

The Ace Amateur Astronomer Programme (AAA)

Field Guide and Certificate Sheets for RASC Outreach Volunteers

Tony Schellinck, Halifax Centre, March 2018

The Ace Amateur Astronomer Programme has been developed as a tool for binocular users to enhance the experience and value of an evening of outreach. The programme is designed for amateur astronomers where one or more RASC members provides a sky tour and shows participants how to find DSOs with binoculars. The programme helps participants find and observe at least five DSOs in an evening, provides a record of the objects they found, and gives them a sense of accomplishment by achieving the status of Ace Amateur Astronomer. Perhaps they will be motivated to learn more about the night sky and to enjoy observing with binoculars or telescopes in the future.

The primary material to be distributed is the monthly AAA sheet listing approximately two dozen objects that can be observed near astronomical twilight that month. Twelve separate sheets, one for each month are on the pages that follow this description and can be printed off separately. Each sheet has a table: the first column contains the DSO name (e.g., M35 Open Cluster); the second column indicates the relative ease with which the DSO can be located and observed (easy, fairly easy, less easy); the third column provides a description that includes the type of object and in which constellation it is to be found. The fourth column leaves a space for a check mark to indicate that the individual has observed the object.

The first six observable objects are the same for each sheet: 1. Saturn's Rings, 2. Jupiter's Moons, 3. Venus Crescent, 4. Mars, 5. Moon Craters, and 6. Mizar & Alcor. Except for Mizar and Alcor, these objects may not be visible every night but are included on the list for those nights that they are. In my experience, most participants want to observe these objects if at all possible so I have set goals for observing them that are within the scope of binocular viewing on a clear night. Some RASC volunteers may have objects they prefer to show people in a particular month, or they are observing later in the night when other objects can be found. You may add objects to the bottom of the list for any evening.

I often print off several copies of the current month's sky map from skymaps.com for distribution with the AAA certificates. I make sure that all the objects I show participants are displayed on the map and described on the accompanying page so that they have something to take home and will know where to look if they want to venture out themselves to observe the night sky.



Participants need to have access to binoculars to observe. I purchased 15 pairs (10x35, 8x40 and 7x35) from Canadian Tire when they were on sale. Each Canadian Tire (CT) store price matches so always ask to see if other CT stores nearby have the binoculars on sale. I created a binocular table with the binoculars under one plastic container to keep the dew off them when they are not in use, and a second container covering the paper handouts for the same reason (see photo). The containers are then used to store the binoculars and handout material afterwards. Your RASC centre may consider purchasing ten to fifteen pair of binoculars to create a binocular table

that could be used by outreach volunteers at star parties and other outreach events.

There is also a video called *The Magnificent Sky—a Weekend at Kejimikujik Dark Sky Preserve* on YouTube that describes the binocular table and the AAA programme (<https://www.youtube.com/watch?v=zJ4bq-Um1xU>) or (search for RASC Halifax on www.YouTube.com).

If I am doing outreach with smaller crowds I try to have a fellow RASC member accompany me with a telescope. While I am giving my talk, they are focusing their scope on many of the objects we are viewing through binoculars that evening. This way participants can see the objects up close and can better appreciate what they are seeing through binoculars.

At a larger Star Party, I will typically have three to four shows lasting 20 to 30 minutes each. I gather together between 10 to 25 people at a time and begin the instructions. I don't worry about optimizing the focus in both eyes using the dioptic focus. Instead I show them how to carefully focus on a star until it is sharp. Sometimes one or two people are having problems so I help them adjust the width of the eyepieces and focusing. Once everyone can see through the binoculars reasonably well I use my laser pointer to select the easiest targets and those that are setting in the west. Mizar and Alcor are always a good starting target as participants can test the focus of their binoculars and their eyesight in seeing Alcor without binoculars. I point out that in ancient times it was a test for eyesight, though Alcor may have been dimmer in past centuries and thus more of a challenge. My next target, if it is in the sky, is Andromeda, as few people have ever seen it. Finding and observing another galaxy by oneself is a life changing experience for many, and it is something they can easily repeat later. While people are viewing each target, I give a brief description of that object; explaining what galaxies, open clusters, globular clusters, multiple star systems, etc. are. This makes the viewing experience much more interesting and memorable for them. Other easy targets that are picked first because they are bright and easily located are M22 the globular cluster, M42 the Orion Nebula, M44 the Beehive, M45 Pleiades, Hyades, M8 the Lagoon Nebula, M7 and M6 the Ptolemy and Butterfly clusters, Cr 399 the Coathanger, and the Double Double in Lyra.

