

## Rules & Requirements for an SBAS Observing Certificate

1. You must be a member of the SBAS in good standing to receive a certificate.
2. No Go To or Push To aided attempts will be accepted. Reading charts and star hopping are essential skills in our hobby. (You may use these methods to confirm your findings.)
3. Honor system is in full effect. These lists benefit your knowledge of the sky. Cheating only cheats yourself and the SBAS membership. Observations will be verified against digital planetarium charts. You may be required to answer questions about the objects you observed to verify your work. You may also be asked to show one of these objects at a star party. Once a list is completed, it is assumed you are familiar with every object on that list to the point where you can find it again and describe it to another person.
4. Upon completion of a list, submit the original paper version in person to Coy Wagoner at an SBAS meeting, public star party, or informal observing at the Worley. No digital submissions will be accepted at this time.
5. No observations may overlap. If one object is on two lists, your observations must be done on separate dates/times for credit. Copies of your observing logs will be saved and later compared to additional lists to make sure nothing overlaps. No observations prior to January 1, 2015 will be accepted for credit.
6. Observations should be done on your own. If you observe an object in someone else's telescope or binoculars, the observation does not count unless you did the work to find it. Again, after completion, it is assumed you are capable of finding and describing objects on these lists.
7. Asking for help is permitted, but the hunt is yours to master. Questions related to objects you are unfamiliar with will be entertained, whether in person or via email.
8. To receive full credit, all required fields must be filled out. Upon verification, you will receive a certificate and your list(s) will be returned.

## Naked Eye Beginner Challenge

Object/Nickname	Constellation	Difficulty Rating	Date	Time	Moon Phase
Northern Cross	Cygnus	Easy			
Summer Triangle (Altair, Deneb, Vega)	Aquila/Cygnus/Lyra	Easy			
Milky Way	N/A	Easy			
Great Square of Pegasus	Pegasus	Easy			
Teapot asterism	Sagittarius	Easy			
Hyades	Taurus	Easy			
Pleiades	Taurus	Easy			
Big Dipper	Ursa Major	Easy			
Little Dipper	Ursa Minor	Moderate			
Head of the Dragon	Draco	Easy			
Keystone asterism	Hercules	Easy			
<b>Planets:</b>	<b>Jupiter</b>	<b>Saturn</b>	<b>Mars</b>	<b>Venus</b>	<b>Mercury</b>
<b>Date</b>					
<b>Time</b>					
<b>Constellation</b>				N/A	N/A
<b>Satellites:</b>	<b>Magnitude</b>	<b>Altitude (peak)</b>	<b>Date</b>	<b>Time</b>	
<b>ISS flyby</b>					
<b>Hubble Space Telescope flyby</b>					
<b>Tiangong flyby</b>					
<b>Iridium Flare</b>	<b>Magnitude</b>	<b>Duration (s)</b>	<b>Date</b>	<b>Time</b>	
<b>Name:</b>					
Satellite predictions can be found at <a href="http://heavens-above.com">heavens-above.com</a> by entering your geographic location.					

For planet observations, please include the constellation the planet is located in.

## Naked Eye Advanced Challenge

Object/Nickname	Constellation	Difficulty Rating	Date	Time	Moon Phase
Messier 44 (Beehive cluster)	Cancer	Easy			
Messier 31 (Andromeda Gx)	Andromeda	Easy			
Teapot asterism	Sagittarius	Easy			
NGC884/869 (Double Cluster)	Perseus	Easy			
Sagittarius Star Cloud	Sagittarius	Easy			
Albireo (Star)	Cygnus	Easy			
Sagitta (Constellation)	Sagitta	Easy			
Melotte 111 (Coma Cluster)	Coma Berenices	Moderate			
Melotte 20 (Alpha Persei Group)	Perseus	Moderate			
Ptolemy Cluster (Messier 7)	Scorpius	Moderate			
Butterfly Cluster (Messier 6)	Scorpius	Moderate			
Coathanger Cluster	Vulpecula	Moderate			
Lagoon Nebula	Sagittarius	Moderate			
Omega Centauri	Centaurus	Moderate			
Messier 35	Gemini	Difficult			
Eagle & Swan Nebula	Sagittarius	Difficult			
Planet Conjunction		Moderate			
Planet/Moon Conjunction		Moderate			
Planet/Star Conjunction		Moderate			
<b>Satellites:</b>	<b>Magnitude</b>	<b>Altitude (peak)</b>	<b>Date</b>	<b>Time</b>	
ISS flyby (Bright)	-3.5 to -4.0				
Hubble Space Telescope flyby					
Tiangong flyby					
<b>Iridium Flare (-7.0 or brighter)</b>	<b>Magnitude</b>	<b>Duration (s)</b>	<b>Date</b>	<b>Time</b>	
<b>Name:</b>					
Satellite predictions can be found at <a href="http://heavens-above.com">heavens-above.com</a> by entering your geographic location.					

