Lake</p> <p>★★★★★★</p>																																																																																											
14	15	16	17	18	19	20																																																																																											
	\$TAX\$DAY\$☼		Noon ~ Begin Carrington Solar Rotation number 2136 5 PM ~ Mars at solar conjunct. Alpha Virgind meteor shower peaks (max ZHR = 5±)	5:31 AM ☽	2 PM ~ Mercury 2.1° S of Uranus (conjunction in RA, 19° W of Sun)	<p>☼☼☼☼☼☼☼☼☼☼</p> <p>CVA Solar Viewing at CSUF</p> <p>☼☼☼☼☼☼☼☼☼☼</p>																																																																																											
April 15-21: ASTRONOMY WEEK / April 20: ASTRONOMY DAY																																																																																																	
21	22	23	24	25	26	27																																																																																											
EARTH DAY				12:57 PM ☉																																																																																													
VINTAGE DAYS	April Lyrid meteor shower peaks(max ZHR = 18±)	Pi Puppid meteor shower peaks (max ZHR = 5-40±)	ADMIN. PROFESSIONAL'S DAY	Partial Lunar Eclipse (Australia, Asia, & Africa) Moon dia = 32.699 arcmin	ARBOR DAY	1 PM ~ Moon at perigee (225,092 miles)																																																																																											
ASTRONOMY WEEK						7:00 PM ~ CVA meeting at CSUF (East Engr 191)																																																																																											
28	29	30	<p>MARCH 2013</p> <table border="1"> <thead> <tr> <th>S</th><th>M</th><th>T</th><th>W</th><th>T</th><th>F</th><th>S</th> </tr> </thead> <tbody> <tr> <td></td><td></td><td></td><td></td><td></td><td>1</td><td>2</td> </tr> <tr> <td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td> </tr> <tr> <td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td> </tr> <tr> <td>17</td><td>18</td><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td> </tr> <tr> <td>24</td><td>25</td><td>26</td><td>27</td><td>28</td><td>29</td><td>30</td> </tr> <tr> <td>31</td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </tbody> </table>		S	M	T	W	T	F	S						1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31							<p>MAY 2013</p> <table border="1"> <thead> <tr> <th>S</th><th>M</th><th>T</th><th>W</th><th>T</th><th>F</th><th>S</th> </tr> </thead> <tbody> <tr> <td></td><td></td><td></td><td></td><td>1</td><td>2</td><td>3</td> </tr> <tr> <td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td> </tr> <tr> <td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td> </tr> <tr> <td>18</td><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td> </tr> <tr> <td>25</td><td>26</td><td>27</td><td>28</td><td>29</td><td>30</td><td>31</td> </tr> </tbody> </table>	S	M	T	W	T	F	S					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	<p>SUNRISE/SUNSET for SATURDAYS</p> <p>6: 6:37 AM / 7:26 PM</p> <p>13: 6:27 AM / 7:32 PM</p> <p>20: 6:18 AM / 7:38 PM</p> <p>27: 6:09 AM / 7:44 PM</p>
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1 AM ~ Saturn at opposition (dist = 8.82 AU, dia = 18.8", Mv = 0.1, ring incl. = +18.1°)			 <p>Venus in the daytime by Fred Lusk</p>																																																																																														