Once people have mastered finding the easy targets, I move on to those targets on the AAA list that are more of a challenge but still fairly easy. These would include the other DSOs around the Teapot such as M20 the Trifid Nebula, M17 the Swan Nebula, M16 the Eagle Nebula in Serpens, and the open cluster M25. M4 the globular cluster also can be found at this point. Going back to the Coathanger, Albireo can be spotted by many as a double star, using the flat side of the Coathanger as a pointer to it.

I often have a group of keeners who may stay through two or more shows and then hang around when most of the others have left. This is when I show them how to be sure their binoculars are adjusted and focused correctly and then we start looking for the less easy objects on the AAA list.

Often, after taking a group of participants through the AAA list, I invite them to take the binoculars and show someone else how to find the easy DSOs. On occasion, all my binoculars are out in the field being used to show others how to find DSOs. Often it is one family member showing others in the family how to find these objects.

I recommend you do a rehearsal under a clear sky before doing a show. If you cannot easily locate and see an object then chances are you will have a tough time showing a group of complete novices how to find it.

Please share your experience and send suggested improvements for the AAA programme to schell@dal.ca and put AAA in the subject heading.


Good luck,

Tony Schellinck, Halifax RASC Centre

Become an *Ace Amateur Astronomer*: Find Five DSOs!

Your Name _____

Binocular Deep Sky Objects Observable in *January*

Deep Sky Object	Ease to Find	Description	Saw It
1. Saturn's Rings	Easy	The rings make Saturn look oblong in shape 	
2. Jupiter's Moons	Fairly easy	A steady hand and larger aperture reveal four moons	
3. Venus Crescent	Easy	See Venus's phases as it circles the Sun	
4. Mars	Easy	See the red disk of Mars	
5. Moon Craters	Easy	Discover how many moon craters you can see with binoculars	
6. Mizar & Alcor	Easy	Double star, middle star in the handle of the Big Dipper	
7. M31 Galaxy	Easy	Andromeda Galaxy in Andromeda	
8. M42 Orion Nebula	Easy	Large bright nebula, Orion's sword below his belt	
9 Double Cluster	Fairly easy	Two bright, sparse open clusters near each other in Perseus	
10. v Draconis Double	Less easy	A wide pair of white stars in the head of Draco the Dragon	
11. M33 Galaxy	Less easy	Triangulum Galaxy in Triangulum	
12. Hyades Open Cluster	Easy	Open cluster forming the head of Taurus the Bull	
13. M45 Open Cluster	Easy	Pleiades, an open cluster above the head of Taurus the Bull	
14. M35 Open Cluster	Fairly Easy	Open cluster above Castor's foot in Gemini	
15. M36 Open Cluster	Fairly Easy	Open cluster in Auriga	
16. M37 Open Cluster	Fairly Easy	Open cluster in Auriga	
17. M38 Open Cluster	Fairly Easy	Open cluster in Auriga	
18. M44 Open Cluster	Easy	Beehive open cluster in Cancer	
Rising in the East after sunset			
19. M41 Open Cluster	Easy	Open cluster in Canis Major just below the star Sirius	
20. M46 M47 Open Clusters	Less easy	Two open clusters in Puppis	
21. M48 Open Cluster	Less easy	A large open cluster in Puppis	
22. NGC 2244 Open Cluster	Less easy	Open cluster in Monoceros	
23. NGC 2232 Open Cluster	Less easy	Open cluster in Monoceros	
Low in the West at sunset			
24. M39 Open Cluster	Less easy	Open cluster in Cygnus above the bright star Deneb	
25.			
26.			

I attest that this person has found at least five of these deep sky objects on his or her own and therefore qualifies as an *Ace Amateur Astronomer*.


Royal Astronomical Society of Canada Member

Go to Skymaps.com each month to download a map of the night sky and a listing of objects that can be found with binoculars.

