



# JANUARY 2014

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
<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>FEBRUARY 2014</p> <p>S M T W T F S</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</p>	<p><b>MOON PHASES</b></p> <p> New Moon</p> <p> First Quarter</p> <p> Full Moon</p> <p> Third Quarter</p>	<p>1 3:14 AM </p> <p>0h = JD 2456658.8333</p> <p>1 PM ~ Moon at perigee (221,782 miles)</p> <p>Pluto at solar conjunction (2.7° N of center of Sun)</p> <p>NEW YEAR'S DAY</p>	<p>2</p> <p>4 PM ~ Mars at aphelion</p>	<p>3</p> <p>Quadrantid meteor shower peaks (ZHR = 120±)</p>	<p>4</p> <p>4 AM ~ Earth at perihelion (91.4 million miles/0.98 AU)</p> <p>★ ★ ★ ★ ★ ★ ★ ★ ★ ★</p> <p>CYA Star Party at Eastman Lake</p> <p>★ ★ ★ ★ ★ ★ ★ ★ ★ ★</p>
<p>5</p> <p>1 PM ~ Jupiter at opposition (dist to Earth = 4.21 AU; dia = 46.8"; Mv = -2.7)</p>	<p>6</p> <p>7:12.1 AM ~ Latest sunrise of the year for Fresno</p>	<p>7 7:39 PM </p> <p>2 AM ~ Mercury 6.4° S of Venus (conjunction in RA; 6° E of Sun)</p> <p>1 PM ~ Moon at max libration east for the year (7.76°)</p> <p>ORTHODOX CHRISTMAS</p>	<p>8</p>	<p>9</p>	<p>10</p>	<p>11</p> <p>4:25 AM ~ Venus at inferior conjunction (5.2' above center of Sun; dist to Earth = 0.266 AU)</p>
<p>12</p>	<p>13</p> <p>12:12 AM ~ Moon at max declination north for the year (19.5°)</p>	<p>14</p>	<p>15 8:52 PM </p> <p>1 AM ~ Begin Carrington Solar Rotation No. 2146</p> <p>6 PM ~ Moon at apogee (252,607 miles)</p> <p>Moon dia = 29.384 arcmin (this is the smallest full moon for &gt;±1000 years)</p>	<p>16</p>	<p>17</p>	<p>18</p> <p>7:00 PM ~ CVA meeting at CSUF (East Engr 191) After Xmas Gadget Night</p>
<p>19</p>	<p>20</p> <p>MARTIN LUTHER KING DAY</p>	<p>21</p>	<p>22</p>	<p>23 9:20 PM </p> <p>6 PM ~ Venus at perihelion</p>	<p>24</p>	<p>25</p>
<p>26</p>	<p>27</p> <p>8:31 AM ~ Moon at max declination South for the year (-19.4°)</p>	<p>28</p>	<p>29</p>	<p>30 1:38 PM </p> <p>2 AM ~ Moon at perigee (221,879 miles)</p>	<p>31</p> <p>2 AM ~ Mercury at eastern elongation (18.4°, evening)</p> <p>11 PM ~ Mercury at dichotomy (half phase)</p> <p>CHINESE NEW YEAR</p>	<p><b>SUNRISE/SUNSET for SATURDAYS</b></p> <p>4: 7:12 AM / 4:56 PM</p> <p>11: 7:12 AM / 5:03 PM</p> <p>18: 7:10 AM / 5:10 PM</p> <p>25: 7:06 AM / 5:17 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/](http://www.imo.net/calendar/) for details about the major meteor showers shown in the calendar. Most meteor showers are strongest in the early morning hours.



# FEBRUARY 2014

Sunday

Monday

Tuesday

Wednesday

Thursday

Friday

Saturday

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	

MARCH 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					



The Terminator  
by Griffin & Kissinger

MOON PHASES

-  New Moon
-  First Quarter
-  Full Moon
-  Third Quarter

1

0h = JD 2456689.8333  
 ★★★★★★  
 CVYA Star Party  
 at Eastman Lake  
 ★★★★★★

2

SUPER BOWL XLVIII  
GROUNDHOG DAY

3

4:19 AM ~ Mars close to Spica  
(4.6° NNE; 110° W of Sun)  
 4 PM ~ Mercury at perihelion  
 6 PM ~ Mercury dims  
 to  $M_v = 0.0$

4

4:39 AM ~ Mercury close to  
Neptune (2.5° NW;  
17° E of Sun)

5

8:58 AM ~ Venus close to  
Pluto (4.3° N; 33° W of Sun)

6

11:22 AM



7

8

Alpha Centaurid meteor  
shower peaks (ZHR = 6±)

9

Centaurid II meteor shower  
peaks (ZHP = 3±)

10

11

12:37 AM ~ Equation of time  
at minimum (sundials 14.21  
minutes late)  
 9 AM ~ Begin Carrington  
Solar Rotation No. 2147  
 9 PM ~ Moon at apogee  
(252,420 miles)

12

LINCOLN'S BIRTHDAY

13

2 PM ~ Mars grows to  
10 arcsec ( $M_v = -0.1$ )

14

3:53 PM



7:42 PM ~ Summer begins in  
Mars' northern hemisphere  
 Moon dia = 29.607 arcmin  
 ST. VALENTINE'S DAY

15

12:25 AM ~ Mercury at  
inferior conjunction (3.7° N  
of center of Sun; dist to  
Earth = 0.646 AU)

7:00 PM ~ CVYA meeting  
at CSUF (East Engr 191)

16

17

PRESIDENT'S DAY

18

19

20

21

7 AM ~ Comet C/2012 X1  
(Linear) at perihelion  
 Dist to Sun center = 1.6 AU  
 Dist to Earth = 2.0 AU  
 Estm  $M_v = 7.4$  (51° W of Sun)

