Lunar 100 Observing Club

Raleigh Astronomy Club

Version 1.2 09-AUG-2005

Introduction

Welcome to the Lunar 100 Observing Club! This is an observation program to better acquaint you with our nearest satellite. It involves a hundred observations, most of them using a telescope. Some of the observations are easy, but some will challenge you as an observer. However, since the target is the moon, the telescope does not need to be large, or the sky conditions dark, with most of the observations able to be done from an urban location.

This program was originally designed by Charles A. Wood and originally published in Sky & Telescope (used by permission). Charles Wood's original presentation of this list is available on Sky and Telescope's web site[1]. The observations in the list are ranked from the easiest to observe to the most difficult.

Rules

In order to earn the certificate for the program, the applicant must meet the following qualifications:

1. Be a member in good standing of the Raleigh Astronomy Club.
2. Observe all features in the list and record the time and date of each observation.
3. Any record sheet/format can be used. For convenience, there is one in this document that can be printed and used.
4. Send a copy of the observing record to the Raleigh Astronomy Club at:

Raleigh Astronomy Club
c/o P.O. Box 10643
Raleigh, NC 27605
Email: rac@rtpnet.org

1 See http://skyandtelescope.com/observing/objects/moon/article_1199_6.asp

Lunar Coordinates and References

All the observations have names, descriptions, and a set of lunar co-ordinates. These same coordinates are used on many lunar maps. Just like terrestrial mapping, latitudes run north and south (i. e. up and down) from the lunar equator, and longitudes run east and west (e. g. right and left) from a prime meridian down the center of the earth facing side of the moon. If you are viewing the moon with naked eye, the east longitudes (+70) start on the right hand side and the northern latitudes (+80) are on "top." From the new moon to the full moon, the shadow will also start at extreme east longitudes, proceed through the prime meridian, and progress to the far western longitudes.

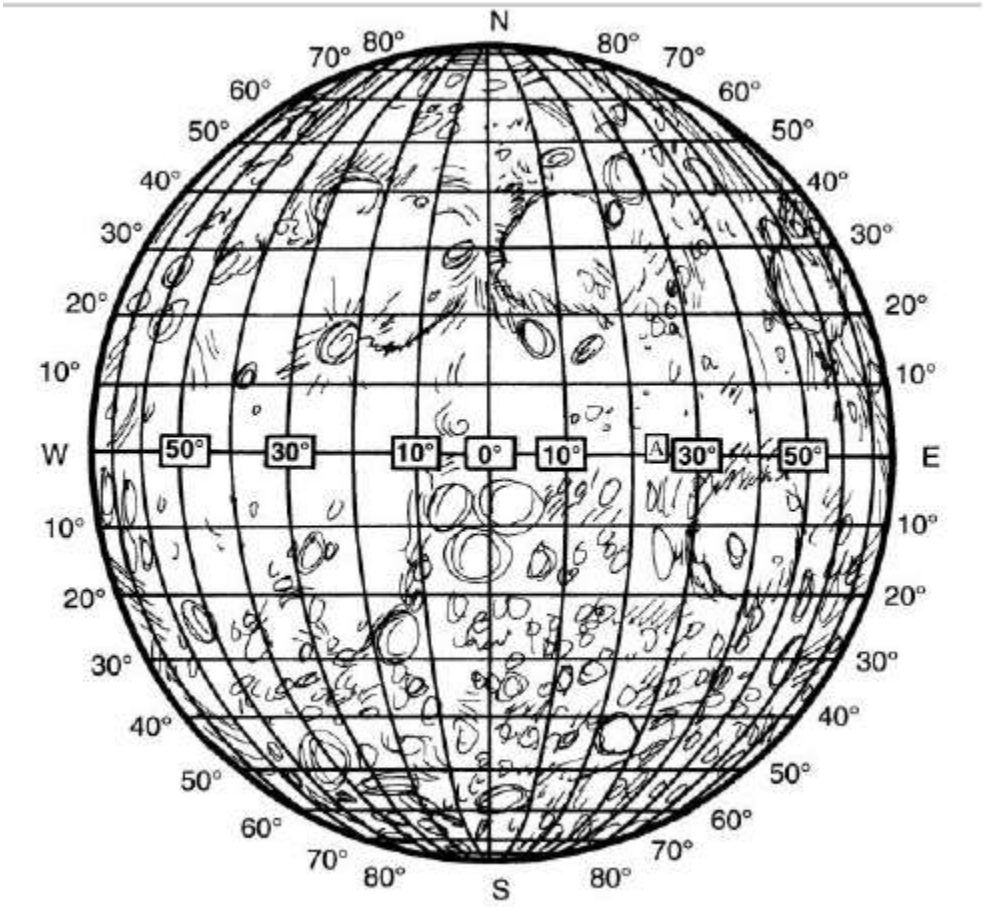

Figure 1: Lunar Latitudes and Longitudes

This system is used on many atlases and maps and is the one referenced in the observing list. Please note that many maps use a negative number for southern latitudes or western longitudes (but the numerical value is still the same). The one exception is Sky & Telescope's good Lunar Quadrant maps (which use a decimal coordinate system. For observers with these charts, there is an alternate list at the end of the document with map and grid references for these charts.