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Your Name _____

Binocular Deep Sky Objects Observable in *February*

Deep Sky Object	Ease to Find	Description	Saw It
1. Saturn's Rings	Easy	The rings make Saturn look oblong in shape 	
2. Jupiter's Moons	Fairly easy	A steady hand and larger aperture reveal four moons	
3. Venus Crescent	Easy	See Venus's phases as it circles the Sun	
4. Mars	Easy	See the disk of Mars; it is more than a red star	
5. Moon Craters	Easy	Discover how many moon craters you can see with binoculars	
6. Mizar & Alcor	Easy	Double star, middle star in the handle of the Big Dipper	
7. M42 Orion Nebula	Easy	Large bright nebula, Orion's sword below his belt	
8. Double Cluster	Fairly easy	Two bright, sparse open clusters near each other in Perseus	
9. v Draconis Double	Less easy	A wide pair of white stars in the head of Draco the Dragon	
10. Hyades Open Cluster	Easy	Open cluster forming the head of Taurus the Bull	
11. M45 Open Cluster	Easy	Pleiades, an open cluster above the head of Taurus	
12. M35 Open Cluster	Fairly Easy	Open cluster above Castor's foot in Gemini	
13. M36, M37, M38	Fairly Easy	Open clusters in Auriga (if you see at least one of them)	
14. M44 Open Cluster	Easy	Beehive open cluster in Cancer	
15. M41 Open Cluster	Easy	Open cluster in Canis Major just below the star Sirius	
16. M46 M47 Open Clusters	Less easy	Two open clusters in Puppis	
17. M48 Open Cluster	Less easy	A large open cluster in Puppis	
18. NGC 2244 Open Cluster	Less easy	Open cluster in Monoceros	
19. NGC 2232 Open Cluster	Less easy	Open cluster in Monoceros	
Low in the west at sunset			
20. M39 Open Cluster	Less easy	Open cluster in Cygnus above the bright star Deneb	
21. M31 Galaxy	Easy	Andromeda Galaxy in Andromeda – visible to the naked eye	
22. M33 Galaxy	Less easy	Triangulum Galaxy in Triangulum	
23.			
24.			

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Your Name _____

Binocular Deep Sky Objects Observable in *March*

Deep Sky Object	Ease to Find	Description	Saw It
1. Saturn's Rings	Easy	The rings make Saturn look oblong in shape 	
2. Jupiter's Moons	Fairly easy	A steady hand and larger aperture reveal four moons	
3. Venus Crescent	Easy	See Venus's phases as it circles the Sun	
4. Mars	Easy	See the disk of Mars; it is more than a red star	
5. Moon Craters	Easy	Discover how many moon craters you can see with binoculars	
6. Mizar & Alcor	Easy	Double star, middle star in the handle of the Big Dipper	
7. M42 Orion Nebula	Easy	Large nebula, Orion's sword below his belt	
8. Double Cluster	Fairly easy	Two bright, sparse open clusters near each other in Perseus	
9. v Draconis Double	Less easy	A wide pair of white stars in the head of Draco the Dragon	
10. Hyades Open Cluster	Easy	Open cluster forming the head of Taurus the Bull	
11. M45 Open Cluster	Easy	Pleiades, an open cluster above the head of Taurus	
12. M35 Open Cluster	Fairly Easy	Open cluster above Castor's foot in Gemini	
13. M36, M37, M38	Fairly Easy	Open clusters in Auriga (if you see at least one of them)	
14. M44 Open Cluster	Easy	Beehive open cluster in Cancer	
15. M41 Open Cluster	Easy	Open cluster in Canis Major just below the star Sirius	
16. M46 M47 Open Clusters	Less easy	Two open clusters in Puppis	
17. M48 Open Cluster	Less easy	A large open cluster in Puppis	
18. NGC 2244 Open Cluster	Less easy	Open cluster in Monoceros	
19. NGC 2232 Open Cluster	Less easy	Open cluster in Monoceros	
Low in the west at sunset			
20. M31 Galaxy	Easy	Andromeda Galaxy in Andromeda – visible to the naked eye	
21. M33 Galaxy	Less easy	Triangulum Galaxy in Triangulum	
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Your Name _____