22

9:15 AM



1 AM ~ 2 Pallas at opposition  
(dist. = 1.23 AU,  $M_v = 7.0$ )  
 WASHINGTON'S BIRTHDAY

23

Neptune at solar  
conjunction (40 arcmin  
S of center of Sun)

24

25

26

27

Noon ~ Moon at perigee  
(223,967 miles)

28

SUNRISE/SUNSET  
for SATURDAYS

1: 7:01 AM / 5:25 PM  
 8: 6:55 AM / 5:32 PM  
 15: 6:47 AM / 5:40 PM  
 22: 6:39 AM / 5:47 PM

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# MARCH 2014

Sunday

Monday

Tuesday

Wednesday

Thursday

Friday

Saturday

**FEBRUARY 2014**

S	M	T	W	T	F	S
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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 2014**

S	M	T	W	T	F	S
						1
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



Meteor Crater  
by Dr. Fred Ringwald

**SUNRISE/SUNSET  
for SATURDAYS**

1:	6:30 AM / 5:54 PM
8:	6:20 AM / 6:00 PM
15:	7:10 AM / 7:07 PM
22:	7:00 AM / 7:13 PM
29:	6:49 AM / 7:19 PM

1 12:00 AM 

0h = JD 2456717.833  
9 AM ~ Mars stationary, then moving retrograde  
★ ★ ★ ★ ★ ★ ★ ★ ★ ★  
MESSIER MARATHON #1  
at Eastman Lake  
★ ★ ★ ★ ★ ★ ★ ★ ★ ★

2  9 AM ~ Saturn stationary, then moving retrograde	3	4  MARDI GRAS	5  ASH WEDNESDAY	6  2 AM ~ Jupiter stationary, then moving prograde	7	8 5:27 AM  9 AM ~ Jupiter 1.9° S of Mabsuta (Eps Gem) ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ CVA Public Star Party at River Park ★ ★ ★ ★ ★ ★ ★ ★ ★ ★
9  2:00 AM ~ Daylight Saving Time begins	10 7 AM ~ Venus 1.3° S of Dabih (Beta Cap), 46° W of Sun 6 PM ~ Begin Carrington Solar Rotation No. 2148 11 PM ~ Mercury at dichotomy (half phase)	11 1 PM ~ Moon at apogee (251,882 miles) Jupiter at greatest northern declination (+26°16'15")	12	13 11:30 PM ~ Mercury at W elongation (27.6°, morning) Gamma Normid meteor shower peaks (ZHR = 6±)	14	15  7:00 PM ~ CVA meeting at CSUF (East Engr 191)
16 10:08 AM  7 PM ~ Equilux: equal length day & night for Fresno (= local spring) Moon dia = 30.193 arcmin	17  ST. PATRICK'S DAY	18	19 4 PM ~ Mercury at aphelion Jupiter shrinks to 40 arcsec Mv = -2.3	20  9:57 AM ~ Vernal Equinox	21	22  4:33 AM ~ Mercury 1.2° S of Neptune (conjunction in RA; 26° W of Sun) 12:30 PM ~ Venus at western elongation (46.6°, morning)
23  6:46 PM 10 AM ~ Venus at dichotomy = half phase  11:45 AM  30	24  31	25 2 AM ~ Mercury brightens to Mv = 0 4 PM ~ Mars 4.8° north of Spica	26	27  Noon ~ Moon at perigee (227,237 miles)	28	29  ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ MESSIER MARATHON #2 at Eastman Lake ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

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/](http://www.imo.net/calendar/) for details about the major meteor showers shown in the calendar. Most meteor showers are strongest in the early morning hours.



# APRIL 2014

**TAX DAY TOTAL LUNAR ECLIPSE**  
 U1 = 10:58.0 PM (4/14)  
 U2 = 12:06.4 AM (4/15)  
 Mid = 12:45.7 AM  
 U3 = 1:25.0 AM  
 U4 = 2:33.4 AM