Lunar References

There are many good references locating the features on this observing list. These include books, software programs, atlases, and maps, and web sites. Of course, the program can be done with only a single resource (not all of these listed), this list is a compilation of resources that have been recommend. Some of the recommended ones:

Periodicals

"Introducing the Lunar 100," Charles A. Wood, Sky & Telescope, *April 2004,* pp. 113-120

Books

Observing the Moon, Gerald North

The Modern Moon, Charles A. Wood – An excellent guide to learning the moon

Software

Virtual Moon Atlas, http://www.astrosurf.com/avl/UK_index.html -- Very good free Moon mapping software.

Atlases

Photographic Atlas of the Moon

Atlas of the Moon, Antonin Rükl

Maps

Sky and Telescope Lunar 100 Card – Quick Reference to this observing list with references to the Atlas of the Moon.

Sky and Telescope *Lunar Quadrant Maps* – These are good maps for lunar features. It's a good idea to get them laminated (somewhere like Kinko's) before use.

Web Sites

The Full Moon Atlas, http://www.lunarrepublic.com/atlas/index.shtml

Hitchhikers Guide to the Moon, http://shallowsky.com/moon/ -- An excellent web site. Provides detailed pictures of individual features with pointers.

Lunar 100, http://www.astrospider.com/Lunar100list.htm -- A good Lunar 100 web site with pictures of some the of the features and Rükl chart references.

Lunar Features

The moon is the most prominent feature in the sky (aside from the Sun). With the naked eye, it appears to be a collection of large-scale, light and dark features. These represent lunar highlands (light colored areas) and lava plains (dark colored areas). However, when binoculars or telescopes are used, a wealth of details and features are revealed. This program is designed to provide a visual tour of many of these features on the lunar surface. This section is a basic glossary to describe the major classes of features in the observing list.

Basin (Impact Basin) – A shallow circular depression created by a large body impact. Most of these were subsequently filled with lava.

Crater – A bowl shaped depression mostly formed by the impact of a large body (a few are volcanic).

Dome – A low-rounded hill caused by volcanic activity, often capped with a small crater.

Mare – Lava flows

Ray – A light colored linear streak extending outward from an impact crater.

Rille – A surface fissure or channel produced by a fracture or fault, or collapse of a lava tube. Also called a rima (pl. rimae).

Sinus – Latin for "bay." A bay-like feature along borders of maria.

Terminator – The line that divides the daytime and nighttime regions of the moon.

Terrace – A flat-top, narrow stretch of crust that has slid down from a crater's rim. It is concentric with the crater rim.

Volcano – An opening (vent) in the crust where lava, ash, and gases once flowed.

Good Luck and Good Observing!!

Raleigh Astronomy Club
Lunar 100 Observing Club List

Observer: _____

Instruments Used: _____

	Object/Feature	Lat	Long	Date	Time
1. [ ]	Moon *Large Satellite*	n/a	n/a	_____	_____
2. [ ]	Earthshine *Twice Reflected Sunlight*	n/a	n/a	_____	_____
3. [ ]	Mare/Highland Dichotomy *Two materials with distinct composition*	n/a	n/a	_____	_____
4. [ ]	Apennines *Imbrium basin rim*	18.9n	3.7w	_____	_____
5. [ ]	Copernicus *Archetype large complex crater*	9.7n	20.1w	_____	_____
6. [ ]	Tycho *Large rayed crater with impact melts*	43.4s	11.1w	_____	_____
7. [ ]	Altai Scarp *Nectaris basin rim*	24.3s	22.6e	_____	_____
8. [ ]	Theophilus, Cyrilus, Catharina *Crater sequence illustrating stages of degradation*	13.2s	24.0e	_____	_____
9. [ ]	Clavius *Lacks basin features in spite of it's size*	58.8s	14.1w	_____	_____
10. [ ]	Mare Crisium *Mare contained in large circular basin*	18.0n	59.0e	_____	_____
11. [ ]	Aristarchus *Very bright crater with dark bands on its walls*	23.7n	47.4w	_____	_____
12. [ ]	Proclus *Oblique-impact rays*	16.1n	46.8e	_____	_____

	Object/Feature	Lat	Long	Date	Time
13. [ ]	Gassendi *Floor fractured crater*	17.6s	40.1w	_____	_____
14. [ ]	Sinus Iridium *Very large crater with missing rim*	45.0n	32.0w	_____	_____
15. [ ]	Straight Wall *Best example of a lunar fault*	21.8s	7.8w	_____	_____
16. [ ]	Petavius *Crater with domed & fractured floor*	25.1s	60.4e	_____	_____
17. [ ]	Schröter's Valley *Giant sinuous rille*	26.2n	50.8w	_____	_____
18. [ ]	Mare Serenitatis dark edges *Distinct mare areas with different compositions*	17.8n	23.0e	_____	_____
19. [ ]	Alpine Valley *Lunar graben*	49.0n	3.0e	_____	_____
20. [ ]	Posidonius *Floor-fractured crater*	31.8n	29.9e	_____	_____
21. [ ]	Fracastorius *Crater with subsided & fractured floor*	21.5s	33.2e	_____	_____
22. [ ]	Aristarchus Plateau *Mysterious uplifted region mantled with pyroclastics*	26.0n	51.0w	_____	_____
23. [ ]	Pico *Isolated Imbrium basin-ring fragment*	45.7n	8.9w	_____	_____
24. [ ]	Hyginus Rille *Rille containing rimless collapse pits*	7.4n	7.8e	_____	_____
25. [ ]	Messier & Messier A *Oblique ricochet-impact pair*	1.9s	47.6e	_____	_____
26. [ ]	Mare Frigoris *Arcuate mare of uncertain origin*	56.0n	1.4e	_____	_____
27. [ ]	Archimedes *Large crater lacking central peak*	29.7n	4.0w	_____	_____
28. [ ]	Hipparchus *First drawing of a single crater*	5.5s	4.8e	_____	_____