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MAY 2013

Summer Friday nights
observing at
The Discovery Center

May 24: Penumbral
Lunar Eclipse
Maximum eclipse at 9:11 PM;
penumbral magnitude = 0.0158.
DON'T BOTHER.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
<p>APRIL 2013</p> <p>S M T W T F S</p> <p>1 2 3 4 5 6</p> <p>7 8 9 10 11 12 13</p> <p>14 15 16 17 18 19 20</p> <p>21 22 23 24 25 26 27</p> <p>28 29 30</p>	<p>JUNE 2013</p> <p>S M T W T F S</p> <p>1</p> <p>2 3 4 5 6 7 8</p> <p>9 10 11 12 13 14 15</p> <p>16 17 18 19 20 21 22</p> <p>23 24 25 26 27 28 29</p> <p>30</p>	<p>MOON PHASES</p> <p> New Moon</p> <p> First Quarter</p> <p> Full Moon</p> <p> Third Quarter</p>	<p>1</p> <p>0h = JD 2456413.791667</p>	<p>2</p> <p>4:14 AM </p> <p>Noon ~ Moon at max libration south (-6.81°, geocentric) for 2013. Lunar South Pole tipped into view.</p>	<p>3</p>	<p>4</p>
<p>5</p>	<p>6</p> <p>Daytime Omega-Cetid meteor shower peaks (max ZHR = 8±)</p>	<p>7</p> <p>3 PM ~ Mercury 0.44° S of Mars (conjunction in RA; 4.5° W of Sun) Eta Aquariid meteor shower peaks (max ZHR = 28±)</p>	<p>8</p> <p>Eta Lyrid meteor shower peaks (max ZHR = 3±) VICTORY IN EUROPE DAY</p>	<p>9</p> <p>5:28 PM </p> <p>5:48 AM ~ Lunar limb passes 2 arcmin S of Mars 11:00 AM-12:59 PM ~ Moon occults Mercury 5:25 PM ~ Annular Solar Eclipse max (Pacific Ocean) Moon dia = 29.784 arcmin</p>	<p>10</p>	<p>11</p> <p>2 PM ~ Mercury at superior conjunction and occulted by the Sun</p> <p>★★★★★★★★</p> <p>CYA Star Party at Eastman Lake</p> <p>★★★★★★★★</p>
<p>12</p> <p>MOTHER'S DAY</p>	<p>13</p> <p>7 AM ~ Moon at apogee (252,184 miles) 1:30 PM ~ Equation of time at minor max (sundials 3.68 minutes early)</p>	<p>14</p> <p>5 PM ~ Begin Carrington Solar Rotation number 2137</p>	<p>15</p> <p>7 PM ~ Mercury at perihelion (0.3075 AU) Daytime May Arietid & Epsilon Arietid meteor showers peak (max ZHR = 4± each) Alpha Scorpiid meteor shower peaks (max ZHR = 3±)</p>	<p>16</p>	<p>17</p> <p>9:34 PM </p>	<p>18</p> <p>2 PM ~ Moon at max total libration for 2013 (9.58°, geocentric)</p> <p>★★★★★★★★</p> <p>CYA Public Star Party at Riverpark</p> <p>★★★★★★★★</p>
<p>19</p>	<p>20</p>	<p>21</p> <p>Daytime Omega Cetid meteor shower peaks (max ZHR = 8±)</p>	<p>22</p>	<p>23</p> <p>Noon ~ 6 Hebe at opposition (1.8 AU, Mv 9.6)</p>	<p>24</p> <p>9:25 PM </p> <p>9 PM ~ Mercury 1.4° N of Venus (conjunction in RA, 16° E of Sun) Moon dia = 33.264 arcmin</p>	<p>25</p> <p>7 PM ~ Moon at perigee (222,680 miles)</p> <p>7:00 PM ~ CYA meeting at CSUF (East Engr 191)</p>
<p>May 22-27: RIVERSIDE TELESCOPE MAKERS CONFERENCE (RTMC), http://www.rtmcastronomyexpo.org/</p>						
<p>26</p> <p>EVENING BINOCULAR OBSERVING ALERT: May 24 - May 28: Mercury, Venus, & Jupiter grouped within a 4± circle</p> <p>RTMC</p>	<p>27</p> <p>3 AM ~ Mercury 2.4° N of Jupiter (conjunction in RA, 18° E of Sun) MEMORIAL DAY</p>	<p>28</p> <p>2 PM ~ Venus 1.0° N of Jupiter (conjunction in RA, 17° E of Sun)</p>	<p>29</p>	<p>30</p> <p>N & S Omega Scorpiid meteor showers peak (max ZHR = 5± each)</p>	<p>31</p> <p>11:58 AM </p>	<p>SUNRISE/SUNSET for SATURDAYS</p> <p>4: 6:02 AM / 7:51 PM</p> <p>11: 5:55 AM / 7:57 PM</p> <p>18: 5:49 AM / 8:03 PM</p> <p>25: 5:45 AM / 8:08 PM</p>

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June 23: Full Moon
 This is the largest and most southerly Full Moon of 2013.
 Diameter = 33.462 arcmin;
 Declination = -19.7°