★ ★ ★ ★ ★ ★ ★ ★ ★ ★  
 April 26  
 CVA Star Party  
 at Eastman Lake  
 ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
<p>MARCH 2014</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>MAY 2014</p> <p>S M T W T F S</p> <p>1 2 3</p> <p>4 5 6 7 8 9 10</p> <p>11 12 13 14 15 16 17</p> <p>18 19 20 21 22 23 24</p> <p>25 26 27 28 29 30 31</p>	<p>1</p> <p>Oh = JD 2456748.7917            Comet C/2012 X1 (Linear) at            estm. max. brightness            Dist to Sun center = 1.7 AU            Dist to Earth = 1.9 AU            Estm Mv = 7.4 (62° W of Sun)            APRIL FOOLS' DAY</p>	<p>2</p> <p>Uranus at solar conjunction            (38.8 arcmin S of center            of Sun)</p>	<p>3</p>	<p>4</p>	<p>5</p> <p>Kappa Serpentid meteor            shower peaks (ZHR = 4±)            ★ ★ ★ ★ ★ ★ ★ ★ ★ ★            CVA Public Star Party            at River Park            ★ ★ ★ ★ ★ ★ ★ ★ ★ ★</p>
<p>6</p>	<p>7</p> <p>1:31 AM </p> <p>2 AM ~ Begin Carrington            Solar Rotation No. 2149</p>	<p>8</p> <p>8 AM ~ Moon at apogee            (251,345 miles)            2 PM ~ Mars at opposition            (dist = 0.621 AU; dia = 15.1";            Mv = -1.5)</p>	<p>9</p>	<p>10</p>	<p>11</p>	<p>12</p> <p>1 AM ~ Venus 41.5 arcmin N of            Neptune (conjunction in RA;            45° W of Sun)</p> <p>7:00 PM ~ CVA meeting            at CSUF (East Engr 191)</p>
<p>13</p> <p>4 AM ~ 4 Vesta at opposition            (dist. = 1.23 AU; Mv = 5.7)            Pluto stationary, then            moving retrograde            PALM SUNDAY</p>	<p>14</p> <p>6 AM ~ Mars closest to Earth            (0.618 AU; Mv = -1.4; 15.16")            9 AM ~ Mercury 1.4° S of            Uranus (conjunction in RA;            12° W of Sun)            10 PM ~ 1 Ceres at opposition            (dist. = 1.64 AU, Mv = 7.0)</p>	<p>15</p> <p>12:42 AM </p> <p>8:50 AM ~ Equation of Time            is zero (sundials on time)            TOTAL LUNAR ECLIPSE            Moon dia = 31.019 arcmin            PASSOVER begins at sunset</p> <p>Ⓢ \$TAX\$DAY\$ Ⓢ</p>	<p>16</p> <p>April Lyrid meteor shower            begins (erratic fireballs)</p>	<p>17</p>	<p>18</p> <p>Alpha Virginid meteor shower            peaks (ZHR = 5±)            GOOD FRIDAY</p>	<p>19</p>
<p>20</p> <p>EASTER</p>	<p>21</p>	<p>22</p> <p>12:52 AM </p> <p>5 PM ~ Moon at perigee            (229,761 miles)            April Lyrid meteor shower            peaks (ZHR = 13±)</p>	<p>23</p> <p>ADMIN. PROFESSIONAL'S DAY</p>	<p>24</p>	<p>25</p> <p>8:30 PM ~ Mercury at            superior conjunction (22.4            arcmin S of center of Sun)            ARBOR DAY</p> <p>April 25-27: VINTAGE DAYS at Fresno State</p>	<p>26</p> <p>☼ ☼ ☼ ☼ ☼ ☼ ☼ ☼ ☼ ☼            CVA Solar Viewing at CSUF            ☼ ☼ ☼ ☼ ☼ ☼ ☼ ☼ ☼ ☼</p>
<p>27</p> <p>VINTAGE DAYS</p>	<p>28</p> <p>11:14 PM </p> <p>11:03 PM ~ Maximum            of rare NON-CENTRAL            ANNULAR SOLAR ECLIPSE            (visible from Australia plus            parts of S Indian Ocean and            Antarctica)  <math>\gamma = 1.00001</math>, Mag = 0.9868</p>	<p>29</p>	<p>30</p>	<p>@ CSUF by Fred Lusk</p>	<p><b>MOON PHASES</b></p> <p> New Moon</p> <p> First Quarter</p> <p> Full Moon</p> <p> Third Quarter</p>	<p><b>SUNRISE/SUNSET            for SATURDAYS</b></p> <p>5: 6:39 AM / 7:25 PM</p> <p>12: 6:29 AM / 7:31 PM</p> <p>19: 6:20 AM / 7:37 PM</p> <p>26: 6:11 AM / 7:43 PM</p>



# MAY 2014

*Summer Friday nights  
observing at  
The Discovery Center*

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
<p>APRIL 2014</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</p>	<p>JUNE 2014</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><b>MOON PHASES</b></p> <p> New Moon</p> <p> First Quarter</p> <p> Full Moon</p> <p> Third Quarter</p>	<p><b>SUNRISE/SUNSET for SATURDAYS</b></p> <p>3: 6:03 AM / 7:50 PM</p> <p>10: 5:56 AM / 7:56 PM</p> <p>17: 5:50 AM / 8:01 PM</p> <p>24: 5:45 AM / 8:07 PM</p> <p>31: 5:42 AM / 7:12 PM</p>	1	2	3
4	5	6 8:15 PM	7 Daytime Omega-Cetid meteor shower peaks (ZHR = 8±) Eta Aquariid meteor shower peaks (ZHR = 28±)	8 VICTORY IN EUROPE DAY	9 Eta Lyrid meteor shower peaks (ZHR = 3±)	10 11 AM ~ Saturn at opposition (dist. = 8.90 AU; dia. = 18.7"; Mv = 0.1)
May 5–11: SPRING ASTRONOMY WEEK / May 10: ASTRONOMY DAY						
11 MOTHER'S DAY <span style="background-color: #e0ffe0; padding: 2px;">ASTRONOMY WEEK</span>	12	13	14 12:16 PM 1:39 AM ~ Equation of time at maximum (sundials 3.67 minutes early) Moon dia = 31.921 arcmin	15 6 AM ~ Venus 1.3° S of Uranus (conjunction in RA; 40° W of Sun) Daytime Epsilon Arietid meteor shower peaks (ZHR = 4±)	16 1:30 AM ~ Venus at aphelion Alpha Scorpiid meteor shower peaks (ZHR = 3±)	17 7:00 PM ~ CVA meeting at CSUF (East Engr 191)
18 5 AM ~ Moon at perigee (228,107 miles)	19 2 PM ~ Mercury at dichotomy (half phase) 6 PM ~ Mars stationary, then moving prograde 7 PM ~ Mercury dims to Mv = 0.0	20	21 5:59 AM	22 Midnight ~ Jupiter 30 arcmin S of Wasat (Delta Gem)	23	24 CVA Star Party at Eastman Lake <span style="background-color: #e0ffe0; padding: 2px;">★★★★★★★★</span>
May 22–26: RIVERSIDE TELESCOPE MAKERS CONFERENCE (RTMC)						
25 12 AM ~ Mercury at eastern elongation (22.7°, evening) <span style="background-color: #e0ffe0; padding: 2px;">RTMC</span>	26 MEMORIAL DAY	27	28 11:40 AM	29 Midnight ~ Mars 2.5° S of Porrima (Gamma Vir)	30 N & S Omega Scorpiid meteor showers peak (ZHR = 5± ea.)	31 1 PM ~ Begin Carrington Solar Rotation No. 2151 <span style="background-color: #e0ffe0; padding: 2px;">★★★★★★★★</span> CVA Star Party at Eastman Lake <span style="background-color: #e0ffe0; padding: 2px;">★★★★★★★★</span>