29. [ ]	Aridaeus Rille *Long, linear graben*	6.4n	14.0e	_____	_____
30. [ ]	Schiller *Possible oblique impact*	51.9s	39.0w	_____	_____
	Object/Feature	**Lat**	**Long**	**Date**	**Time**
31. [ ]	Taruntius *Young floor-fractured crater*	5.6n	46.5e	_____	_____
32. [ ]	Arago Alpha & Beta *Volcanic Domes*	6.2n	21.4e	_____	_____
33. [ ]	Serpentine Ridge *Basin inner-ring segment*	27.3n	25.3e	_____	_____
34. [ ]	Lacus Mortis *Strange crater with rille & ridge*	45.0n	27.2e	_____	_____
35. [ ]	Triesnecker Rilles *Rille family*	4.3n	4.6e	_____	_____
36. [ ]	Grimaldi Basin *A small two-ring basin*	5.5s	68.3w	_____	_____
37. [ ]	Bailly *Barely discernable basin*	66.5s	69.1w	_____	_____
38. [ ]	Sabine & Ritter *Possible twin impacts*	1.7n	19.7e	_____	_____
39. [ ]	Schickard *Crater floor with Orientale basin ejecta stripe*	44.3s	55.3w	_____	_____
40. [ ]	Janssen Rille *Rare example of a highland rille*	45.4s	39.3e	_____	_____
41. [ ]	Bessel ray *Ray of uncertain origin near Bessel*	21.8n	17.9e	_____	_____
42. [ ]	Marius Hills *Complex of volcanic domes & hills*	12.5n	54.0w	_____	_____
43. [ ]	Wargentin *A crater filled to the rim with lava or ejecta*	49.6s	60.2w	_____	_____
44. [ ]	Mersenius *Domed floor cut by secondary craters*	21.5s	49.2w	_____	_____

45. [ ]	Maurolycus *Region of saturation cratering*	42.0s	14.0e	_____	_____
46. [ ]	Regiomontanus central peak *Possible volcanic peak*	28.0s	0.6w	_____	_____
47. [ ]	Alphonsus dark spots *Dark-halo eruptions on crater floor*	13.7s	3.2w	_____	_____
	Object/Feature	**Lat**	**Long**	**Date**	**Time**
48. [ ]	Cauchy region *Fault, rilles, & domes*	10.5n	38.0e	_____	_____
49. [ ]	Gruithuisen Delta & Gamma *Volcanic domes formed with viscous lavas*	36.3n	40.0w	_____	_____
50. [ ]	Cayley Plains *Light, smooth plains of uncertain origin*	4.0n	15.1e	_____	_____
51. [ ]	Davy Crater Chain *Result of comet-fragment impacts*	11.1s	6.6w	_____	_____
52. [ ]	Crüger *Possible volcanic caldera*	16.7s	66.8w	_____	_____
53. [ ]	Lamont *Possible buried basin*	4.4n	23.7e	_____	_____
54. [ ]	Hippalus Rilles *Rilles concentric to Humorum basin*	24.5s	29.0w	_____	_____
55. [ ]	Baco *Unusually smooth crater floor & surrounding plains*	51.0s	19.1e	_____	_____
56. [ ]	Australe Basin *A partially flooded ancient basin*	49.8s	84.5e	_____	_____
57. [ ]	Reiner Gamma *Conspicuous swirl & magnetic anomaly*	7.7n	59.2w	_____	_____
58. [ ]	Rheita Valley *Basin secondary-crater chain*	42.5s	51.5e	_____	_____
59. [ ]	Schiller-Zucchius Basin *Badly degraded overlooked basin*	56.0s	45.0w	_____	_____
60. [ ]	Kies Pi *Volcanic dome*	26.9s	24.2w	_____	_____