JUNE 2013

Summer Friday nights
 observing at Downing Planetarium & The Discovery Center

★★★★★★★★
 Glacier Point Star Party
 (dates TBA)
 ★★★★★★★★

Sunday

Monday

Tuesday

Wednesday

Thursday

Friday

Saturday

MAY 2013							JULY 2013							 @ Venus Transit by Fred Lusk	MOON PHASES	SUNRISE/SUNSET for SATURDAYS	1						
S	M	T	W	T	F	S	S	M	T	W	T	F	S		☉ New Moon ☾ First Quarter ☽ Full Moon ☽ Third Quarter	1: 5:42 AM / 8:13 PM 8: 5:40 AM / 8:17 PM 15: 5:40 AM / 8:20 PM 22: 5:41 AM / 8:22 PM 29: 5:43 AM / 8:22 PM	0h = JD 2456444.791667						
2							3							4 4 PM ~ Mars farthest from Earth (2.467 AU, Mv = 1.4, dia = 3.79 arcsec) 11 PM ~ Mercury dims to Mv 0.0 Mars: end of dust storm season	5						6 10 AM ~ Mercury at dichotomy (half phase)	7 Daytime Arietid meteor shower peaks (max ZHR = 54±) ★★★★★★★★ CVA Courtright Star Party (Friday-Sunday) ★★★★★★★★	8 8:56 AM ☉ ★★★★★★★★ CVA Star Party at Eastman Lake ★★★★★★★★
9 3 PM ~ Moon at max apogee for 2013 (252,585 miles) Daytime Zeta Perseid meteor shower peaks (max ZHR = 20±)	10 10 PM ~ Begin Carrington Solar Rotation number 2138	11	12 10 AM ~ Mercury at eastern elongation (24.3°, evening) 7:40 PM ~ Equation of time is zero (sundials on time)	13 5:39:36 AM ~ Earliest sunrise of the year for Fresno (latest sunset is June 28 at 8:22:00 PM) 7 AM ~ Venus at perihelion (0.7184 AU)	14 FLAG DAY	15 ★★★★★★★★ CVA Public Star Party at Riverpark ★★★★★★★★																	
16 10:24 AM ☾ June Lyrid & South June Aquilid meteor showers peak (max ZHR = 3± each) FATHER'S DAY	17	18	19 9 AM ~ Jupiter at solar conjunction and occulted by the Sun	20 11 AM ~ Mercury 1.9° S of Venus (conjunction in RA, 24° E of Sun) 10:04 PM ~ Summer Solstice (solar decl = +23.436°)	21	22 7:00 PM ~ CVA meeting at CSUF (East Engr 191)																	
23 4 AM ~ Min 2013 Lunar perigee (221,824 miles) 30	24	25	26 Pi Cetid meteor shower peaks (max ZHR = 4±)	27 June Bootid meteor shower peaks (max ZHR = 0-100±)	28 6 PM ~ Mercury at aphelion (0.4667 AU) Daytime Beta Taurid meteor shower peaks (max ZHR = 10±) Tau Aquariid meteor shower peaks (max ZHR = 7±)	29 9:53 PM ☽ 6 AM ~ Moon at max libration east for 2013 (7.87°, geocentric) ★★★★★★★★ CVA Public Star Party at Millerton Lake ★★★★★★★★																	