Binocular Deep Sky Objects Observable in *April*

Deep Sky Object	Ease to Find	Description	Saw It
1. Saturn's Rings	Easy	The rings make Saturn look oblong in shape 	
2. Jupiter's Moons	Fairly easy	A steady hand and larger aperture reveal four moons	
3. Venus Crescent	Easy	See Venus's phases as it circles the Sun	
4. Mars	Easy	See the disk of Mars; it is more than a red star	
5. Moon Craters	Easy	Discover how many moon craters you can see with binoculars	
6. Mizar & Alcor	Easy	Double star, middle star in the handle of the Big Dipper	
7. M42 Orion Nebula	Easy	Large nebula, Orion's sword below his belt	
8. Double Cluster	Fairly easy	Two bright, sparse open clusters near each other in Perseus	
9. v Draconis Double	Less easy	A wide pair of white stars in the head of Draco the Dragon	
10. Hyades Open Cluster	Easy	Open cluster forming the head of Taurus the Bull	
11. M45 Open Cluster	Easy	Pleiades, an open cluster above the head of Taurus	
12. M35 Open Cluster	Fairly Easy	Open cluster above Castor's foot in Gemini	
13. M36, M37, M38	Fairly Easy	Open clusters in Auriga (if you see at least one of them)	
14. M44 Open Cluster	Easy	Beehive open cluster in Cancer	
15. Mel 111 Open Cluster	Fairly Easy	Coma Cluster in Coma Berenices	
16. M41 Open Cluster	Easy	Open cluster in Canis Major just below the star Sirius	
17. M46 M47 Open Clusters	Less easy	Two open clusters in Puppis	
18. M48 Open Cluster	Less easy	A large open cluster in Puppis	
19. NGC 2244 Open Cluster	Less easy	Open cluster in Monoceros	
20. NGC 2232 Open Cluster	Less easy	Open cluster in Monoceros	
21. M13 Globular Cluster	Less easy	Globular cluster in Hercules (keystone)	
Low in the west at sunset			
22. M31 Galaxy	Easy	Andromeda Galaxy in Andromeda – visible to the naked eye	
23. M33 Galaxy	Less easy	Triangulum Galaxy in Triangulum	
24.			
25.			

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Your Name _____

Binocular Deep Sky Objects Observable in *May*

Deep Sky Object	Ease to Find	Description	Saw It
1. Saturn's Rings	Easy	The rings make Saturn look oblong in shape 	
2. Jupiter's Moons	Fairly easy	A steady hand and larger aperture reveal four moons	
3. Venus Crescent	Easy	See Venus's phases as it circles the Sun	
4. Mars	Easy	See the disk of Mars; it is more than a red star	
5. Moon Craters	Easy	Discover how many moon craters you can see with binoculars	
6. Mizar & Alcor	Easy	Double star, middle star in the handle of the Big Dipper	
7. Double cluster	Fairly easy	Two bright, sparse open clusters near each other in Perseus	
8. v Draconis Double	Less easy	A wide pair of white stars in the head of Draco the Dragon	
9. Hyades Open Cluster	Easy	Open cluster forming the head of Taurus the Bull	
10. M45 Open Cluster	Easy	Pleiades, an open cluster above the head of Taurus	
11. M36, M37, M38	Fairly Easy	Open clusters in Auriga (if you see at least one of them)	
12. M44 Open Cluster	Easy	Beehive open cluster in Cancer	
13. Mel 111 Coma Berenices	Fairly Easy	Coma Cluster in Coma Berenices	
14. M41 Open Cluster	Easy	Open cluster in Canis Major just below the star Sirius	
15. M46 M47 Open Clusters	Less easy	Two open clusters in Puppis	
16. M48 Open Cluster	Less easy	A large open cluster in Puppis	
17. NGC 2244 Open Cluster	Less easy	Open cluster in Monoceros	
18. NGC 2232 Open Cluster	Less easy	Open cluster in Monoceros	
19. M13 Globular Cluster	Less easy	Globular cluster in Hercules (keystone)	
20. Cr 399 Asterism		The Coathanger near the head of the Swan; in Vulpecula	
21. Albireo		A colourful pair of stars at the head of Cygnus	
22. M12		Globular cluster in Ophiuchus; close to the brighter M10	
23. M10		Globular cluster in Ophiuchus; 3° from the fainter M12	
Low in the west at sunset			
24. M35 Open Cluster	Fairly Easy	Open cluster above Castor's foot in Gemini	
25.			
26.			