61. [ ]	Mösting A *Simple crater close to center of lunar near side*	3.2s	5.2w	_____	_____
62. [ ]	Rümker *Large volcanic dome*	40.8n	58.1w	_____	_____
63. [ ]	Imbrium sculpture *Basin ejecta near & overlying Boscovich & Julius Caesar*	11.0n	12.0e	_____	_____
64. [ ]	Descartes *Apollo 16 landing site; putative region of highland volcanism*	11.7s	15.7e	_____	_____
	Object/Feature	**Lat**	**Long**	**Date**	**Time**
65. [ ]	Hortensius domes *Dome field north of Hortensius*	7.6n	27.9w	_____	_____
66. [ ]	Hadley Rille *Lava channel near Apollo 15 landing site*	25.0n	3.0e	_____	_____
67. [ ]	Fra Mauro formation *Apollo 14 landing site on Imbrium ejecta*	3.6s	17.5w	_____	_____
68. [ ]	Flamsteed P *Proposed young volcanic crater & Surveyor 1 landing site*	3.0s	44.0w	_____	_____
69. [ ]	Copernicus secondary craters *Rays & craterlets near Pytheas*	19.6n	19.1w	_____	_____
70. [ ]	Humboldtianum basin *Multi-ring impact basin*	57.0n	80.0e	_____	_____
71. [ ]	Sulpicius Gallus dark mantle *Ash eruptions northwest of crater*	19.6n	11.6e	_____	_____
72. [ ]	Atlas dark-halo craters *Explosive volcanic pits on the floor of Atlas*	46.7n	44.4e	_____	_____
73. [ ]	Smythii basin *Difficult-to-observe basin scarp & mare*	2.0s	87.0e	_____	_____
74. [ ]	Copernicus H *Dark-halo impact crater*	6.9n	18.3w	_____	_____
75. [ ]	Ptolemaeus B *Saucerlike depression on the floor of Ptolemaeus*	8.0s	0.8w	_____	_____
76. [ ]	W. Bond *Large crater degraded by Imbrium ejecta*	65.3n	3.7e	_____	_____

77. [ ]	Sirsalis Rille *Procellarum basin radial rilles*	15.7s	61.7w	_____	_____
78. [ ]	Lambert R *A buried "ghost" crater*	23.8n	20.6w	_____	_____
79. [ ]	Sinus Aestuum *Eastern dark-mantle volcanic deposit*	12.0n	3.5w	_____	_____
80. [ ]	Orientale basin *Youngest large impact basin*	19.0s	95.0w	_____	_____
81. [ ]	Hesiodus A *Concentric crater*	30.1s1	7.0w	_____	_____

	Object/Feature	**Lat**	**Long**	**Date**	**Time**
82. [ ]	Linnë *Small crater once thought to have disappeared*	27.7n	11.8e	_____	_____
83. [ ]	Plato craterlets *Crater pits at limits of detection*	51.6n	9.4w	_____	_____
84. [ ]	Pitatus *Crater with concentric rilles*	29.8s	13.5w	_____	_____
85. [ ]	Langrenus rays *Aged ray system*	8.9s	60.9e	_____	_____
86. [ ]	Prinz Rilles *Rille system near the crater Prinz*	27.0n	43.0w	_____	_____
87. [ ]	Humboldt *Crater with central peaks & dark spots*	27.0s	80.9e	_____	_____
88. [ ]	Peary *Difficult-to-observe polar crater*	88.6n	33.0e	_____	_____
89. [ ]	Valentine Dome *Volcanic dome*	30.5n	10.1e	_____	_____
90. [ ]	Armstrong, Aldrin, & Collins *Small craters near the Apollo 11 landing site*	1.3n	23.7e	_____	_____
91. [ ]	De Gasparis Rilles *Area with many rilles*	25.9s	50.7w	_____	_____
92. [ ]	Gylden Valley *Part of the Imbrium radial sculpture*	5.1s	0.7e	_____	_____

93. [ ]	Dionysius rays *Unusual & rare dark rays*	2.8n	17.3e	_____	_____
94. [ ]	Drygalski *Large south-pole region crater*	79.3s	84.9w	_____	_____
95. [ ]	Procellarum basin *The Moon's biggest basin?*	23.0n	15.0w	_____	_____
96. [ ]	Leibnitz Mountains *Rim of South Pole-Aitken basin*	85.0s	30.0e	_____	_____
97. [ ]	Inghirami Valley *Orientale basin ejecta*	44.0s	73.0w	_____	_____
98. [ ]	Imbrium lava flows *Mare lava-flow boundaries*	32.8n	22.0w	_____	_____
	Object/Feature	**Lat**	**Long**	**Date**	**Time**
99. [ ]	Ina *D-shaped young volcanic caldera*	18.6n	5.3e	_____	_____
100. [ ]	Mare Marginis swirls *Possible magnetic field deposits*	18.5n	88.0e	_____	_____

Appendix A
Object List by Longitude (East to West)

This list (sorted by longitude) is provided to plan observing based on the current phase. The days in the WHEN column are approximate days after new moon.