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No CVA meeting
this month

JULY 2013

Summer Friday nights
observing at Downing
Planetarium & The
Discovery Center

★★★★★★★★★
Glacier Point Star Party
(dates TBA)
★★★★★★★★★

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday																																																																																											
<p>MOON PHASES</p> <p>☉ New Moon</p> <p>☾ First Quarter</p> <p>☽ Full Moon</p> <p>☾ Third Quarter</p>	<p>1</p> <p>0h = JD 2456474.791667 5 PM ~ Pluto at opposition (dist = 31.45 AU, Mv = 14.0, dia = 0.13 arcsec)</p>	<p>2</p>	<p>3</p>	<p>4</p> <p>INDEPENDENCE DAY</p>	<p>5</p> <p>8 AM ~ Earth at aphelion (94.5 million miles / 1.02 AU) ★★★★★★★★★ CVA Courtright Star Party (Friday-Sunday) ★★★★★★★★★</p>	<p>6</p> <p>6 PM ~ Moon at apogee (252,575 miles) ★★★★★★★★★ CVA Star Party at Eastman Lake ★★★★★★★★★</p>																																																																																											
<p>7</p>	<p>8 12:14 AM ☉</p> <p>3 AM ~ Begin Carrington Solar Rotation number 2139</p>	<p>9</p> <p>Noon ~ Mercury at inferior conjunction (4.8° below center of Sun)</p>	<p>10</p>	<p>11</p>	<p>12</p> <p>July Phoenicid meteor shower peaks (max ZHR = 4±)</p>	<p>13</p> <p>★★★★★★★★★ CVA Public Star Party at Riverpark ★★★★★★★★★</p>																																																																																											
<p>14</p>	<p>15 8:18 PM ☾</p>	<p>16</p>	<p>17</p>	<p>18</p>	<p>19</p> <p>5 PM ~ 8 Flora at opposition (1.2 AU, Mv 8.7)</p>	<p>20</p>																																																																																											
<p>21</p> <p>1 PM ~ Moon at perigee (222,705 miles) 11 PM ~ Mars 0.78° N of Jupiter (conjunction in RA, 25° W of Sun)</p>	<p>22 11:15 AM ☽</p> <p>Moon dia = 33.258 arcmin</p>	<p>23</p>	<p>24</p>	<p>25</p> <p>3:31 PM ~ Equation of time at minor min (sundials 6.5 minutes late)</p>	<p>26</p> <p>North Delta Aquariid meteor shower peaks (max ZHR = 4±)</p>	<p>27</p> <p>Piscis Austrinid meteor shower peaks (max ZHR = 5±) ★★★★★★★★★ CVA Public Star Party at Millerton Lake ★★★★★★★★★</p>																																																																																											
<p>28</p> <p>Beginning of Callisto eclipse sequence (ends July 21, 2014 after 66 eclipses) South Delta Aquariid meteor shower peaks (max ZHR = 18±)</p>	<p>29 10:43 AM ☾</p> <p>Beta Cassiopeid meteor shower peaks (max ZHR = 10±) Alpha Capricornid meteor shower peaks (max ZHR = 5±)</p>	<p>30</p> <p>2 AM ~ Mercury at western elongation (20.7°, morning)</p>	<p>31</p> <p>7 AM ~ Mars' spring equinox (northern hemisphere) Mercury brightens to Mv 0.0</p>	<p>JUNE 2013</p> <table border="1"> <tr><td>S</td><td>M</td><td>T</td><td>W</td><td>T</td><td>F</td><td>S</td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td>1</td></tr> <tr><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr> <tr><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td></tr> <tr><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td><td>21</td><td>22</td></tr> <tr><td>23</td><td>24</td><td>25</td><td>26</td><td>27</td><td>28</td><td>29</td></tr> <tr><td>30</td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>	S	M	T	W	T	F	S							1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30							<p>AUGUST 2013</p> <table border="1"> <tr><td>S</td><td>M</td><td>T</td><td>W</td><td>T</td><td>F</td><td>S</td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td>1 2 3</td></tr> <tr><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr> <tr><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td></tr> <tr><td>18</td><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td></tr> <tr><td>25</td><td>26</td><td>27</td><td>28</td><td>29</td><td>30</td><td>31</td></tr> </table>	S	M	T	W	T	F	S							1 2 3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	<p>SUNRISE/SUNSET for SATURDAYS</p> <p>6: 5:47 AM / 8:21 PM 13: 5:51 AM / 8:19 PM 20: 5:56 AM / 8:15 PM 27: 6:01 AM / 8:10 PM</p>
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No CVA meeting
this month

