The Insider's Guide to the Galaxy Presents...

Messier Minutes

a guide to completing RASC's Messier Observing Certificate

Part 4 -

March 29th – April 12th, 2022

The following pages include a list of objects discussed in the March 29th, 2022, episode of Messier Minutes. Including finder charts and log pages.

List of Targets Discussed:

Evening Targets (after 10 pm)

March 29 new moon allows for galaxies!

Messier #	Constellation	Magnitude	Type	NGC	Name
96	Leo	9.3	SG	3368	PGC 32192
95	Leo	9.7	SG	3351	PGC 32007
105	Leo	9.8	EG	3379	PGC32256 plus NGC3384/89
66	Leo	8.9	SG	3627	Arp16 in Leo Triplet
65	Leo	10.3	SG	3623	Arp 317 in Leo Triplet

Notes:

M96:

(7.6 by 5.2 arc minutes)

Brightest member of the Leo I Group. Intermediate spiral galaxy sits 2° below (south of) the mid-point of line connecting Regulus to Chertan. Shares FOV with M95 which sits 0.6° to the west. Relatively bright, but barely visible with binoculars. Most telescopes will show the bright core well, larger apertures reveal halo, more structure. Can you tease out details about shape? Only 32 million l-y away!

M95:

(3.1 by 2.9 arc minutes)

Barred spiral galaxy near M96 below Regulus-Chertan midpoint. Tough in binoculars. Fairly easy in backyard telescopes, especially dark sites. Look for a ring shape. Only 32 million l-y away!

M105:

(5.4 by 4.8 arc minutes)

Elliptical galaxy sitting only 0.8 ° north from M96. Requires large binoculars and medium-sized or larger telescopes. Larger telescopes can reveal small galaxies NGC 3384 and NGC 3389 very close by to east. At 32 million l-y, is part of Leo I Group – but is receding!

M66:

(9.1 by 4.2 arc minutes)

Largest and brightest member of Leo Triplet. Intermediate spiral galaxy located 2.8° SSE of star Chertan, or roughly midway between Chertan and the mag 4 star Iota Leonis (Tsze Tseang). 36 million l-y away. Shares eyepiece FOV with M65 and fainter

NGC 3628 (Hambuger Galaxy). Look for arm structure and warped shape, especially in larger telescopes.

M65:

(8.6 by 2.5 arc minutes)

Just 0.3° west of brighter M66, and south of Hamburger Galaxy. Small and compact, so easier in binoculars and backyard telescopes. In larger apertures / very dark skies, look for arcs of dark dust, and note its shape. About 35 million l-y away.

Virgo Cluster Guided Tour

Start by aiming your telescope finder midway between Denebola and Vindemiatrix! Markarian's Chain!

Messier #	Constellation	Magnitude	Type	NGC	Name
86	Vir	8.9	EG	4406	Faust V051 in Markarian's Chain
84	Vir	10.5	EG	4374	PGC40455 in Markarian's Chain
87	Vir	8.6	EG	4486	Virgo Galaxy / Virgo A / Smoking Gun / Arp152
89	Vir	9.8	EG	4552	PGC41968
58	Vir	9.7	SG	4579	PGC42168
59	Vir	10.6	EG	4261	PGC42628
60	Vir	9.8	EG	4649	PGC42831 and NGC4647
90	Vir	9.5	SG	4569	PGC42089 / Arp76
91	Com	11.0	SG	4548	PGC41934
88	Com	10.4	SG	4501	PGC41517
100	Com	9.4	SG	4321	Blow-dryer Galaxy
99	Com	9.9	SG	4254	Virgo Cluster Pinwheel
98	Com	10.1	SG	4192	PGC39028
85	Com	10.0	EG	4382	PGC40515 with NGC4394

Notes:

Exploring Markarian's Chain:

The galaxies forming Markarian's Chain are singles and in pairs, each "link" separated by 0.25 to 0.5 degrees. In the early 1960s Armenian astrophysicist B. E. Markarian discovered the galaxies' common motion. To explore it, start by using a low magnification eyepiece – something that gives you at least a degree FOV, or about 70x - and find the bright elliptical galaxies M84 and M86. Take time to enjoy them and the bright edge-on spirals NGC 4402, NGC 4388, and NGC 4413 and 4425 just to the north and south of them. Next, slew from M84 to M86, the keep slewing in the same direction (east) to the Eyes (distorted NGC 4438 and NGC 4435). The next hop lands you at brighter NGC 4461 and smaller NGC 4458. Another jog, while bending the line a little north, lands you on NGC 4473. A shorter hop following that arc (northeast) reveals NGC 4477 and smaller NGC 4479. By that point, you'll see more bright galaxies at the edge of the field of view half a degree away. Those are bright NGC 4459, smaller NGC 4474, and several smaller galaxies forming a line. A FOV east of them sits bright M88.

M86:

(8.9 by 5.8 arc minutes)

Home base for the Messiers in the Virgo Cluster and for finding Markarian's chain. Bright and large, relatively easy for smaller telescopes, possibly binoculars. Elliptical or

Lenticular. Note its shape, variations in brightness, and smaller M84 nearby. 50 million l-y and heading fast toward us!

M84:

(6.5 by 5.6 arc minutes)

Round, bright elliptical or face-on lenticular 0.3° west of M86. Although smaller, it may look even brighter. Easy in smaller telescopes, and maybe binoculars. Giant black hole! 60 million l-y away.

M87:

(7.2 by 6.8 arc minutes)

1° south of middle of Markarian's Chain. Bright, round elliptical visible in any size of telescope and binoculars. Very bright radio source due to active supermassive black hole (event horizon imaged). Larger telescopes might show plasma jet. About 55 million l-y away. Maybe 200 times larger than Milky Way! Note shape, and look for smaller galaxies around it.

M89:

(5.1 by 4.7 arc minutes)

(Another anchoring point!) Medium-bright, round elliptical galaxy 1.2° east of M87, although long axis might be aimed toward us. Easy in medium and larger telescopes. 50 million l-y away. Big black hole inside! Bright M90 is nearby.

M58:

(5.9 by 4.7 arc-minutes)

Barred spiral 1° SSE from M89. Visible in big binoculars and any size of telescope, but larger aperture will reveal more details. 62 million l-y away. Watch for the small, but bright pair called the Siamese Twins Galaxies (NGC 4567 and NGC 4568) to south of M58

M59:

(5.4 by 3.7 arc minutes)

Smallish, elongated E5 elliptical galaxy located 1° east of M58. Best for medium and larger telescopes. 60 million l-y away. Quite close to M60. Some field stars will aid focusing. Giant black hole inside!

M60:

(7.4 by 6 arc-minutes)

Medium sized E2 elliptical galaxy only 0.4° east of M59 at eastern edge of Virgo Cluster. Shape visible in most telescope, but larger apertures can capture the spiral galaxy NGC 4647 adjacent to the northwest, and smaller galaxies nearby. Only 54 million l-y away. (now re-trace your steps back to M89)

M90:

(9.5 by 4.4 arc minutes)

Large, bright spiral galaxy 0.6° north of M89. Visible in binoculars and any size of telescope. Larger telescopes can show structure, especially at 50x. Nearby stars aid in focusing. Note shape, details, nearby small patch IC3583. About 60 million l-y away and closing almost as fast as M86. May have aged beyond much star formation (arms are smooth).

M91:

(5.4 by 4.3 arc minutes)

Barred spiral galaxy 1.4° north of M90 in next-door Coma. Face-on aspect gives lower surface brightness, plus smaller size makes it challenging for small apertures, but bright core will be visible. Can you see the shape of the bar and arms?

M88:

(6.9 by 3.7 arc minutes)

(Could also arc to it from Markarian's Chain!) Tilted spiral galaxy only 0.8° west of M91 is brighter in the eyepiece, good for any size of telescope and binoculars. Can you see any structure? Relatively close - only 47 million l-y away!