Object/Feature	Lat	Long	Number	When
Moon *Large Satellite*	n/a	n/a	1	(Any)
Earthshine *Twice Reflected Sunlight*	n/a	n/a	2	(Near new moon)
Mare/Highland Dichotomy *Two materials with distinct composition*	n/a	n/a	3	(Any)
Mare Marginis swirls *Possible magnetic field deposits*	18.5n	88.0e	100	
Smythii basin *Difficult-to-observe basin scarp & mare*	2.0s	87.0e	73	
Australe Basin *A partially flooded ancient basin*	49.8s	84.5e	56	
Humboldt *Crater with central peaks & dark spots*	27.0s	80.9e	87	
Humboldtianum basin *Multi-ring impact basin*	57.0n	80.0e	70	
Langrenus rays *Aged ray system*	8.9s	60.9e	85	~ 3 days old
Petavius *Crater with domed & fractured floor*	25.1s	60.4e	16	
Mare Crisium *Mare contained in large circular basin*	18.0n	59.0e	10	
Rheita Valley *Basin secondary-crater chain*	42.5s	51.5e	58	
Messier & Messier A *Oblique ricochet-impact pair*	1.9s	47.6e	25	

Object/Feature	Lat	Long	Number	When
Proclus *Oblique-impact rays*	16.1n	46.8e	12	
Taruntius *Young floor-fractured crater*	5.6n	46.5e	31	
Atlas dark-halo craters *Explosive volcanic pits on the floor of Atlas*	46.7n	44.4e	72	~ 4 days old
Janssen Rille *Rare example of a highland rille*	45.4s	39.3e	40	
Cauchy region *Fault, rilles, & domes*	10.5n	38.0e	48	~ 5 days old
Fracastorius *Crater with subsided & fractured floor*	21.5s	33.2e	21	
Peary *Difficult-to-observe polar crater*	88.6n	33.0e	88	
Leibnitz Mountains *Rim of South Pole-Aitken basin*	85.0s	30.0e	96	
Posidonius *Floor-fractured crater*	31.8n	29.9e	20	
Lacus Mortis *Strange crater with rille & ridge*	45.0n	27.2e	34	
Serpentine Ridge *Basin inner-ring segment*	27.3n	25.3e	33	
Theophilus, Cyrilus, Catharina *Crater sequence illustrating stages of degradation*	13.2s	24.0e	8	
Armstrong, Aldrin, & Collins *Small craters near the Apollo 11 landing site*	1.3n	23.7e	90	
Lamont *Possible buried basin*	4.4n	23.7e	53	
Mare Serenitatis dark edges *Distinct mare areas with different compositions*	17.8n	23.0e	18	
Altai Scarp *Nectaris basin rim*	24.3s	22.6e	7	

Object/Feature	Lat	Long	Number	When
Arago Alpha & Beta *Volcanic Domes*	6.2n	21.4e	32	
Sabine & Ritter *Possible twin impacts*	1.7n	19.7e	38	
Baco *Unusually smooth crater floor & surrounding plains*	51.0s	19.1e	55	
Bessel ray *Ray of uncertain origin near Bessel*	21.8n	17.9e	41	
Dionysius rays *Unusual & rare dark rays*	2.8n	17.3e	93	
Descartes *Apollo 16 landing site; putative region of highland volcanism*	11.7s	15.7e	64	
Cayley Plains *Light, smooth plains of uncertain origin*	4.0n	15.1e	50	
Aridaeus Rille *Long, linear graben*	6.4n	14.0e	29	
Maurolycus *Region of saturation cratering*	42.0s	14.0e	45	
Imbrium sculpture *Basin ejecta near & overlying Boscovich & Julius Caesar*	11.0n	12.0e	63	
Linnë *Small crater once thought to have disappeared*	27.7n	11.8e	82	
Sulpicius Gallus dark mantle *Ash eruptions northwest of crater*	19.6n	11.6e	71	
Valentine Dome *Volcanic dome*	30.5n	10.1e	89	
Hyginus Rille *Rille containing rimless collapse pits*	7.4n	7.8e	24	
Ina *D-shaped young volcanic caldera*	18.6n	5.3e	99	
Hipparchus *First drawing of a single crater*	5.5s	4.8e	28	~ 7 days

Object/Feature	Lat	Long	Number	When
Triesnecker Rilles *Rille family*	4.3n	4.6e	35	
W. Bond *Large crater degraded by Imbrium ejecta*	65.3n	3.7e	76	
Alpine Valley *Lunar graben*	49.0n	3.0e	19	
Hadley Rille *Lava channel near Apollo 15 landing site*	25.0n	3.0e	66	
Mare Frigoris *Arcuate mare of uncertain origin*	56.0n	1.4e	26	
Gylden Valley *Part of the Imbrium radial sculpture*	5.1s	0.7e	92	
Regiomontanus central peak *Possible volcanic peak*	28.0s	0.6w	46	
Ptolemaeus B *Saucerlike depression on the floor of Ptolemaeus*	8.0s	0.8w	75	
Alphonsus dark spots *Dark-halo eruptions on crater floor*	13.7s	3.2w	47	
Sinus Aestuum *Eastern dark-mantle volcanic deposit*	12.0n	3.5w	79	
Apennines *Imbrium basin rim*	18.9n	3.7w	4	
Archimedes *Large crater lacking central peak*	29.7n	4.0w	27	
Mösting A *Simple crater close to center of lunar near side*	3.2s	5.2w	61	
Davy Crater Chain *Result of comet-fragment impacts*	11.1s	6.6w	51	
Straight Wall *Best example of a lunar fault*	21.8s	7.8w	15	~ 8 days
Pico *Isolated Imbrium basin-ring fragment*	45.7n	8.9w	23	