AUGUST 2013

Summer Friday nights
observing at Downing
Planetarium

★★★★★★★★★
Glacier Point Star Party
(dates TBA)
★★★★★★★★★

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
<p>JULY 2013</p> <p>S M T W T F S</p> <p>1 2 3 4 5 6</p> <p>7 8 9 10 11 12 13</p> <p>14 15 16 17 18 19 20</p> <p>21 22 23 24 25 26 27</p> <p>28 29 30 31</p>	<p>SEPTEMBER 2013</p> <p>S M T W T F S</p> <p>1 2 3 4 5 6 7</p> <p>8 9 10 11 12 13 14</p> <p>15 16 17 18 19 20 21</p> <p>22 23 24 25 26 27 28</p> <p>29 30</p>	<p>MOON PHASES</p> <p>☉ New Moon</p> <p>☾ First Quarter</p> <p>☀ Full Moon</p> <p>☾ Third Quarter</p>	<p>SUNRISE/SUNSET for SATURDAYS</p> <p>3: 6:07 AM / 8:03 PM</p> <p>10: 6:12 AM / 7:56 PM</p> <p>17: 6:18 AM / 7:47 PM</p> <p>24: 6:24 AM / 7:38 PM</p> <p>31: 6:30 AM / 7:28 PM</p>	<p>1</p> <p>0h = JD 2456505.791667</p>	<p>2</p> <p>8 AM ~ Mercury at dichotomy (half phase)</p> <p>★★★★★★★★★ CVA Courtright Star Party (Friday-Sunday) ★★★★★★★★★</p>	<p>3</p> <p>2 AM ~ Moon at apogee (251,157 miles)</p> <p>6 PM ~ ♃ Juno at opposition</p> <p>★★★★★★★★★ CVA Star Party at Eastman Lake ★★★★★★★★★</p>
<p>4</p> <p>8 AM ~ Begin Carrington Solar Rotation number 2140</p>	<p>5</p>	<p>6</p> <p>2:51 PM ☉</p>	<p>7</p>	<p>8</p>	<p>9</p> <p>Eta Eridanid meteor shower peaks (max ZHR = 6±)</p> <p>★★★★★★★★★ CVA Courtright Star Party (Friday-Sunday) ★★★★★★★★★</p>	<p>10</p> <p>★★★★★★★★★ CVA Public Star Party at Millerton Lake ★★★★★★★★★</p>
<p>11</p> <p>6 PM ~ Mercury at perihelion (0.3075 AU)</p>	<p>12</p> <p>Perseid meteor shower peaks (max ZHR = 100±)</p>	<p>13</p>	<p>14</p> <p>3:56 AM ☾</p>	<p>15</p>	<p>16</p> <p>10 AM ~ 7 Iris at opposition (1.2 AU, Mv 7.9)</p>	<p>17</p> <p>Kappa Cygnid meteor shower peaks (max ZHR = 3±)</p> <p>★★★★★★★★★ CVA Public Star Party at Riverpark ★★★★★★★★★</p>
<p>18</p> <p>7 PM ~ Moon at perigee (225,111 miles)</p>	<p>19</p>	<p>20</p> <p>6:45 PM ☀</p> <p>Moon dia = 32.697 arcmin</p>	<p>21</p>	<p>22</p>	<p>23</p>	<p>24</p> <p>2 PM ~ Mercury at superior conjunction (1.8° above center of Sun)</p>
<p>25</p>	<p>26</p> <p>Neptune at opposition (distance = 28.973 AU, dia = 2.31 arcsec, Mv = 7.8)</p>	<p>27</p>	<p>28</p> <p>2:35 AM ☾</p> <p>Gamma Doradid meteor shower peaks (max ZHR = 5±)</p>	<p>29</p>	<p>30</p> <p>5 PM ~ Moon at apogee (251,560 miles)</p>	<p>31</p> <p>2 PM ~ Begin Carrington Solar Rotation number 2141</p> <p>11 PM ~ Equation of time is zero (sundials on time)</p> <p>Alpha Aurigid meteor shower peaks (max ZHR = 6±)</p>

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SEPTEMBER 2013

COMET C/2012 S1 (ISON)
 This Sun-grazing comet has the potential to become a "Great Comet." It should be visible in binoculars by August or September and visible to the unaided eye by late October or early November through mid-January 2014. It will pass 0.4 AU from Earth on December 26.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	
1 0h = JD 2456536.791667	2 LABOR DAY	3	4 ROSH HASHANAH begins at sunset	5 4:36 AM	6	7 ★★★★★★★★★★ CVA Star Party & Star-BQ (Eastman; details TBA) ★★★★★★★★★★	
8 GRANDPARENTS DAY	9 September Epsilon Perseid meteor shower peaks (max ZHR = 5±) CALIFORNIA ADMISSION DAY	10	11	12 10:08 AM	13 YOM KIPPUR begins at sunset	14 ★★★★★★★★★★ CVA Public Star Party at Riverpark ★★★★★★★★★★	
15 10 AM ~ Moon at perigee (228,304 miles)	16	17	18	19 4:13 AM 5 PM ~ Venus 3.8° S of Saturn (conjunction in RA, 40° E of Sun) Moon dia = 31.882 arcmin	20	21 7:00 PM ~ CVA meeting at CSUF (East Engr 191)	
22 1:44 PM ~ Autumnal Equinox	23	24 6 PM ~ Mercury at aphelion (0.4667 AU) 7 PM ~ Mercury (Mv -0.1) 0.74° NE of Spica (Mv 1.0)	25	26 8:55 PM	27 11 AM ~ Moon at apogee (251,200 miles) 10 PM ~ Begin Carrington Solar Rotation number 2142	28	
29	30	 @ Venus Transit by Fred Lusk		AUGUST 2013 S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	OCTOBER 2013 S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	MOON PHASES New Moon First Quarter Full Moon Third Quarter	SUNRISE/SUNSET for SATURDAYS 7: 6:35 AM / 7:18 PM 14: 6:41 AM / 7:08 PM 21: 6:46 AM / 6:57 PM 28: 6:52 AM / 6:46 PM