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# JUNE 2014

Summer Friday nights  
observing at Downing  
Planetarium & The  
Discovery Center

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

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday																																																																																					
1  0h = JD 2456809.7917	2  9 PM ~ Moon at apogee (251,627 miles)	3	4	5 1:39 PM	6  11 AM ~ Earth crosses the Sun's equator (S to N)	7  Daytime Arietid meteor shower peaks (ZHR = 54±) ★★★★★★★★★ CVA Public Star Party at River Park ★★★★★★★★★																																																																																					
8	9  Neptune stationary, then moving retrograde Daytime Zeta Perseid meteor shower peaks (ZHR = 20±)	10	11	12 9:11 PM  11:59 PM ~ Equation of Time is zero (sundials on time) Moon dia = 32.724 arcmin	13  5:39.6 AM ~ Earliest sunrise of the year for Fresno	14  8 PM ~ Moon at perigee (224,977 miles) FLAG DAY  7:00 PM ~ CVA meeting at CSUF (East Engr 191)																																																																																					
15  FATHER'S DAY	16  June Lyrid meteor shower peaks (ZHR = 3±)	17  South June Aquilid meteor shower peaks (ZHR = 3±)	18	19 11:39 PM  3:50 PM ~ Mercury at inferior conjunction (3.8° S of center of Sun; dist to Earth = 0.554 AU)	20	21  3:51 AM ~ Summer Solstice (solar decl = +23°26'06") ★★★★★★★★★ CVA Public Star Party at Millerton Lake ★★★★★★★★★																																																																																					
22  8 PM ~ Mars shrinks to 10 arcsec (Mv = -0.1)	23	24	25	26  Pi Cetid meteor shower peaks (ZHR = 4±)	27 1:08 AM  June Bootid meteor shower peaks (ZHR = 0-100±) ★★★★★★★★★ CVA Courtright Star Party (Friday-Sunday) ★★★★★★★★★	28  2 PM ~ Mars dims to Mv = 0.0 8:22.1 PM ~ Latest sunset of the year for Fresno ★★★★★★★★★ CVA Star Party at Eastman Lake ★★★★★★★★★																																																																																					
29  Tau-Aquarid meteor shower peaks (ZHR = 7±)	30  Noon ~ Moon at apogee (252,233 miles)	 <p>Full Moon by Fred Lusk</p>		<p>MAY 2014</p> <table border="1"> <tr><th>S</th><th>M</th><th>T</th><th>W</th><th>T</th><th>F</th><th>S</th></tr> <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> </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>JULY 2014</p> <table border="1"> <tr><th>S</th><th>M</th><th>T</th><th>W</th><th>T</th><th>F</th><th>S</th></tr> <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> </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>MOON PHASES</p> <ul style="list-style-type: none"> <li> New Moon</li> <li> First Quarter</li> <li> Full Moon</li> <li> Third Quarter</li> </ul>	<p>SUNRISE/SUNSET for SATURDAYS</p> <p>7: 5:40 AM / 8:16 PM 14: 5:40 AM / 8:19 PM 21: 5:41 AM / 8:21 PM 28: 5:43 AM / 8:22 PM</p>
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No CVA meeting  
this month

# JULY 2014

Summer Friday nights  
observing at Downing  
Planetarium & The  
Discovery Center