Object/Feature	Lat	Long	Number	When
Plato craterlets *Crater pits at limits of detection*	51.6n	9.4w	83	
Tycho *Large rayed crater with impact melts*	43.4s	11.1w	6	
Pitatus *Crater with concentric rilles*	29.8s	13.5w	84	
Clavius *Lacks basin features in spite of it's size*	58.8s	14.1w	9	
Procellarum basin *The Moon's biggest basin?*	23.0n	15.0w	95	
Hesiodus A *Concentric crater*	30.1s	17.0w	81	
Fra Mauro formation *Apollo 14 landing site on Imbrium ejecta*	3.6s	17.5w	67	
Copernicus H *Dark-halo impact crater*	6.9n	18.3w	74	~ 9 days old
Copernicus secondary craters *Rays & craterlets near Pytheas*	19.6n	19.1w	69	
Copernicus *Archetype large complex crater*	9.7n	20.1w	5	
Lambert R *A buried "ghost" crater*	23.8n	20.6w	78	
Imbrium lava flows *Mare lava-flow boundaries*	32.8n	22.0w	98	
Kies Pi *Volcanic dome*	26.9s	24.2w	60	
Hortensius domes *Dome field north of Hortensius*	7.6n	27.9w	65	
Hippalus Rilles *Rilles concentric to Humorum basin*	24.5s	29.0w	54	
Sinus Iridium *Very large crater with missing rim*	45.0n	32.0w	14	~10 days old

Schiller *Possible oblique impact*	51.9s	39.0w	30	
Gruithuisen Delta & Gamma *Volcanic domes formed with viscous lavas*	36.3n	40.0w	49	
Gassendi *Floor fractured crater*	17.6s	40.1w	13	
Prinz Rilles *Rille system near the crater Prinz*	27.0n	43.0w	86	
Flamsteed P *Proposed young volcanic crater & Surveyor 1 landing site*	3.0s	44.0w	68	
Object/Feature	**Lat**	**Long**	**Number**	**When**
Schiller-Zucchius basin *Badly degraded overlooked basin*	56.0s	45.0w	59	
Aristarchus *Very bright crater with dark bands on its walls*	23.7n	47.4w	11	
Mersenius *Domed floor cut by secondary craters*	21.5s	49.2w	44	
De Gasparis Rilles *Area with many rilles*	25.9s	50.7w	91	
Schröter's Valley *Giant sinuous rille*	26.2n	50.8w	17	~11 days old
Aristarchus Plateau *Mysterious uplifted region mantled with pyroclastics*	26.0n	51.0w	22	
Marius Hills *Complex of volcanic domes & hills*	12.5n	54.0w	42	
Schickard *Crater floor with Orientale basin ejecta stripe*	44.3s	55.3w	39	
Rümker *Large volcanic dome*	40.8n	58.1w	62	
Reiner Gamma *Conspicuous swirl & magnetic anomaly*	7.7n	59.2w	57	
Wargentin *A crater filled to the rim with lava or ejecta*	49.6s	60.2w	43	

Sirsalis Rille *Procellarum basin radial rilles*	15.7s	61.7w	77	
Crüger *Possible volcanic caldera*	16.7s	66.8w	52	
Grimaldi Basin *A small two-ring basin*	5.5s	68.3w	36	
Bailly *Barely discernable basin*	66.5s	69.1w	37	
Inghirami Valley *Orientale basin ejecta*	44.0s	73.0w	97	
Drygalski *Large south-pole region crater*	79.3s	84.9w	94	
Object/Feature	**Lat**	**Long**	**Number**	**When**
Orientale basin *Youngest large impact basin*	19.0s	95.0w	80	

Raleigh Astronomy Club
Lunar 100 Observing Club Alternate List

Observer: _____

Instruments Used: _____

#	Object/Feature	Map	Lat/Lon	Date	Time
1. [ ]	Moon *Large Satellite*	n/a	n/a	_____	_____
2. [ ]	Earthshine *Twice Reflected Sunlight*	n/a	n/a	_____	_____
3. [ ]	Mare/Highland Dichotomy *Two materials with distinct composition*	n/a	n/a	_____	_____
4. [ ]	Apennines *Imbrium basin rim*	II	.4/0	_____	_____
5. [ ]	Copernicus *Archetype large complex crater*	II	.2/-.3	_____	_____
6. [ ]	Tycho *Large rayed crater with impact melts*	III	-.7/-.15	_____	_____
7. [ ]	Altai Scarp *Nectaris basin rim*	IV	-.4/.35	_____	_____
8. [ ]	Theophilus, Cyrilus, Catharina *Crater sequence illustrating stages of degradation*	IV	-.25/.4	_____	_____
9. [ ]	Clavius *Lacks basin features in spite of it's size*	III	-.85/-.1	_____	_____
10. [ ]	Mare Crisium *Mare contained in large circular basin*	I	.3/.8	_____	_____
11. [ ]	Aristarchus *Very bright crater with dark bands on its walls*	II	.4/-.68	_____	_____
12. [ ]	Proclus *Oblique-impact rays*	I	.3/.7	_____	_____

