

Outdoor Lab 8 - Mars

Objective: To observe the characteristics of the planet Mars.

1 Mars

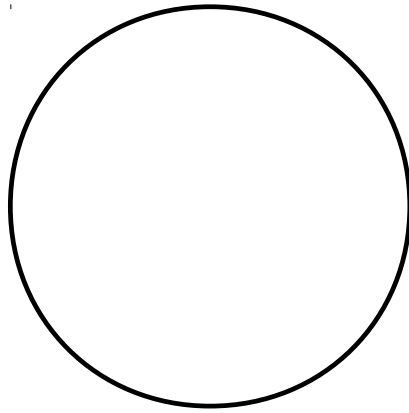
The planet Mars can be disappointing in a small telescope, owing to its small angular size. However, we are approaching an opposition, and Mars will make its closest approach to Earth on April 14, 2014. Let's see what we can see.

2 Indoor Preparations

Before going outside, study the Ephemeris on Page 3 to see the expected RA, Dec, Altitude, Azimuth, magnitude, and angular size of Mars during our observing run. This is calculated for 9:00 PM EDT. It is from the JPL Horizons website at <http://ssd.jpl.nasa.gov/horizons.cgi#top>. Note that the angular size will only be about 15 arcseconds. Mars is a small planet!

3 Observations

1. Record the time and date.
2. Identify the naked eye stars around Mars and locate its position in the atlas. Estimate and record the RA and Dec, and identify the constellation.
3. Find Mars with the telescope. We will likely use the 10" Alt-Az telescopes for this. Determine the directions N, S, E, W and label the figures on the observing sheet accordingly.
4. Examine Mars and sketch the result on the large circle on the observing sheet. Can you see any surface markings?
5. If you have a camera, try taking a photograph of Mars. Can you see more or less detail in the photograph than with the naked eye?
6. Try using eyepieces of different focal length. What is the trade-off of magnification vs field of view? Which eyepiece gives the best view, in your opinion?
7. Try watching Mars for several minutes. You should see brief times intervals where the turbulence in the atmosphere steadies down and you get a clearer view for a short time.
8. If there are any nearby stars in the field of view, record these as well.

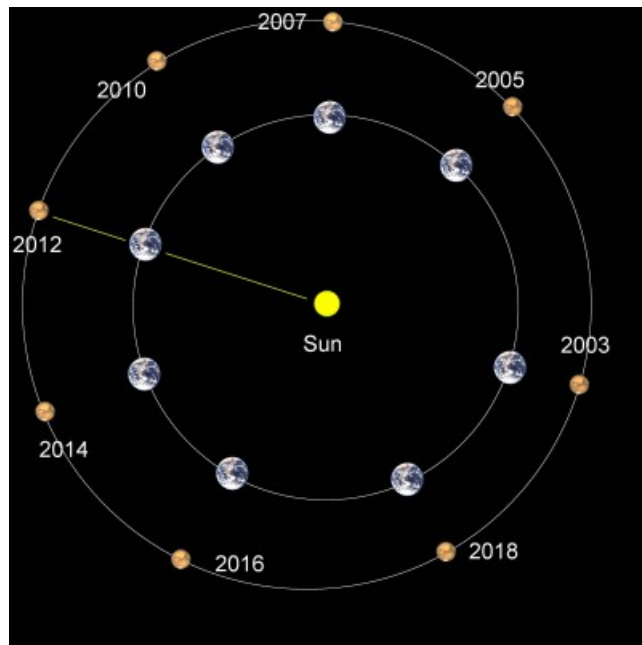


Date = _____

Time = _____

RA/Dec = _____

Constellation = _____



The 2014 opposition of Mars is not especially favorable, since Mars is near the outer part of its elliptical orbit, making its distance from the Earth relatively large.