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Your Name _____

Binocular Deep Sky Objects Observable in *June*

Deep Sky Object	Ease to Find	Description	Saw It
1. Saturn's Rings	Easy	The rings make Saturn look oblong in shape 	
2. Jupiter's Moons	Fairly easy	A steady hand and larger aperture reveal four moons	
3. Venus Crescent	Easy	See Venus's phases as it circles the Sun	
4. Mars	Easy	See the disk of Mars; it is more than a red star	
5. Moon Craters	Easy	Discover how many moon craters you can see with binoculars	
6. Mizar & Alcor	Easy	Double star, middle star in the handle of the Big Dipper	
7. ε Lyra Double Star	Easy	The Double Double, a pair of stars in Lyra near Vega	
8. Mel 111 Open Cluster	Fairly easy	Coma cluster in Coma Berenices	
9. v Draconis Double Star	Less easy	A wide pair of white stars in the head of Draco the Dragon	
10. M13 Globular Cluster	Less easy	Globular cluster in Hercules	
11. M3 Globular Cluster	Less easy	A globular cluster in Canes Venatici, near Bootes	
12. M39 Open Cluster	Less easy	Open cluster in Cygnus above the bright star Deneb	
13. Cr 399 Asterism	Fairly easy	The Coathanger near the head of the Swan; in Vulpecula	
14. Albireo Double Star	Fairly easy	A colourful pair of stars at the head of Cygnus	
15. M10 and M12	Less easy	Globular clusters 3° apart in Ophiuchus	
16. IC 4665 Open Cluster	Less easy	Summer Beehive - Large, scattered open cluster in Ophiuchus	
17. M8 Nebula	Fairly easy	Lagoon Nebula in Sagittarius	
18. M20 Nebula	Fairly easy	Trifid Nebula just above Lagoon Nebula, smaller & fainter than M8	
19. M25 Open Cluster	Fairly Easy	Bright open cluster north of teapot lid (Sagittarius)	
20. M17 Nebula	Less easy	Swan or Omega Nebula in Serpens	
21. M16 Nebula	Less easy	Eagle Nebula in Serpens	
22. M22 Globular Cluster	Easy	Large globular cluster in Sagittarius near the lid of the Teapot	
23.			
24.			

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Your Name _____

Binocular Deep Sky Objects Observable in *July*

Deep Sky Object	Ease to Find	Description	Saw It
1. Saturn's Rings	Easy	The rings make Saturn look oblong in shape 	
2. Jupiter's Moons	Fairly easy	A steady hand and larger aperture reveal four moons	
3. Venus Crescent	Easy	See Venus's phases as it circles the Sun	
4. Mars	Easy	See the disk of Mars; it is more than a red star	
5. Moon Craters	Easy	Discover how many moon craters you can see with binoculars	
6. Mizar & Alcor	Easy	Double star, middle star in the handle of the Big Dipper	
7. ε Lyra Double Star	Easy	The Double Double, a pair of stars in Lyra near Vega	
8. Mel 111 Open Cluster	Fairly easy	Coma Cluster in Coma Berenices	
9. Cr 399 Asterism	Fairly easy	The Coathanger near the head of the Swan; in Vulpecula	
10. Albireo Double Star	Fairly easy	A colourful pair of stars at the head of Cygnus	
11. Double Cluster	Fairly easy	Two bright, sparse open clusters near each other in Perseus	
12. v Draconis Double Star	Less easy	A wide pair of white stars in the head of Draco the Dragon	
13. M13 Globular Cluster	Less easy	Globular cluster in Hercules	
14. M3 Globular Cluster	Less easy	A globular cluster in Canes Venatici, near Bootes, a challenge to see. Looks like a fuzzy star.	
15. M39 Open Cluster	Less easy	Open cluster in Cygnus. above the bright star Deneb	
16. M10 M12 Globular Clusters	Less easy	Globular clusters in Ophiuchus 3° apart	
Looking Toward the South Horizon			
17. M6 Open Cluster	Easy	Butterfly Cluster in Scorpius	
18. M7 Open Cluster	Easy	Ptolemy Cluster in Scorpius	
19. M22 Globular Cluster	Easy	Large globular cluster in Sagittarius near the lid of the Teapot	
20. M8 Nebula	Easy	Lagoon Nebula in Sagittarius	
21. M4 Globular Cluster	Fairly easy	Globular cluster next to Antares in Scorpio	
22. M25 Open Cluster	Fairly Easy	Bright open cluster north of teapot lid (Sagittarius)	
23. M17 Nebula	Fairly Easy	Swan or Omega Nebula in Serpens	
24. M16 Nebula	Less easy	Eagle Nebula in Serpens	
25. IC 4665 Open Cluster	Less easy	Summer Beehive - Large, scattered open cluster in Ophiuchus	
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Your Name _____