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

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
<p><b>JUNE 2014</b></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><b>AUGUST 2014</b></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>31</p>	<p>1</p> <p>0h = JD 2456639.7917</p> <p>Noon ~ Venus 4.1° N of Aldebaran</p>	<p>2</p>	<p>3</p> <p>5 PM ~ Earth at aphelion (94.5 million miles/1.02 AU)</p>	<p>4</p> <p>1 AM ~ Pluto at opposition (dist. = 31.7 AU; dia. = 0.13"; Mv = 14.0)</p> <p>INDEPENDENCE DAY</p>	<p>5 4:59 AM </p> <p>★★★★★★★★★</p> <p>CVA Public Star Party at River Park</p> <p>★★★★★★★★★</p>
<p>6</p>	<p>7</p>	<p>8</p>	<p>9</p>	<p>10</p>	<p>11</p>	<p>12 4:25 AM </p> <p>11 AM ~ Mercury at western elongation (20.9°, morning)</p> <p>July Phoenicid meteor shower peaks (ZHR = 4±)</p> <p>Moon dia = 33.277 arcmin</p>
<p>13</p> <p>1 AM ~ Moon at perigee (222,612 miles)</p> <p>10 PM ~ Mars 1.3° N of Spica</p>	<p>14</p> <p>2 AM ~ Venus 1.3° N of Zeta Tau</p>	<p>15</p> <p>6 PM ~ Mercury brightens to Mv = 0</p>	<p>16</p> <p>10 PM ~ Mercury at dichotomy (half phase)</p>	<p>17</p>	<p>18 7:08 PM </p>	<p>19</p> <p>★★★★★★★★★</p> <p>CVA Public Star Party at Millerton Lake</p> <p>★★★★★★★★★</p>
<p>20</p> <p>2 PM ~ Saturn stationary, then moving prograde</p>	<p>21</p> <p>7 AM ~ Venus 19.8 arcmin N of Tejat Prior (Eta Gem)</p> <p>Uranus stationary, then moving retrograde</p>	<p>22</p> <p>7 AM ~ Venus 19.9 arcmin N of Tejat Posterior (Mu Gem)</p>	<p>23</p>	<p>24</p> <p>8 AM ~ Saturn 2.4° NE of Zubenelgenubi (Alpha2 Lib)</p> <p>2 PM ~ Jupiter at solar conjunction (23.8 arcmin N of center of Sun)</p> <p>11 PM ~ Begin Carrington Solar Rotation No. 2153</p>	<p>25</p> <p>★★★★★★★★★</p> <p>CVA Courtright Star Party (Friday-Sunday)</p> <p>★★★★★★★★★</p>	<p>26 3:42 PM </p> <p>3:39 AM ~ Equation of time at minimum (sundials 6:53 minutes late)</p> <p>★★★★★★★★★</p> <p>CVA Star Party at Eastman Lake</p> <p>★★★★★★★★★</p>
<p>27</p> <p>8 PM ~ Moon at apogee (252,629 miles)</p> <p>Piscis Austrinid meteor shower peaks (ZHR = 5±)</p>	<p>28</p> <p>South Delta Aquariid meteor shower peaks (ZHR = 18±)</p>	<p>29</p> <p>3 PM ~ Mercury at perihelion</p> <p>Beta Cassiopeid meteor shower peaks (ZHR = 10±)</p>	<p>30</p> <p>Alpha Capricornid meteor shower peaks (ZHR = 5±)</p>	<p>31</p>	<p><b>MOON PHASES</b></p> <p> New Moon</p> <p> First Quarter</p> <p> Full Moon</p> <p> Third Quarter</p>	<p><b>SUNRISE/SUNSET for SATURDAYS</b></p> <p>5: 5:46 AM / 8:21 PM</p> <p>12: 5:50 AM / 8:19 PM</p> <p>19: 5:55 AM / 8:16 PM</p> <p>26: 6:00 AM / 8:11 PM</p>

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No CVA meeting  
this month

# AUGUST 2014

Summer Friday nights  
observing at Downing  
Planetarium

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

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
<p><b>JULY 2014</b></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><b>SEPTEMBER 2014</b></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><b>MOON PHASES</b></p> <p>☉ New Moon</p> <p>☾ First Quarter</p> <p>☽ Full Moon</p> <p>☾ Third Quarter</p>	 <p>Star Party, Dr. Fred Ringwald</p>	<p><b>SUNRISE/SUNSET for SATURDAYS</b></p> <p>2: 6:06 AM / 8:04 PM</p> <p>9: 6:11 AM / 7:57 PM</p> <p>16: 6:17 AM / 7:49 PM</p> <p>23: 6:23 AM / 7:40 PM</p> <p>30: 6:29 AM / 7:30 PM</p>	<p>1</p> <p>0h = JD 2456870.7917</p>	<p>2</p> <p>10 AM ~ Mercury 0.97° N of Jupiter (conjunction in RA; 6.6° W of Sun)</p> <p>★★★★★★★★★ CVA Public Star Party at River Park ★★★★★★★★★</p>
<p>3</p> <p>5:50 PM ☾</p>	<p>4</p> <p>11 AM ~ Moon at westernmost libration for 2014 (Earth's selenographic longitude: -7.78°; latitude: -3.17°) Crater Grimaldi tipped into view</p>	<p>5</p> <p>NEIL ARMSTRONG DAY (Proposed)</p>	<p>6</p>	<p>7</p>	<p>8</p> <p>9:24 AM ~ Mercury at superior conjunction (1.7° N of center of Sun)</p>	<p>9</p>
<p>10</p> <p>11:09 AM ☽</p> <p>11 AM ~ Moon at closest perigee of 2014 (221,765 miles) Moon dia = 33.470 arcmin Eta Eridanid meteor shower peaks (ZHR = 6±)</p>	<p>11</p>	<p>12</p> <p>10 PM ~ Perseid meteor shower peaks (ZHR = 100±) Stream active from July 17 to August 24</p>	<p>13</p>	<p>14</p>	<p>15</p> <p>10 AM ~ Mercury 1.2° N of Regulus (7.2° E of Sun)</p>	<p>16</p> <p>★★★★★★★★★ CVA Public Star Party at Millerton Lake ★★★★★★★★★</p>
<p>17</p> <p>5:26 AM ☾</p> <p>9 AM ~ Begin southern spring &amp; dust storm season 9 PM ~ Venus 12 arcmin N of Jupiter (conjunction in RA; 18° W of Sun)</p>	<p>18</p> <p>Kappa Cygnid meteor shower peaks (ZHR = 3±)</p>	<p>19</p>	<p>20</p>	<p>21</p> <p>4 AM ~ Begin Carrington Solar Rotation No. 2154 3 PM ~ Mars 1.6° S of Zubeneigenubi (Alp2 Lib)</p>	<p>22</p> <p>★★★★★★★★★ CVA Courtright Star Party (Friday-Sunday) ★★★★★★★★★</p>	<p>23</p> <p>11 PM ~ Moon at apogee (251,602 miles)</p> <p>★★★★★★★★★ CVA Star Party at Eastman Lake ★★★★★★★★★</p>
<p>24</p> <p>31</p>	<p>25</p> <p>7:13 AM ☽</p>	<p>26</p>	<p>27</p> <p>6 AM ~ Mars 3.6° S of Saturn (conjunction in RA; 74° E of Sun) 9 AM ~ Comet C/2012 K1 (PanSTARRS) at perihelion (Mv = 5.7±; 1.055 AU from Sun &amp; 1.956 AU from Earth)</p>	<p>28</p>	<p>29</p> <p>7 AM ~ Neptune at opposition (dist = 29.0 AU; dia = 2.52"; Mv = 7.64) Gamma Doradid meteor shower peaks (ZHR = 5±)</p>	<p>30</p> <p>★★★★★★★★★ CVA Public Star Party at Riverpark ★★★★★★★★★</p>