Date (UT)	HR:MN	R.A. (ICRF/J2000.0)	DEC Azi (a-appr)	Elev	APmag	S-brt	Ang-diam	delta	deldot	S-0-T /r	S-T-0	
2014-Apr-02 02:00		13 22 37.48	-05 50 39.6	119.3432	21.7311	-1.36	4.22	14.77957	0.63366533123314	-4.7811988	170.4034 /L	5.8784
2014-Apr-03 02:00	m	13 21 14.90	-05 43 52.2	120.3354	22.6897	-1.38	4.21	14.83794	0.63117233251891	-4.4166234	171.6964 /L	5.0945
2014-Apr-04 02:00	m	13 19 51.02	-05 37 00.5	121.3477	23.6446	-1.40	4.20	14.89185	0.62888766621033	-4.0501815	172.9744 /L	4.3169
2014-Apr-05 02:00	m	13 18 26.00	-05 30 05.2	122.3808	24.5945	-1.42	4.18	14.94116	0.62681217582885	-3.6823379	174.2232 /L	3.5546
2014-Apr-06 02:00	m	13 17 00.01	-05 23 07.2	123.4351	25.5385	-1.44	4.17	14.98576	0.62494644533999	-3.3135347	175.4146 /L	2.8253
2014-Apr-07 02:00	m	13 15 33.20	-05 16 07.4	124.5112	26.4752	-1.46	4.16	15.02557	0.62329081044044	-2.9441985	176.4849 /L	2.1683
2014-Apr-08 02:00	m	13 14 05.74	-05 09 06.8	125.6097	27.4037	-1.47	4.15	15.06050	0.62184536607007	-2.5747461	177.2826 /L	1.6774
2014-Apr-09 02:00	m	13 12 37.80	-05 02 06.3	126.7309	28.3226	-1.48	4.14	15.09048	0.62060997154978	-2.2055865	177.5245 /L	1.5280
2014-Apr-10 02:00	m	13 11 09.54	-04 55 06.7	127.8754	29.2309	-1.48	4.15	15.11546	0.61958425517497	-1.8371210	177.0682 /T	1.8097
2014-Apr-11 02:00	m	13 09 41.13	-04 48 09.0	129.0436	30.1272	-1.48	4.15	15.13541	0.61876762007028	-1.4697389	176.1547 /T	2.3751
2014-Apr-12 02:00	m	13 08 12.73	-04 41 14.2	130.2358	31.0104	-1.47	4.16	15.15030	0.61815925281543	-1.1038119	175.0307 /T	3.0713
2014-Apr-13 02:00	m	13 06 44.52	-04 34 23.1	131.4523	31.8792	-1.46	4.18	15.16014	0.61775813583143	-0.7396871	173.8111 /T	3.8273
2014-Apr-14 02:00	m	13 05 16.64	-04 27 36.6	132.6935	32.7325	-1.45	4.19	15.16493	0.61750306373698	-0.3776804	172.5442 /T	4.6126
2014-Apr-15 02:00	m	13 03 49.27	-04 20 55.6	133.9594	33.5691	-1.44	4.20	15.16469	0.6175266283406	-0.0180726	171.2523 /T	5.4134
2014-Apr-16 02:00	m	13 02 22.55	-04 14 20.9	135.2503	34.3876	-1.42	4.21	15.15947	0.61778541168818	0.3388903	169.9469 /T	6.2222
2014-Apr-17 02:00	m	13 00 56.65	-04 07 53.5	136.5661	35.1871	-1.41	4.22	15.14931	0.61819965976895	0.6929906	168.6346 /T	7.0347
2014-Apr-18 02:00		12 59 31.71	-04 01 34.2	137.9068	35.9663	-1.40	4.23	15.13428	0.61881364077314	1.0440272	167.3195 /T	7.8480
2014-Apr-19 02:00		12 58 07.89	-03 55 23.7	139.2723	36.7241	-1.38	4.24	15.11445	0.61962547789894	1.3918000	166.0046 /T	8.6601
2014-Apr-20 02:00		12 56 45.32	-03 49 22.9	140.6622	37.4594	-1.37	4.26	15.08991	0.62063317989135	1.7360942	164.6919 /T	9.4695