For conjunctions, please include the name of the respective planet(s) or star(s).  
 Some conjunctions may occur over the course of a few days with the exception of Moon/Planet conjunctions.  
 All objects on this list are visible at the Worley Observatory. Some may be more difficult to see than others.

## SBAS “Fun” Challenge

Object	Nickname	Type	Constellation	Date	Time	Moon Phase
NGC457	ET Cluster	OC	Cassiopeia			
Asterism in NGC869	Smiling Cyclops	Asterism	Perseus			
NGC2169	37 Cluster	OC	Orion			
NGC6543	Cat’s Eye Nebula	PN	Draco			
Albireo	“Greg’s Double”	DS	Cygnus			
Hubble’s Variable Nebula (NGC2261)	“Raney’s Comet”	N	Gemini			
Messier 57 (Ring)	“Reid’s Cheerio”	PN	Lyra			
Messier 78	“Matheson Prowler”	N	Orion			
NGC2264	Christmas Tree Cluster	OC	Monoceros			
Collinder 399	Coathanger	OC	Vulpecula			
Asterism in Messier 13	Propeller	Asterism	Hercules			
Lunar X	Blanchinus, La Caille & Purbach craters	Lunar feature				~First Quarter
Lunar S	Kant crater & Mons Penck	Lunar feature				Before First Quarter
Lunar V	Near Ukert crater	Lunar feature				~First Quarter
Rupes Recta	"The Wall"	Lunar feature				After Half
Lunar Earthshine	(Naked eye)	Lunar feature				
Ceres	Observe twice for movement	Asteroid		1: 2:	1: 2:	
Vesta	Observe twice for movement	Asteroid		1: 2:	1: 2:	
Jupiter’s GRS		Surface feature				
Jupiter moon transit	Shadow transit					
Cassini Division	In Saturn’s Rings	Ring feature				
Venus as crescent	(Max Elongation)					
<b>Note: Do not observe Venus if too close to the sun. Only observe Venus after sunset or before sunrise.</b>	<b>Nicknames above in quotes are not official, but rather, named for members of the SBAS.</b>					
GX-Galaxy. OC-Open Cluster. N-Nebula. PN-Planetary Nebula. GC-Globular Cluster. DS-Double Star.						