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# SEPTEMBER 2014

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday																																																																																												
 <p><i>Gloomy Moon by Fred Lusk</i></p>	<b>1</b> 0h = JD 2456901.7917 7:12 AM ~ Equation of Time is zero (sundials on time) Alpha Aurigid meteor shower peaks (ZHR = 4±) <b>LABOR DAY</b>	<b>2</b> 4:11 AM 	<b>3</b>	<b>4</b>	<b>5</b> 9 AM ~ Venus at perihelion 10 AM ~ Venus 43.9 arcmin N of Regulus	<b>6</b> <div style="border: 1px solid black; padding: 2px;">           7:00 PM ~ CVA meeting at CSUF (East Engr 191)         </div>																																																																																												
<b>7</b> 9 PM ~ Moon at perigee (222,693 miles) <b>GRANDPARENTS DAY</b>	<b>8</b> 6:38 PM  Moon dia = 33.258 arcmin	<b>9</b> September Epsilon Perseid meteor shower peaks (ZHR = 5±) <b>CALIFORNIA ADMISSION DAY</b>	<b>10</b>	<b>11</b> 3 AM ~ Mercury dims to Mv 0 3 PM ~ Mercury at aphelion	<b>12</b>	<b>13</b>																																																																																												
<b>14</b>	<b>15</b> 7:05 PM  Noon ~ Moon at max libration for the year (total = 8.99°)	<b>16</b> 12 AM ~ Comet C/2013 V5 closest to Earth Dist to Sun center = 0.7 AU Dist to Earth = 0.48 AU Estm Mv = 6.1 (35° SW Sun)	<b>17</b> 10 AM ~ Begin Carrington Solar Rotation No. 2155 6 PM ~ Mars 32.1 arcmin N of Delta Sco	<b>18</b> Comet C/2013 V5 brightest Estm Mv = 6.0 (34° SW of Sun)	<b>19</b>	<b>20</b> 7 AM ~ Moon at apogee (252,180 miles) 11 AM ~ Mercury 33' S of Spica <div style="border: 1px solid black; padding: 2px;">             ★★★★★★★★★★              CVA Star Party &amp; Star-BQ (Eastman; details TBA)              ★★★★★★★★★★           </div>																																																																																												
<b>21</b> 3 PM ~ Mercury at eastern elongation (26.4°, evening)	<b>22</b> 7:29 PM ~ Autumnal Equinox Pluto stationary, then moving prograde	<b>23</b> 11:14 PM 	<b>24</b> ROSH HASHANAH begins at sunset	<b>25</b>	<b>26</b> 4 AM ~ Mercury at dichotomy (half phase) 7 AM ~ Equilux: equal length day & night for Fresno (= local fall)	<b>27</b> 12 AM ~ Comet C/2013 V5 at perihelion Dist to Sun center = 0.6 AU Dist to Earth = 0.72 AU Estm Mv = 6.7 (39° SW Sun)																																																																																												
<b>28</b> 6 AM ~ Mars 3.1° N of Antares	<b>29</b> <div style="background-color: #e0ffe0; padding: 2px;">             Sep 29–Oct 5: FALL ASTRONOMY WEEK           </div>	<b>30</b>	<div style="display: flex; justify-content: space-around;"> <div> <b>AUGUST 2014</b>  <table border="1" style="font-size: small;"> <tr><th>S</th><th>M</th><th>T</th><th>W</th><th>T</th><th>F</th><th>S</th></tr> <tr><td></td><td></td><td></td><td></td><td>1</td><td>2</td><td></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></td><td></td><td></td><td></td><td></td><td></td><td>31</td></tr> </table> </div> <div> <b>OCTOBER 2014</b>  <table border="1" style="font-size: small;"> <tr><th>S</th><th>M</th><th>T</th><th>W</th><th>T</th><th>F</th><th>S</th></tr> <tr><td></td><td></td><td></td><td></td><td>1</td><td>2</td><td>3</td><td>4</td></tr> <tr><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td></tr> <tr><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td></tr> <tr><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td></tr> <tr><td>26</td><td>27</td><td>28</td><td>29</td><td>30</td><td>31</td><td></td></tr> </table> </div> </div>		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	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		<b>MOON PHASES</b>  New Moon  First Quarter  Full Moon  Third Quarter	<b>SUNRISE/SUNSET for SATURDAYS</b> 6: 6:34 AM / 7:20 PM 13: 6:40 AM / 7:09 PM 20: 6:45 AM / 6:59 PM 27: 6:51 AM / 6:48 PM
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# OCTOBER 2014

<b>10/8 TOTAL LUNAR ECLIPSE</b>	<b>10/23 PARTIAL SOLAR ECLIPSE</b>
U1 = 2:14.5 AM U2 = 3:24.6 AM Mid = 3:54.6 AM U3 = 4:24.5 AM U4 = 5:34.7 AM	Beg = 1:58:46 PM Max = 3:21:19 PM End = 4:35:47 PM Duration: 2 <sup>h</sup> 37 <sup>m</sup> 01 <sup>s</sup> Magnitude: 0.495