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OCTOBER 2013

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
<p>SEPTEMBER 2013</p> <p>S M T W T F S</p> <p>1 2 3 4 5 6 7</p> <p>8 9 10 11 12 13 14</p> <p>15 16 17 18 19 20 21</p> <p>22 23 24 25 26 27 28</p> <p>29 30</p>	<p>NOVEMBER 2013</p> <p>S M T W T F S</p> <p>1 2</p> <p>3 4 5 6 7 8 9</p> <p>10 11 12 13 14 15 16</p> <p>17 18 19 20 21 22 23</p> <p>24 25 26 27 28 29 30</p>	<p>1</p> <p>0h = JD 2456566.791667</p> <p>Daytime Sextanid meteor shower peaks (max ZHR = 20±)</p>	<p>2</p>	<p>3</p> <p>4 PM ~ Venus at aphelion (0.7282 AU)</p> <p>Uranus at opposition (distance = 19.040 AU, dia = 3.68 arcsec, Mv = 5.7)</p> <p>October Delta Aurigid meteor shower peaks (max ZHR=3±)</p>	<p>4</p> <p>5:34 PM </p>	<p>5</p> <p>2:29 PM - 3:48 PM ~ Moon occults Spica (9.7° E of Sun)</p> <p>★ ★ ★ ★ ★ ★ ★ ★ ★ ★</p> <p>CYA Star Party at Eastman Lake</p> <p>★ ★ ★ ★ ★ ★ ★ ★ ★ ★</p>
<p>6</p>	<p>7</p> <p>Mercury dims to Mv 0.0</p>	<p>8</p> <p>Draconid meteor shower peaks (max ZHR = 50±)</p>	<p>9</p> <p>3 AM ~ Mercury at eastern elongation (25.3°, evening)</p>	<p>10</p> <p>Noon ~ Mercury 5.4° S of Saturn (conjunction in RA)</p> <p>4 PM ~ Moon at perigee (229,814 miles)</p> <p>Southern Taurid meteor shower peaks (max ZHR = 5±)</p>	<p>11</p> <p>4:02 PM </p> <p>Delta Aurigid meteor shower peaks (max ZHR = 2±)</p>	<p>12</p> <p>INTERNATIONAL MOON NIGHT</p> <p>COLUMBUS DAY</p> <p>★ ★ ★ ★ ★ ★ ★ ★ ★ ★</p> <p>CYA Public Star Party at Riverpark</p> <p>★ ★ ★ ★ ★ ★ ★ ★ ★ ★</p>
<p>13</p>	<p>14</p> <p>9 AM ~ Mercury at dichotomy (half phase)</p> <p>COLUMBUS DAY (observed)</p>	<p>15</p> <p>4 AM ~ Mars (Mv 1.6)</p> <p>0.94° NNE of Regulus (Mv 1.4)</p>	<p>16</p>	<p>17</p>	<p>18</p> <p>4:38 PM </p> <p>Penumbral Lunar Eclipse (in progress at sunset; penumbral mag = 0.765; don't bother)</p> <p>Moon dia = 30.971 arcmin</p>	<p>19</p> <p>Epsilon Geminid meteor shower peaks (max ZHR = 3±)</p> <p>7:00 PM ~ CYA meeting at CSUF (East Engr 191)</p>
<p>20</p>	<p>21</p> <p>Orionid meteor shower peaks (max ZHR = 25±)</p>	<p>22</p>	<p>23</p>	<p>24</p> <p>Leo Minorid meteor shower peaks (max ZHR = 2±)</p>	<p>25</p> <p>3 AM ~ Begin Carrington Solar Rotation number 2143</p> <p>7 AM ~ Moon at apogee (251,356 miles)</p>	<p>26</p> <p>4:40 PM </p>
<p>27</p> <p>1 AM ~ Moon at max libration north (+6.86°, geocentric) for 2013. Lunar North Pole and Mare Frigoris tipped into view.</p>	<p>28</p> <p>2 PM ~ Mercury 4.1° S of Saturn (conjunction in RA; 8° E of Sun)</p>	<p>29</p>	<p>30</p> <p>8 PM ~ Venus at dichotomy (half phase)</p>	<p>31</p> <p>HALLOWEEN</p>	<p>MOON PHASES</p> <p> New Moon</p> <p> First Quarter</p> <p> Full Moon</p> <p> Third Quarter</p>	<p>SUNRISE/SUNSET for SATURDAYS</p> <p>5: 6:58 AM / 6:36 PM</p> <p>12: 7:04 AM / 6:26 PM</p> <p>19: 7:11 AM / 6:17 PM</p> <p>26: 7:17 AM / 6:08 PM</p>