Binocular Deep Sky Objects Observable in *August*

Deep Sky Object	Ease to Find	Description	Saw It
1. Saturn's Rings	Easy	The rings make Saturn look oblong in shape 	
2. Jupiter's Moons	Fairly easy	A steady hand and larger aperture reveal four moons	
3. Venus Crescent	Easy	See Venus's phases as it circles the Sun	
4. Mars	Easy	See the disk of Mars; it is more than a red star	
5. Moon Craters	Easy	Discover how many moon craters you can see with binoculars	
6. Mizar & Alcor	Easy	Double star, middle star in the handle of the Big Dipper	
7. ε Lyra Double Star	Easy	The Double Double, a pair of stars in Lyra near Vega	
5. M31 Galaxy	Easy	Andromeda Galaxy in Andromeda – visible to the naked eye	
6. Cr 399 Asterism	Fairly easy	The Coathanger near the head of the Swan; in Vulpecula	
7. Albireo Double Star	Fairly easy	A colourful pair of stars at the head of Cygnus	
8. Double Cluster	Fairly easy	Two bright, sparse open clusters near each other in Perseus	
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10. M13 Globular Cluster	Less easy	Globular cluster in Hercules	
11. M3 Globular Cluster	Less easy	A globular cluster in Canes Venatici, near Bootes, a challenge to see	
12. M39 Open Cluster	Less easy	Open cluster in Cygnus above the bright star Deneb	
13. M10 M12	Less easy	Globular clusters in Ophiuchus 3° apart	
Looking Toward the South Horizon			
15. M6 Open Cluster	Easy	Butterfly Cluster in Scorpius	
16. M7 Open Cluster	Easy	Ptolemy Cluster in Scorpius	
17. M22 Globular Cluster	Easy	Large globular cluster in Sagittarius near the lid of the Teapot	
18. M8 Nebula	Fairly easy	Lagoon Nebula in Sagittarius	
19. M20 Nebula	Fairly easy	Trifid Nebula just above Lagoon Nebula, smaller & fainter than M8	
20. M4 Globular Cluster	Fairly easy	Globular cluster next to Antares in Scorpio	
21. M25 Open Cluster	Fairly Easy	Bright open cluster north of teapot lid (Sagittarius)	
22. M17 Nebula	Less easy	Swan or Omega Nebula in Serpens	
23. M16 Nebula	Less easy	Eagle Nebula in Serpens	
25. IC 4665 Open Cluster	Less easy	Summer Beehive - Large, scattered open cluster in Ophiuchus	
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Your Name _____