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
<b>SEPTEMBER 2014</b> 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	<b>NOVEMBER 2014</b> 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	<b>MOON PHASES</b> New Moon First Quarter Full Moon Third Quarter	<b>1</b> 12:32 PM 0h = JD 2456931.7917 Daytime Sextanid meteor shower peaks (ZHR = 20±)	<b>2</b> 7 AM ~ Moon at max libration south for the year (-6.80°)	<b>3</b> October Delta Aurigid meteor shower peaks (ZHR=3±) YOM KIPPUR begins at sunset	<b>4</b> ★★★★★★★★ CVA Public Star Party at River Park ★★★★★★★★
Sep 29-Oct 5: FALL ASTRONOMY WEEK / Oct 4: ASTRONOMY DAY						
<b>5</b> ASTRONOMY WEEK	<b>6</b> 3 AM ~ Moon at perigee (225,232 miles)	<b>7</b> 2 PM ~ Uranus at opposition (dist. = 19.0 AU, dia. = 3.68", Mv = 5.7) 10 PM ~ Venus 1.4° S of Gam Vir (Porrima; 5° W of Sun)	<b>8</b> 3:51 AM Draconid meteor shower peaks (ZHR = 50±) Moon dia = 32.668 arcmin TOTAL LUNAR ECLIPSE	<b>9</b>	<b>10</b> Comet C/2012 K1 brightest Dist to Earth = 1.17 AU Estm Mv = 5.5 (72° SW of Sun) Southern Taurid meteor shower peaks (ZHR = 5±)	<b>11</b> 7:00 PM ~ CVA meeting at CSUF (East Engr 191)
<b>12</b> COLUMBUS DAY	<b>13</b> COLUMBUS DAY (observed)	<b>14</b> 4 PM ~ Mars 19.5 arcmin N of Theta Oph (60° E of Sun); 5 PM ~ Begin Carrington Solar Rotation No. 2156	<b>15</b> 12:12 PM 6 AM ~ Moon at max libration north for the year (6.86°) 11 PM ~ Mercury 23.3 arcmin N of Spica (2° E of Sun)	<b>16</b> 1:40 PM ~ Mercury at inferior conjunction (1.5° below center of Sun; dist to Earth = 0.666 AU)	<b>17</b> 1 AM ~ Mercury 2.7° S of Venus (conjunction in RA; 2° W of Sun) 11 PM ~ Moon at apogee (251,591 miles)	<b>18</b> 11 PM ~ Venus 3.2° N of Spica (2° W of Sun)
<b>19</b> Epsilon Geminid meteor shower peaks (ZHR = 3±)	<b>20</b>	<b>21</b>	<b>22</b> Orionid meteor shower peaks (ZHR = 25±)	<b>23</b> 2:57 PM Moon dia = 30.509 arcmin PARTIAL SOLAR ECLIPSE	<b>24</b> Leo Minorid meteor shower peaks (ZHR = 2±)	<b>25</b> 12:30 AM ~ Venus at superior conjunction 2 PM ~ Mercury at perihelion ★★★★★★★★ CVA Star Party at Eastman Lake ★★★★★★★★
<b>26</b>	<b>27</b>	<b>28</b> 12 AM ~ Mercury brightens to Mv = 0	<b>29</b>	<b>30</b> 7:48 PM 3 PM ~ Mercury at dichotomy (half phase) 11 PM ~ Comet C/2012 K1 closest to Earth Dist to Sun = 1.5 AU Dist to Earth = 0.95 AU Estm Mv = 5.8 (99° SW Sun)	<b>31</b> HALLOWEEN ★★★★★★★★ Star Party in Your Yard ★★★★★★★★	<b>SUNRISE/SUNSET for SATURDAYS</b> 4: 6:57 AM / 6:38 PM 11: 7:03 AM / 6:28 PM 18: 7:09 AM / 6:18 PM 25: 7:16 AM / 6:10 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/](http://www.imo.net/calendar/) for details about the major meteor showers shown in the calendar. Most meteor showers are strongest in the early morning hours.



# NOVEMBER 2014

Sunday

Monday

Tuesday

Wednesday

Thursday

Friday

Saturday

OCTOBER 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	

DECEMBER 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			



Star Party by Fred Lusk

MOON PHASES

- New Moon
- First Quarter
- Full Moon
- Third Quarter

SUNRISE/SUNSET for SATURDAYS

1:	7:23 AM / 6:02 PM
8:	6:30 AM / 4:55 PM
15:	6:37 AM / 4:50 PM
22:	6:44 AM / 4:46 PM
29:	6:51 AM / 4:43 PM

1  
0h = JD 2456962.7917  
6 AM ~ Mercury at western elongation (18.7°, morning)  
★ ★ ★ ★ ★ ★ ★ ★ ★ ★  
CVA Public Star Party at River Park  
★ ★ ★ ★ ★ ★ ★ ★ ★ ★