## Worley Two For One List

Nickname	Object 1	Type	Object 2	Type	Magnitudes	Constellation	Date	Time	Aperture/Magnification	Moon
Double Cluster	NGC884	OC	NGC869	OC	6.1, 5.3	Perseus				
Kemble's Cascade	K1	OC	NGC1502	OC	7.0, 6.9	Camelopardalis				
Gemini Pair	NGC2158	OC	Messier 35	OC	8.9, 5.1	Gemini				
Bode & Cigar	Messier 81	GX	Messier 82	GX	7.9, 9.3	Ursa Major				
Puppis Pair	Messier 46	OC	NGC2438	PN	6.1, 11.5	Puppis				
Fireworks	NGC6939	GX	NGC6946	OC	7.8, 9.6	Cepheus				
Andromeda Pair	NGC752	OC	56 And	DS	5.7, 5.7/6.1	Andromeda				
Antennae Galaxies	NGC4038	GX	NGC4039	GX	10.3	Corvus				
Andromeda Galaxies	Messier 31	GX	Messier 32	GX	3.4, 8.1	Andromeda				
Mirach's Ghost	Mirach	S	NGC404	GX	2.1, 10.3	Andromeda				
Andromeda's Neighbors	NGC185	GX	NGC147	GX	9.2, 9.5	Cassiopeia				
Cetus Pair	NGC246	PN	NGC255	GX	8.0, 11.8	Cetus				
Ink Spot	NGC6520	OC	Barnard 86	DN	7.6, N/A	Sagittarius				
Whirlpool	Messier 51	GX	NGC5195	GX	8.4, 9.6	Canes Venatici				
Orion Pair	Messier 42	N	Messier 43	N	3.0, 9.0	Orion				
Cassiopeia Pair	NGC663	OC	NGC654	OC	7.1, 6.5	Cassiopeia				
Hercules Pair	Messier 13	GC	NGC6207	GX	5.8, 11.6	Hercules				
Leo Pair #1	Messier 65	GX	Messier 66	GX	9.3, 8.9	Leo				
Leo Pair #2	Messier 95	GX	Messier 96	GX	9.7, 9.3	Leo				
Leo Pair #3	Messier 105	GX	NGC3371	GX	9.3, 9.9	Leo				

List of objects with more than one deep sky object in the same field of view.

May require low power and a wide field eyepiece.

GX-Galaxy. OC-Open Cluster. N-Nebula. PN-Planetary Nebula. GC-Globular Cluster. DS-Double Star.

## Worley Galaxies

Object	Constellation	Size	Mag	Rating	Date	Time	Instrument/ Magnification	Moon
NGC2903	Leo	12.6'x6.0'	9.0	Easy				
NGC3628	Leo	13.1'x3.1'	9.5	Moderate				
Messier 33 (Pinwheel)	Triangulum	68.7'x41.6'	5.7	Easy				
Messier 101	Ursa Major	28.8'x26.9'	7.9	Moderate				
Messier 51 (Whirlpool)	Canes Venatici	11.2'x6.9'	8.4	Easy				
NGC6207	Hercules	3.0'x1.2'	11.6	Difficult				
NGC4631 (Whale)	Canes Venatici	15.2'x2.8'	9.2	Easy				
Messier 64 (Black Eye)	Coma Berenices	10.0'x5.4'	8.5	Easy				
NGC4565 (Needle)	Coma Berenices	15.8'x2.1'	9.6	Easy				
Messier 83	Hydra	12.9'x11.5'	7.5	Easy				
Messier 104 (Sombrero)	Corvus	8.6'x4.2'	8.0	Easy				
NGC7331	Pegasus	10.2'x4.2'	9.5	Moderate				
Messier 102 (Spindle)	Draco	6.5'x3.1'	9.9	Moderate				
NGC5907	Draco	12.6'x1.4'	10.3	Difficult				
Messier 49	Virgo	10.2'x8.3'	8.4	Easy				
Messier 61	Virgo	6.5'x5.9'	9.7	Easy				
Messier 98	Coma Berenices	9.8'x2.8'	10.1	Easy				
Messier 99 (Coma Pinwheel)	Coma Berenices	5.3'x4.6'	9.9	Easy				
Messier 100	Coma Berenices	7.5'x6.1'	9.4	Easy				
Messier 85	Coma Berenices	7.1'x5.5'	9.1	Easy				
Messier 110	Andromeda	19.5'x11.5'	8.1	Moderate				
NGC5128 (Hamburger)	Centaurus	25.7'x20.0'	6.8	Difficult				
NGC147	Cassiopeia	13.2'x7.8'	9.5	Moderate				
NGC185	Cassiopeia	8.0'x7.0'	9.2	Moderate				
NGC253 (Sculptor)	Sculptor	29.0'x6.8'	7.2	Easy				

All objects on this list are visible at the Worley Observatory. Some may be more difficult to see than others.