Binocular Deep Sky Objects Observable in *September*

Deep Sky Object	Ease to Find	Description	Saw It
1. Saturn's Rings	Easy	The rings make Saturn look oblong in shape 	
2. Jupiter's Moons	Fairly easy	A steady hand and larger aperture reveal four moons	
3. Venus Crescent	Easy	See Venus's phases as it circles the Sun	
4. Mars	Easy	See the disk of Mars; it is more than a red star	
5. Moon Craters	Easy	Discover how many moon craters you can see with binoculars	
6. Mizar & Alcor	Easy	Double star, middle star in the handle of the Big Dipper	
7. ε Lyra Double Star	Easy	The Double Double, a pair of stars in Lyra near Vega	
8. M31 Galaxy	Easy	Andromeda Galaxy in Andromeda – visible to the naked eye	
9. Cr 399 Asterism	Fairly easy	Coathanger, near the head of the Swan; in Vulpecula	
10. Albireo Double Star	Fairly easy	A colourful pair of stars at the head of Cygnus	
11. Double Cluster	Fairly easy	Two bright, sparse open clusters near each other in Perseus	
12. v Draconis Double Star	Less easy	A wide pair of white stars in the head of Draco the Dragon	
13. M13 Globular Cluster	Less easy	Globular cluster in Hercules	
14. M3 Globular Cluster	Less easy	A globular cluster in Canes Venatici, near Bootes	
15. M39 Open Cluster	Less easy	Open cluster in Cygnus above the bright star Deneb	
Looking Toward the South Horizon			
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Become an *Ace Amateur Astronomer*: Find Five DSOs!

Your Name _____

Binocular Deep Sky Objects Observable in *October*

Deep Sky Object	Ease to Find	Description	Saw It
1. Saturn's Rings	Easy	The rings make Saturn look oblong in shape 	
2. Jupiter's Moons	Fairly easy	A steady hand and larger aperture reveal four moons	
3. Venus Crescent	Easy	See Venus's phases as it circles the Sun	
4. Mars	Easy	See the disk of Mars; it is more than a red star	
5. Moon Craters	Easy	Discover how many moon craters you can see with binoculars	
6. Mizar & Alcor	Easy	Double star, middle star in the handle of the Big Dipper	
7. ε Lyra Double Star	Easy	The Double Double, a pair of stars in Lyra near Vega	
8. M31 Galaxy	Easy	Andromeda Galaxy in Andromeda – visible to the naked eye	
9. Cr 399 Asterism	Fairly easy	The Coathanger, near the head of the Swan; in Vulpecula	
10. Albireo Double Star	Fairly easy	A colourful pair of stars at the head of Cygnus	
11. Double Cluster	Fairly easy	Two bright, sparse open clusters near each other in Perseus	
12. v Draconis Double Star	Less easy	A wide pair of white stars in the head of Draco the Dragon	
13. M13 Globular Cluster	Less easy	Globular cluster in Hercules	
14. M3 Globular Cluster	Less easy	A globular cluster in Canes Venatici, near Bootes	
15. M39 Open Cluster	Less easy	Open cluster in Cygnus above the bright star Deneb	
Looking Toward the South Horizon			
16. M6 Open Cluster	Easy	Butterfly Cluster in Scorpius	
17. M7 Open Cluster	Easy	Ptolemy Cluster in Scorpius	
18. M22 Globular Cluster	Easy	Large globular cluster in Sagittarius near the lid of the Teapot	
19. M8 Nebula	Easy	Lagoon Nebula in Sagittarius	
20. M20 Nebula	Fairly easy	Trifid Nebula just above Lagoon Nebula, smaller & fainter than M8	
21. M4 Globular Cluster	Fairly easy	Globular cluster next to the star Antares in Scorpio	
22. M25 Open Cluster	Fairly Easy	Bright open cluster north of Teapot lid (Sagittarius)	
23. M17 Nebula	Fairly Easy	Swan or Omega Nebula in Serpens	
24. M16 Nebula	Less easy	Eagle Nebula in Serpens	
25. IC 4665 Open Cluster	Less easy	Summer Beehive, a large open cluster in Ophiuchus	
26.			
27.			