2014-Apr-21 02:00		12 55 24.15	-03 43 32.6	142.0762	38.1711	-1.35	4.27	15.06076	0.62183462856977	2.0766670	163.3829 /T	10.2750
2014-Apr-22 02:00		12 54 04.52	-03 37 53.4	143.5137	38.8582	-1.34	4.28	15.02710	0.62322756005033	2.4132392	162.0790 /T	11.0754
2014-Apr-23 02:00		12 52 46.57	-03 32 26.1	144.9741	39.5197	-1.32	4.28	14.98905	0.62480954257251	2.7454920	160.7813 /T	11.8699
2014-Apr-24 02:00		12 51 30.42	-03 27 11.4	146.4565	40.1547	-1.30	4.29	14.94674	0.62657795386138	3.0730688	159.4908 /T	12.6577
2014-Apr-25 02:00		12 50 16.21	-03 22 10.1	147.9599	40.7622	-1.28	4.30	14.90032	0.62852996077716	3.3955809	158.2082 /T	13.4381
2014-Apr-26 02:00		12 49 04.06	-03 17 22.6	149.4832	41.3415	-1.27	4.31	14.84994	0.63066250398766	3.7126196	156.9344 /T	14.2103
2014-Apr-27 02:00		12 47 54.09	-03 12 49.7	151.0252	41.8917	-1.25	4.32	14.79575	0.63297229047343	4.0237715	155.6700 /T	14.9738
2014-Apr-28 02:00		12 46 46.41	-03 08 31.9	152.5843	42.4123	-1.23	4.33	14.73793	0.63545579635693	4.3286382	154.4158 /T	15.7279
2014-Apr-29 02:00		12 45 41.12	-03 04 29.6	154.1591	42.9025	-1.21	4.33	14.67664	0.63810928135504	4.6268566	153.1722 /T	16.4722
2014-Apr-30 02:00		12 44 38.31	-03 00 43.4	155.7478	43.3620	-1.19	4.34	14.61208	0.64092881410806	4.9181158	151.9398 /T	17.2063
2014-May-01 02:00		12 43 38.08	-02 57 13.6	157.3486	43.7904	-1.17	4.35	14.54442	0.64391030543398	5.2021671	150.7190 /T	17.9296
2014-May-02 02:00	m	12 42 40.50	-02 54 00.7	158.9596	44.1872	-1.15	4.36	14.47385	0.64704954515823	5.4788262	149.5104 /T	18.6418
2014-May-03 02:00	m	12 41 45.64	-02 51 04.8	160.5787	44.5524	-1.13	4.37	14.40057	0.65042323815010	5.7479092	148.3141 /T	19.3426
2014-May-04 02:00	m	12 40 53.55	-02 48 26.4	162.2040	44.8858	-1.11	4.37	14.32476	0.6537840368725	6.0095230	147.1305 /T	20.0318
2014-May-05 02:00	m	12 40 04.30	-02 46 05.5	163.8331	45.1874	-1.08	4.38	14.24661	0.65737056559291	6.2634567	145.9600 /T	20.7090
2014-May-06 02:00	m	12 39 17.92	-02 44 02.3	165.4640	45.4573	-1.06	4.39	14.16629	0.66109744655578	6.5097723	144.8026 /T	21.3740
2014-May-07 02:00	m	12 38 34.45	-02 42 17.0	167.0943	45.6957	-1.04	4.40	14.08400	0.66496031228481	6.7484993	143.6587 /T	22.0268
2014-May-08 02:00	m	12 37 53.91	-02 40 49.7	168.7220	45.9029	-1.02	4.41	13.99990	0.66895482263763	6.9796918	142.5282 /T	22.6672
2014-May-09 02:00	m	12 37 16.34	-02 39 40.3	170.3447	46.0792	-1.00	4.41	13.91417	0.67307667813873	7.2034280	141.4114 /T	23.2950
2014-May-10 02:00	m	12 36 41.73	-02 38 49.0	171.9603	46.2250	-0.98	4.42	13.82696	0.67732163451306	7.4198134	140.3082 /T	23.9103

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