### Worley Globular Clusters

Object	Constellation	Size	Mag	Difficulty	Date	Time	Moon Phase	Core visible? Y/N	Stars resolve? Y/N
<b>Messier 13</b>	Hercules	3.4'	5.8	Easy					
<b>Messier 92</b>	Hercules	2.0'	6.4	Easy					
<b>Messier 3</b>	Canes Venatici	4.6'	6.2	Easy					
<b>Messier 53</b>	Coma Berenices	2.6'	7.6	Easy					
<b>Messier 68</b>	Hydra	3.0'	7.8	Difficult					
<b>Messier 71</b>	Sagitta	3.3'	8.2	Moderate					
<b>Messier 4</b>	Scorpius	8.7'	5.6	Moderate					
<b>Messier 56</b>	Lyra	2.2'	8.3	Moderate					
<b>Messier 10</b>	Ophiuchus	3.9'	6.6	Easy					
<b>Messier 12</b>	Ophiuchus	3.5'	6.7	Easy					
<b>Messier 14</b>	Ophiuchus	2.6'	7.6	Easy					
<b>Messier 2</b>	Aquarius	2.1'	6.5	Easy					
<b>Messier 5</b>	Serpens	3.5'	5.6	Easy					
<b>Messier 15</b>	Pegasus	2.0'	6.2	Easy					
<b>Messier 19</b>	Ophiuchus	2.6'	6.8	Moderate					
<b>NGC6284</b>	Ophiuchus	1.3'	8.8	Difficult					
<b>NGC6287</b>	Ophiuchus	1.5'	9.4	Moderate					
<b>NGC7006</b>	Delphinus	0.9'	10.6	Difficult					
<b>NGC2419 (Intergalactic Wanderer)</b>	Lynx	1.8'	10.4	Difficult					
<b>NGC5139 (Omega Centauri)</b>	Centaurus	10.0'	3.7	Easy					

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### Worley Planetary Nebula Challenge

Object/Nickname	Constellation	Size	Mag	Difficulty	Date	Time	Moon Phase
<b>Messier 97 (Owl)</b>	Ursa Major	3.4'x3.3'	9.8	Difficult			
<b>NGC2392 (Eskimo)</b>	Gemini	0.8'x0.7'	9.2	Easy			
<b>NGC6543 (Cat's Eye)</b>	Draco	0.4'x0.3'	8.1	Moderate			
<b>NGC3242 (Ghost of Jupiter)</b>	Hydra	0.7'x0.6'	7.3	Easy			
<b>NGC7008 (Fetus)</b>	Cygnus	1.6'x1.2'	11.0	Moderate			
<b>Messier 57 (Ring)</b>	Lyra	1.4'x1.1'	8.8	Easy			
<b>Messier 1 (Crab)</b>	Taurus	6.0'x4.0'	8.4	Easy			
<b>NGC6818 (Little Gem)</b>	Sagittarius	0.4'x0.2'	9.4	Easy			
<b>NGC2438 (PN inside Messier 46)</b>	Puppis	1.2'x1.1'	11.5	Moderate			
<b>NGC7662 (Blue Snowball)</b>	Andromeda	0.5'x0.5'	8.3	Easy			
<b>Messier 27 (Dumbbell)</b>	Vulpecula	8.0'x5.7'	7.1	Easy			
<b>Messier 76 (Little Dumbbell)</b>	Perseus	2.7'x1.8'	10.1	Moderate			
<b>NGC6826 (Blinking Planetary)</b>	Cygnus	2.1'	8.9	Easy			
<b>NGC7009 (Saturn PN)</b>	Aquarius	0.5'x0.4'	7.8	Moderate			
<b>NGC6905 (Blue Flash)</b>	Delphinus	0.8'x0.6'	10.9	Moderate			
<b>NGC3132 (8 Burst)</b>	Vela	1.0'x0.7'	9.7	Easy			
<b>NGC7026</b>	Cygnus	0.5'x0.2'	10.9	Easy			
<b>NGC7027</b>	Cygnus	0.3'x0.2'	8.5	Easy			
<b>NGC40 (Bow Tie)</b>	Cepheus	0.6'x0.6'	10.6	Difficult			
<b>NGC7293 (Helix)</b>	Aquarius	14.7'x12.0'	7.6	Difficult			

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