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NOVEMBER 2013

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
<p>OCTOBER 2013</p> <p>S M T W T F S</p> <p>1 2 3 4 5</p> <p>6 7 8 9 10 11 12</p> <p>13 14 15 16 17 18 19</p> <p>20 21 22 23 24 25 26</p> <p>27 28 29 30 31</p>	<p>DECEMBER 2013</p> <p>S M T W T F S</p> <p>1 2 3 4 5 6 7</p> <p>8 9 10 11 12 13 14</p> <p>15 16 17 18 19 20 21</p> <p>22 23 24 25 26 27 28</p> <p>29 30 31</p>	<p>MOON PHASES</p> <p> New Moon</p> <p> First Quarter</p> <p> Full Moon</p> <p> Third Quarter</p>	<p>@ Venus Transit by Fred Lusk</p>	<p>SUNRISE/SUNSET for SATURDAYS</p> <p>2: 7:24 AM / 6:01 PM</p> <hr/> <p>9: 6:31 AM / 4:54 PM</p> <p>16: 6:39 AM / 4:49 PM</p> <p>23: 6:46 AM / 4:45 PM</p> <p>30: 6:53 AM / 4:43 PM</p>	<p>1</p> <p>0h = JD 2456597.791667</p> <p>1 AM ~ Venus at eastern elongation (47°, evening)</p> <p>1 PM ~ Mercury at inferior conjunction (0.52" below center of Sun)</p>	<p>2</p> <p>4 PM ~ Equation of time at max (sundials 16.44 minutes early)</p> <p>★★★★★★★★★★</p> <p>CYA Star Party at Eastman Lake</p> <p>★★★★★★★★★★</p>
<p>3 4:50 AM </p> <p>4:46 AM ~ Max of Hybrid Solar Eclipse (Africa & Atlantic Ocean)</p> <p>Moon dia = 32.242 arcmin</p> <p>2:00 AM ~ Daylight Saving Time ends</p>	<p>4</p>	<p>5</p> <p>ELECTION DAY</p>	<p>6</p> <p>1 AM ~ Moon at perigee (227,038 miles)</p> <p>4 AM ~ Saturn at solar conjunction (2.1" above center of Sun)</p>	<p>7</p> <p>4 PM ~ Mercury at perihelion (0.3075 AU)</p>	<p>8</p>	<p>9 9:57 PM </p> <p>★★★★★★★★★★</p> <p>CYA Public Star Party at Riverpark</p> <p>★★★★★★★★★★</p>
<p>10</p>	<p>11</p> <p>VETERANS DAY</p>	<p>12</p> <p>N & S Taurid meteor shower peaks (max ZHR = 5± each)</p> <p>Mercury brightens to Mv 0.0</p>	<p>13</p>	<p>14</p>	<p>15</p> <p>0:16 AM ~ Venus 6.6° S of Pluto (conjunction in RA; 50° E of Sun)</p> <p>7 AM ~ Mercury at dichotomy (half phase)</p>	<p>16</p> <p>November Iota Aurigid meteor shower peaks (max ZHR = 8±)</p> <p>7:00 PM ~ CYA meeting at CSUF (East Engr 191)</p>
<p>17 7:16 AM </p> <p>6 PM ~ Mercury at western elongation (19.5°, morning)</p> <p>Leonid meteor shower peaks (max ZHR = 20-100±)</p> <p>Moon dia = 30.144 arcmin)</p>	<p>18</p>	<p>19</p>	<p>20</p>	<p>21</p> <p>10 AM ~ Begin Carrington Solar Rotation number 2144</p> <p>10 AM ~ Comet 2P / Encke at perihelion (17° W of Sun, Mv 5.8±)</p> <p>Alpha Monocerotid meteor shower peaks (max ZHR=5±)</p>	<p>22</p> <p>2 AM ~ Moon at apogee (251,911 miles)</p>	<p>23</p>
<p>24</p>	<p>25 11:28 AM </p> <p>8 PM ~ Mercury 0.33° S of Saturn (conjunction in RA, 17.4° W of Sun)</p>	<p>26</p>	<p>27</p> <p>HANUKKAH begins at sunset</p>	<p>28</p> <p>Noon ~ Comet C/2012 S1 (ISON) at perihelion behind Sun (0.013 AU; Mv -12.7±)</p> <p>THANKSGIVING</p>	<p>29</p> <p>8:41 AM - 9:55 AM ~ Moon occults Spica (44° W of Sun)</p> <p>November Orionid meteor shower peaks (max ZHR = 3±)</p>	<p>30</p> <p>★★★★★★★★★★</p> <p>CYA Star Party at Eastman Lake</p> <p>★★★★★★★★★★</p>