13. [ ]	Gassendi F*loor fractured crate*r	III	-.3/-.6	_____	_____

#	Object/Feature	Map	Lat/Lon	Date	Time
14. [ ]	Sinus Iridium *Very large crater with missing rim*	II	.7/-.4	_____	_____
15. [ ]	Straight Wall *Best example of a lunar fault*	III	-.4/-.1	_____	_____
16. [ ]	Petavius *Crater with domed & fractured floor*	IV	-.4/.8	_____	_____
17. [ ]	Schröter's Valley *Giant sinuous rille*	II	.45/-.7	_____	_____
18. [ ]	Mare Serenitatis dark edges *Distinct mare areas with different compositions*	I	.3/.3	_____	_____
19. [ ]	Alpine Valley *Lunar graben*	I	.75/.05	_____	_____
20. [ ]	Posidonius *Floor-fractured crater*	I	.5/.4	_____	_____
21. [ ]	Fracastorius *Crater with subsided & fractured floor*	IV	-.35/.5	_____	_____
22. [ ]	Aristarchus Plateau *Mysterious uplifted region mantled with pyroclastics*	II	.4/-.7	_____	_____
23. [ ]	Pico *Isolated Imbrium basin-ring fragment*	II	.7/-.1	_____	_____
24. [ ]	Hyginus Rille *Rille containing rimless collapse pits*	I	.1/.1	_____	_____
25. [ ]	Messier & Messier A *Oblique ricochet-impact pair*	IV	-.05/.75	_____	_____
26. [ ]	Mare Frigoris *Arcuate mare of uncertain origin*	I	.8/.2	_____	_____
27. [ ]	Archimedes *Large crater lacking central peak*	II	.5/-.05	_____	_____
28. [ ]	Hipparchus	IV	-.1/.1	_____	_____

	First drawing of a single crater				
29. [ ]	Aridaeus Rille *Long, linear graben*	I	.1/.25	_____	_____
30. [ ]	Schiller *Possible oblique impact*	III	-.8/-.4	_____	_____
#	**Object/Feature**	**Map**	**Lat/Lon**	**Date**	**Time**
31. [ ]	Taruntius *Young floor-fractured crater*	I	.1/.7	_____	_____
32. [ ]	Arago Alpha & Beta *Volcanic Domes*	I	.1/.35	_____	_____
33. [ ]	Serpentine Ridge *Basin inner-ring segment*	I	.1/.5	_____	_____
34. [ ]	Lacus Mortis *Strange crater with rille & ridge*	I	.7/.3	_____	_____
35. [ ]	Triesnecker Rilles *Rille family*	I	.75/.75	_____	_____
36. [ ]	Grimaldi Basin *A small two-ring basin*	III	-.1/-.9	_____	_____
37. [ ]	Bailly *Barely discernable basin*	III	-.92/-.38	_____	_____
38. [ ]	Sabine & Ritter *Possible twin impacts*	I	.03/.33	_____	_____
39. [ ]	Schickard *Crater floor with Orientale basin ejecta stripe*	III	-.7/-.6	_____	_____
40. [ ]	Janssen Rille *Rare example of a highland rille*	IV	-.7/.45	_____	_____
41. [ ]	Bessel ray *Ray of uncertain origin near Bessel*	I	.4/.3	_____	_____
42. [ ]	Marius Hills *Complex of volcanic domes & hills*	II	.2/-.75	_____	_____
43. [ ]	Wargentin *A crater filled to the rim with lava or ejecta*	III	-.75/-.55	_____	_____

44. [ ]	Mersenius *Domed floor cut by secondary craters*	III	-.35/-.7	_____	_____
45. [ ]	Maurolycus *Region of saturation cratering*	IV	-.65/.18	_____	_____
46. [ ]	Regiomontanus central peak *Possible volcanic peak*	III	-.48/0	_____	_____
47. [ ]	Alphonsus dark spots *Dark-halo eruptions on crater floor*	III	-.25/-.05	_____	_____
#	**Object/Feature**	**Map**	**Lat/Lon**	**Date**	**Time**
48. [ ]	Cauchy region *Fault, rilles, & domes*	I	.2/.6	_____	_____
49. [ ]	Gruithuisen Delta & Gamma *Volcanic domes formed with viscous lavas*	II	.55/-.55	_____	_____
50. [ ]	Cayley Plains *Light, smooth plains of uncertain origin*	I	.1/.25	_____	_____
51. [ ]	Davy Crater Chain *Result of comet-fragment impacts*	III	-.2/-.15	_____	_____
52. [ ]	Crüger *Possible volcanic caldera*	III	-.88/-.3	_____	_____
53. [ ]	Lamont *Possible buried basin*	I	.1/.4	_____	_____
54. [ ]	Hippalus Rilles *Rilles concentric to Humorum basin*	III	-.45/-.45	_____	_____
55. [ ]	Baco *Unusually smooth crater floor & surrounding plains*	IV	-.8/.2	_____	_____
56. [ ]	Australe Basin *A partially flooded ancient basin*	IV	-.75/.65	_____	_____
57. [ ]	Reiner Gamma *Conspicuous swirl & magnetic anomaly*	II	.1/-.8	_____	_____
58. [ ]	Rheita Valley *Basin secondary-crater chain*	IV	-.65/.58	_____	_____
59. [ ]	Schiller-Zucchius basin *Badly degraded overlooked basin*	III	-.8/-.4	_____	_____