2 3 PM ~ Moon at perigee (228,601 miles) 2:00 AM ~ Daylight Saving Time ends	3 4:15 AM ~ Equation of time at maximum (sundials 16.43 minutes early) 9 PM ~ Mars 38.4 arcmin N of Kaus Borealis (Lam Sgr)	4 8 AM ~ Mercury 4.2° N of Spica (18° W of Sun) 6 PM ~ Venus 20.3 arcmin N of Zubenelgenubi (3° E of Sun) ELECTION DAY	5	6 2:23 PM Noon ~ Mars 48 arcmin S of M22 N & S Taurid meteor shower peaks (ZHR = 5± ea) Moon dia = 31.817 arcmin	7	8 7:00 PM ~ CVA meeting at CSUF (East Engr 191)
9 12 AM ~ Mars 2.5° N of Phi Sgt (54° E of Sun)	10 5 PM ~ Mars 3.8° S of Pluto (conjunction in RA; 53° E of Sun) 11 PM ~ Begin Carrington Solar Rotation No. 2157	11 10 PM ~ Mars 2.0° N of Nunki (Sig Sgr; 53° E of Sun) VETERANS DAY	12	13 1 AM ~ Venus 1.6° S of Saturn (conjunction in RA; 5° E of Sun)	14 7:15 AM 6 PM ~ Moon at apogee (251,243 miles)	15 10 AM ~ 6 Hebe at opposition (dist. = 1.07 AU, Mv = 8.0) November Iota Aurigid meteor shower peaks (ZHR = 8±)
16 Neptune stationary, then moving prograde	17 Leonid meteor shower peaks (ZHR = 20-100±)	18 1 AM ~ Saturn at solar conjunction (1.9° N of Sun) 5 PM ~ Venus 2.1° N of Del Sco (6° E of Sun)	19 3 PM ~ Venus 53.1 arcmin S of Graffuas (Bet1 Sco; 6° E of Sun)	20	21 Alpha Monocerotid meteor shower peaks (ZHR=5±)	22 4:32 AM ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ CVA Star Party at Eastman Lake ★ ★ ★ ★ ★ ★ ★ ★ ★ ★
23 30	24 Noon ~ Venus 4.5° N of Antares (8° E of Sun)	25	26 1 AM ~ Mercury 1.7° S of Saturn (conjunction in RA; 7° W of Sun)	27 3 PM ~ Moon at perigee (229,800 miles) THANKSGIVING	28 Mars dims to Mv 1.0	29 2:06 AM November Orionid meteor shower peaks (ZHR = 3±)

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# DECEMBER 2014

**Coming up in 2015**  
 Jan 3 ~ Pluto at solar conjunction  
 Jan 3 ~ Quadrantid meteor shower peaks  
 Jan 4 ~ Earth at perihelion  
 Jan 11 ~ Mercury & Venus 39 arcmin apart  
 Jan 14 ~ Mercury at eastern elongation  
 Jan 30 ~ Mercury at inferior conjunction

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
<b>MOON PHASES</b> New Moon First Quarter Full Moon Third Quarter	<b>1</b> 0h = JD 2456992.8333	<b>2</b> Jupiter grows to 40 arcsec (Mv = -2.3)	<b>3</b> 5 PM ~ Venus 1.4° N of Theta Oph (10° E of Sun)	<b>4</b> 6 AM ~ Mercury 3.9° N of Antares (2.2° W of Sun)	<b>5</b> 4:42:36 AM ~ Earliest sunset of the year for Fresno Phoenicid meteor shower peaks (ZHR = 0-100±) Puppilid / Velid meteor shower peaks (ZHR = 10±)	<b>6</b> 4:27 AM 4:42:36 PM ~ Fresno's earliest sunset of the year Moon dia = 30.885 arcmin <b>7:00 PM ~ CVA meeting at CSUF (East Engr 191)</b> <b>Elect officers for 2015</b>
<b>7</b> 8 PM ~ Earth crosses the Sun's equator (N to S) PEARL HARBOR DAY	<b>8</b> 2 AM ~ Mercury at superior conjunction (1.1° S of center of Sun) 7 AM ~ Begin Carrington Solar Rotation No. 2158 1 PM ~ Jupiter stationary, then moving retrograde	<b>9</b>	<b>10</b>	<b>11</b> Sigma Hydrid meteor shower peaks (ZHR = 3±)	<b>12</b> 12 AM ~ Mars at perihelion (1.38 AU) 3 PM ~ Moon at apogee (251,395 miles)	<b>13</b>
<b>14</b> 4:51 AM Geminid meteor shower peaks (ZHR = 120±)	<b>15</b> 2 PM ~ Venus 2.8° N of Kaus Borealis (Lam Sgr; 13° E of Sun) Coma Berenicid meteor shower peaks (ZHR = 3±)	<b>16</b> HANUKKAH begins at sunset	<b>17</b> WRIGHT BROTHERS DAY	<b>18</b>	<b>19</b> December Leo Minorid meteor shower peaks (ZHR = 5±)	<b>20</b> 7 AM ~ Venus 3.3° S of Pluto (conjunction in RA; 14° E of Sun) ★★★★★★★★★★ <b>CVA Star Party at Eastman Lake</b> ★★★★★★★★★★
<b>21</b> 5:38 PM 3:03 PM ~ Winter Solstice (solar decl = -23°26'05") Uranus stationary, then moving prograde	<b>22</b> Ursid meteor shower peaks (ZHR = 12±)	<b>23</b>	<b>24</b> 9 AM ~ Moon at perigee (226,674 miles) 5 PM ~ Mercury 4.3° S of Pluto (conjunction in RA; 10° E of Sun)	<b>25</b> 2:54 AM ~ Equation of Time is zero (sundials on time) December Comae Berenicid meteor shower peaks (ZHR = 3±) CHRISTMAS	<b>26</b> 4 PM ~ Venus at aphelion	<b>27</b>
<b>28</b> 10:31 AM	<b>29</b>	<b>30</b>	<b>31</b> 24h = JD 2457023.8333 NEW YEAR'S EVE	<b>NOVEMBER 2014</b> S M T W T F S 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	<b>JANUARY 2015</b> 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	<b>SUNRISE/SUNSET for SATURDAYS</b> 6: 6:58 AM / 4:43 PM 13: 7:03 AM / 4:44 PM 20: 7:07 AM / 4:46 PM 27: 7:11 AM / 4:50 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/](http://www.imo.net/calendar/) for details about the major meteor showers shown in the calendar. Most meteor showers are strongest in the early morning hours.