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Your Name _____

Binocular Deep Sky Objects Observable in *November*

Deep Sky Object	Ease to Find	Description	Saw It
1. Saturn's Rings	Easy	The rings make Saturn look oblong in shape 	
2. Jupiter's Moons	Fairly easy	A steady hand and larger aperture reveal four moons	
3. Venus Crescent	Easy	See Venus's phases as it circles the Sun	
4. Mars	Easy	See the disk of Mars; it is more than a red star	
5. Moon Craters	Easy	Discover how many moon craters you can see with binoculars	
6. Mizar & Alcor	Easy	Double star, middle star in the handle of the Big Dipper	
7. ε Lyra Double Star	Easy	The Double Double, a pair of stars in Lyra near Vega	
8. M31 Galaxy	Easy	Andromeda Galaxy in Andromeda – visible to the naked eye	
9. Cr 399 Asterism	Fairly easy	Coathanger, near the head of the Swan; in Vulpecula	
10. Albireo Double Star	Fairly easy	A colourful pair of stars at the head of Cygnus	
11. Double Cluster	Fairly easy	Two bright, sparse open clusters near each other in Perseus	
12. v Draconis Double Star	Less easy	A wide pair of white stars in the head of Draco the Dragon	
13. M13 Globular Cluster	Less easy	Globular cluster in Hercules	
13. M39 Open Cluster	Less easy	Open cluster in Cygnus. May be visible to the naked eye.	
14. M33 Galaxy	Less easy	Triangulum Galaxy in Triangulum	
15. Hyades Open Cluster	Easy	Open cluster forming the head of Taurus the Bull	
16. M45 Open Cluster	Easy	Pleiades, an open cluster above the head of Taurus	
17. M36, M37, M38	Fairly Easy	Open clusters in Auriga (if you see at least one of them)	
18. M27 Planetary Nebula	Less Easy	Dumbbell Nebula planetary nebula above Sagitta the Arrow	
Looking Toward the South West Horizon before 7:00 pm			
19. M22 Globular Cluster	Easy	Large globular cluster in Sagittarius near the lid of the Teapot	
20. M8 Nebula	Easy	Lagoon Nebula in Sagittarius	
21. M20 Nebula	Fairly easy	Trifid Nebula just above Lagoon Nebula, smaller & fainter than M8	
22. M4 Globular Cluster	Fairly easy	Globular cluster next to the star Antares in Scorpio	
23. M25 Open Cluster	Fairly Easy	Bright open cluster north of Teapot lid (Sagittarius)	
24. M17 Nebula	Fairly Easy	Swan or Omega Nebula in Serpens	
25. M16 Nebula	Less easy	Eagle Nebula in Serpens	
26. IC 4665 Open Cluster	Less easy	Summer Beehive, a large open cluster in Ophiuchus	
27.			
28.			

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Become an *Ace Amateur Astronomer*: Find Five DSOs!

Your Name _____

Binocular Deep Sky Objects Observable in *December*

Deep Sky Object	Ease to Find	Description	Saw It
1. Saturn's Rings	Easy	The rings make Saturn look oblong in shape 	
2. Jupiter's Moons	Fairly easy	A steady hand and larger aperture reveal four moons	
3. Venus Crescent	Easy	See Venus's phases as it circles the Sun	
4. Mars	Easy	See the disk of Mars; it is more than a red star	
5. Moon Craters	Easy	Discover how many moon craters you can see with binoculars	
6. Mizar & Alcor	Easy	Double star, middle star in the handle of the Big Dipper	
7. M31 Galaxy	Easy	Andromeda Galaxy in Andromeda – visible to the naked eye	
8. M42 Orion Nebula	Easy	Large nebula, Orion's sword below his belt	
9. Double Cluster	Fairly easy	Two bright but sparse open clusters in Perseus	
10. v Draconis Double	Less easy	A wide pair of white stars in the head of Draco the Dragon	
11. M13 Globular	Less easy	Globular cluster in Hercules	
12. M33 Galaxy	Less easy	Triangulum Galaxy in Triangulum	
13. M39 Open Cluster	Less easy	Open cluster in Cygnus. May be visible to the naked eye.	
14. Hyades Open Cluster	Easy	Open cluster forming the head of Taurus the Bull	
15. M45 Open Cluster	Easy	Pleiades, an open cluster above the head of Taurus	
16. M35 Open Cluster	Fairly Easy	Open cluster above Castor's foot in Gemini	
17. M36, M37, M38	Fairly Easy	Open clusters in Auriga (if you see at least one of them)	
Low in the west at sunset			
18. M27 Planetary	Less Easy	Planetary Nebula in Sagitta	
19. ε Lyra Double Star	Easy	The Double Double, a pair of stars in Lyra near Vega	
20. Cr 399 Asterism	Fairly easy	Coathanger, near the head of the Swan; in Vulpecula	
21. Albireo Double Star	Fairly easy	A colourful pair of stars at the head of Cygnus.	
22.			
23.			

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