60. [ ]	Kies Pi *Volcanic dome*	III	-.45/-.35	_____	_____
61. [ ]	Mösting A *Simple crater close to center of lunar near side*	III	0/-.1	_____	_____
62. [ ]	Rümker *Large volcanic dome*	II	.65/-.65	_____	_____
63. [ ]	Imbrium sculpture *Basin ejecta near & overlying Boscovich & Julius Caesar*	I	.2/.2	_____	_____
64. [ ]	Descartes *Apollo 16 landing site; putative region of highland volcanism*	IV	-.2/.25	_____	_____

#	Object/Feature	Map	Lat/Lon	Date	Time
65. [ ]	Hortensius domes *Dome field north of Hortensius*	II	.12/-.46	_____	_____
66. [ ]	Hadley Rille *Lava channel near Apollo 15 landing site*	I	.45/.05	_____	_____
67. [ ]	Fra Mauro formation *Apollo 14 landing site on Imbrium ejecta*	III	-.1/-.3	_____	_____
68. [ ]	Flamsteed P *Proposed young volcanic crater & Surveyor 1 landing site*	III	-.05/-.7	_____	_____
69. [ ]	Copernicus secondary craters *Rays & craterlets near Pytheas*	II	.15/-.4	_____	_____
70. [ ]	Humboldtianum basin *Multi-ring impact basin*	I	.85/.55	_____	_____
71. [ ]	Sulpicius Gallus dark mantle *Ash eruptions northwest of crater*	I	.35/.2	_____	_____
72. [ ]	Atlas dark-halo craters *Explosive volcanic pits on the floor of Atlas*	I	.7/.5	_____	_____
73. [ ]	Smythii basin *Difficult-to-observe basin scarp & mare*	IV	-.05/1.0	_____	_____
74. [ ]	Copernicus H *Dark-halo impact crater*	II	.12/-.32	_____	_____
75. [ ]	Ptolemaeus B *Saucerlike depression on the floor of Ptolemaeus*	III	-.15/-.05	_____	_____

76. [ ]	W. Bond *Large crater degraded by Imbrium ejecta*	I	.9/0	_____	_____
77. [ ]	Sirsalis Rille *Procellarum basin radial rilles*	III	-.25/-.85	_____	_____
78. [ ]	Lambert R *A buried "ghost" crater*	II	.4/-.32	_____	_____
79. [ ]	Sinus Aestuum *Eastern dark-mantle volcanic deposit*	II	.2/-.1	_____	_____
80. [ ]	Orientale basin *Youngest large impact basin*	III	-.4/-.9	_____	_____
81. [ ]	Hesiodus A *Concentric crater*	III	-.5/-.25	_____	_____

#	Object/Feature	Map	Lat/Lon	Date	Time
82. [ ]	Linnë *Small crater once thought to have disappeared*	I	.46/.18	_____	_____
83. [ ]	Plato craterlets *Crater pits at limits of detection*	II	.8/-.1	_____	_____
84. [ ]	Pitatus *Crater with concentric rilles*	III	-.5/-.2	_____	_____
85. [ ]	Langrenus rays *Aged ray system*	IV	-.15/.85	_____	_____
86. [ ]	Prinz Rilles *Rille system near the crater Prinz*	II	.44/-.64	_____	_____
87. [ ]	Humboldt *Crater with central peaks & dark spots*	IV	-.45/.9	_____	_____
88. [ ]	Peary *Difficult-to-observe polar crater*	I	1.0/0	_____	_____
89. [ ]	Valentine Dome *Volcanic dome*	I	.5/.1	_____	_____
90. [ ]	Armstrong, Aldrin, & Collins *Small craters near the Apollo 11 landing site*	I	0/.4	_____	_____
91. [ ]	De Gasparis Rilles *Area with many rilles*	III	-.45/-.68	_____	_____

92. [ ]	Gylden Valley *Part of the Imbrium radial sculpture*	IV	-.1/0	_____	_____
93. [ ]	Dionysius rays *Unusual & rare dark rays*	I	.05/.3	_____	_____
94. [ ]	Drygalski *Large south-pole region crater*	III	-1.0/-.25	_____	_____
95. [ ]	Procellarum basin *The Moon's biggest basin?*	II	.1/-.8	_____	_____
96. [ ]	Leibnitz Mountains *Rim of South Pole-Aitken basin*	III	-1.0/-.2	_____	_____
97. [ ]	Inghirami Valley *Orientale basin ejecta*	III	-.7/-.7	_____	_____
98. [ ]	Imbrium lava flows *Mare lava-flow boundaries*	II	.5/-.5	_____	_____

#	Object/Feature	Map	Lat/Lon	Date	Time
99. [ ]	Ina *D-shaped young volcanic caldera*	I	.1/.1	_____	_____
100.[ ]	Mare Marginis swirls *Possible magnetic field deposits*	I	.25/1.0	_____	_____