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DECEMBER 2013

Coming up in 2014
 Jan 1 ~ Pluto at solar conjunction
 Jan 2 ~ Mars at aphelion
 Jan 5 ~ Jupiter at opposition
 Jan 10 ~ Venus at inferior conjunction
 Apr 18 ~ Mars at opposition

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1 0h = JD 2456627.833333	2 4:22 PM	3	4 2 AM ~ Moon at perigee (223,743 miles)	5	6 4:42:36 AM ~ Earliest sunset of the year for Fresno Phoenicid meteor shower peaks (max ZHR = 0-100±) Puppis / Velid meteor shower peaks (max ZHR = 10±)	7 PEARL HARBOR DAY
8 Monocerotid meteor shower peaks (max ZHR = 2±)	9 7:12 AM 6 PM ~ Venus reaches max brilliance (Mv -4.67)	10	11 Sigma Hydrid meteor shower peaks (max ZHR = 3±)	12	13 Geminid meteor shower peaks (max ZHR = 120±)	14 7:00 PM ~ CVA meeting at CSUF (East Engr 191) Elect officers for 2014
15 Coma Berenicid meteor shower peaks (max ZHR = 3±)	16	17 1:28 AM Moon dia = 29.575 arcmin (smallest and most northerly Full Moon of 2013; declination = +19.750)	18 5 PM ~ Begin Carrington Solar Rotation number 2145	19 4 PM ~ Moon at apogee (252,432 miles) December Leo Minorid meteor shower peaks (max ZHR = 5±)	20 Mars brightens to Mv 1.0	21 9:11 AM ~ Winter Solstice (solar decl = -23.436°) 4 PM ~ Mercury at aphelion (0.4667 AU)
22	23 Ursid meteor shower peaks (max ZHR = 10±)	24 9 PM ~ Equation of time is zero (sundials on time)	25 5:48 AM December Comae Berenicid meteor shower peaks (max ZHR = 3±) CHRISTMAS	26 2 PM ~ Comet C/2012 S (ISON) closest to Earth (0.427 AU) 7 PM ~ Moon at max libration west (-7.65°, geocentric) for 2013. Crater Grimaldi tipped into view.	27 6 AM ~ Moon at max libration east for 2013 (7.87°, geocentric)	28 ★★★★★★★★★ CVA Star Party at Eastman Lake ★★★★★★★★★
29 7 PM Mars 0.65° S of Porima (Gamma Vir) 10 PM ~ Mercury at superior conjunction (1.7° below center of Sun)	30 10 PM ~ Mercury 4.6° S of Pluto (conjunction in RA, 1.4° E of Sun)	31 24h = JD 2456658.833333 NEW YEARS EVE	NOVEMBER 2013 S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30		JANUARY 2014 S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	
					MOON PHASES New Moon First Quarter Full Moon Third Quarter	
					SUNRISE/SUNSET for SATURDAYS 7: 6:59 AM / 4:43 PM 14: 7:04 AM / 4:44 PM 21: 7:08 AM / 4:47 PM 28: 7:11 AM / 4:51 PM	

Dates and times are for the Pacific Time Zone (PST = UT - 8 hr; PDT = UT - 7 hr), specifically Fresno. Some events will not be visible from California. Times next to the Moon symbols indicate when that phase occurs. See www.imo.net/calendar/2012 for details about the major meteor showers shown in the calendar. Most meteor showers are strongest in the early morning hours.