M100:

(7.4 by 6.3 arc minutes)

Identify medium-bright star HIP60960 beside M88 and slew towards and then past it (towards west-northwest) M100 is a large, grand design, face-on spiral in Coma, about 55 million l-y away. Lower surface brightness hinders binoculars, but most telescopes will do well. Prominent arms - how much structure can you discern with averted vision? Tiny elliptical companions to east and north

M99:

(5.4 by 4.7 arc minutes)

Moderately sized, unbarred spiral 1.7° southwest of M100 (say 1.5 FOVs), face-on, yet bright enough for smaller telescopes. Can you discern structure? Is it symmetrical? 50 million l-y and receding fast! It shares a low power field with the close pair (edge-on spiral NGC 4302 and tilted spiral NGC 4298) sitting only 0.7° east from M99!

M98:

(9.8 by 2.8 arc minutes)

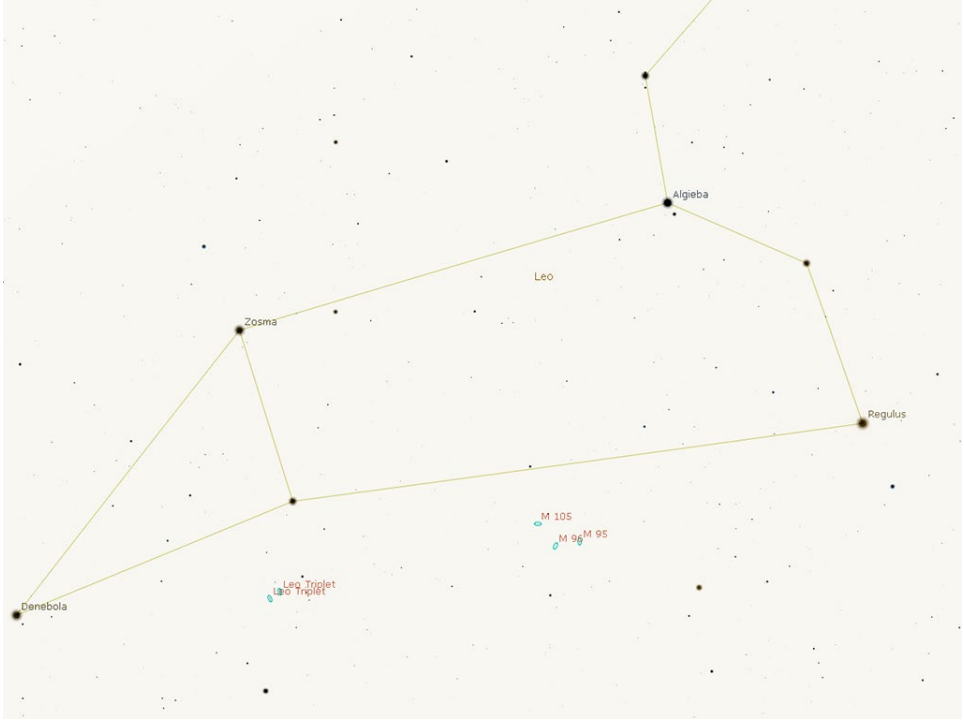
Head roughly opposite to the previous pair plus M99 line to seek M98 sitting 1.3° to the west-northwest from M99 near mag 5 star 6 Comae. Highly tilted spiral, long but narrow. Better in medium-sized telescopes and larger, where it will grow larger, especially with averted vision. 44 million l-y away. (Now return to M100 via M99)

M85:

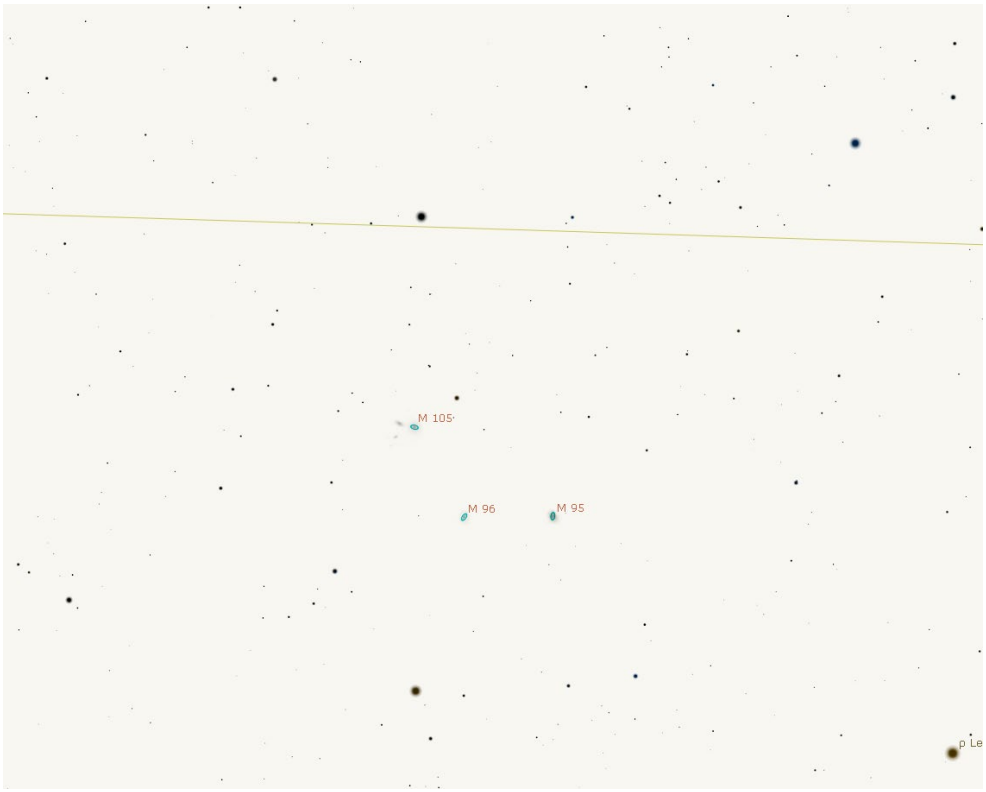
While at M100, look for crooked row of small stars at edge of field to NE. Slew toward and beyond them by 2.4°. M85 is also a degree east of mag 4.7 star 11 Comae. A medium-bright, lenticular galaxy 60 million l-y away. Tough in binoculars and very small telescopes, grows with aperture. Look for field stars and the small barred spiral galaxy NGC 4394 only 8 arc-minutes east.

Early Evening Targets Finder Charts:

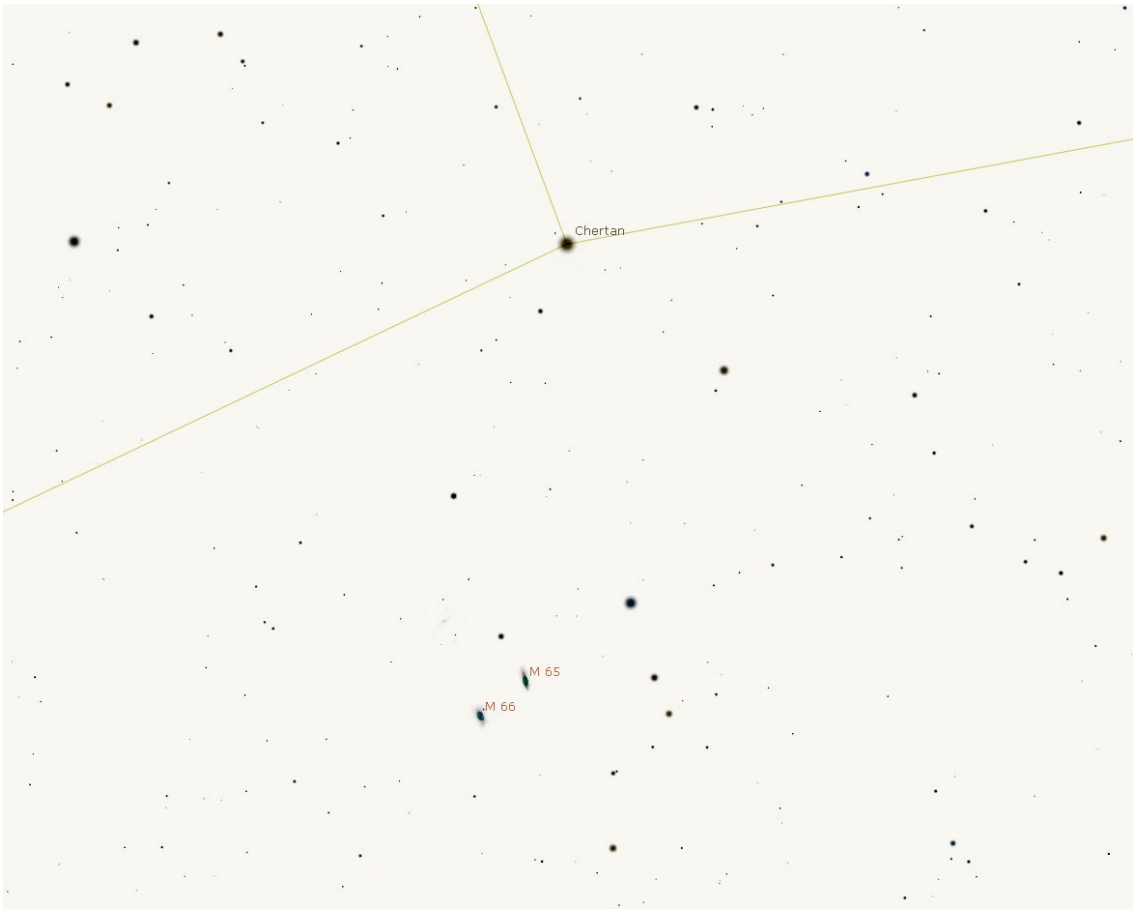
Overview of Targets in Leo Constellation –



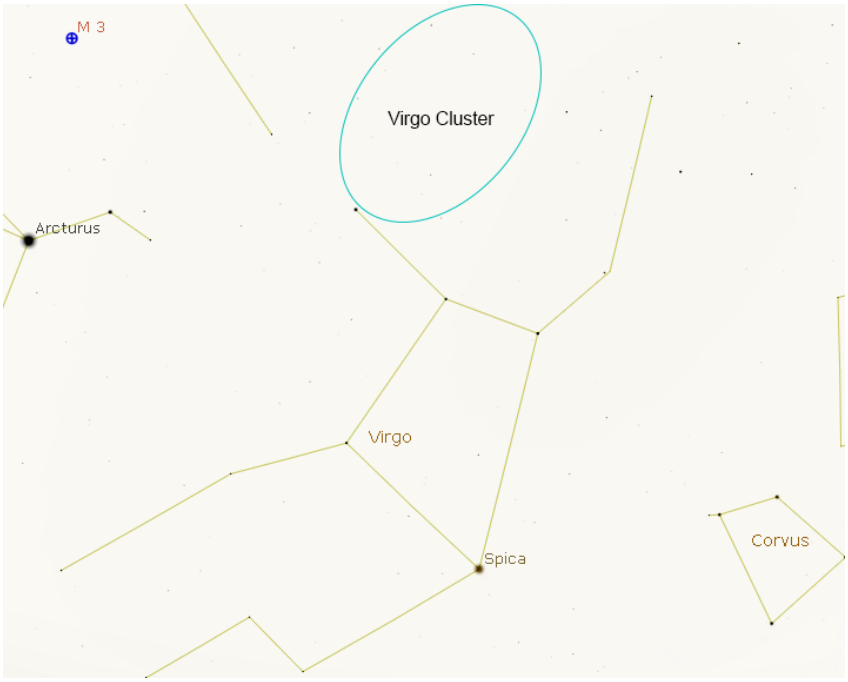
M105, M96, and M95 Closer View –

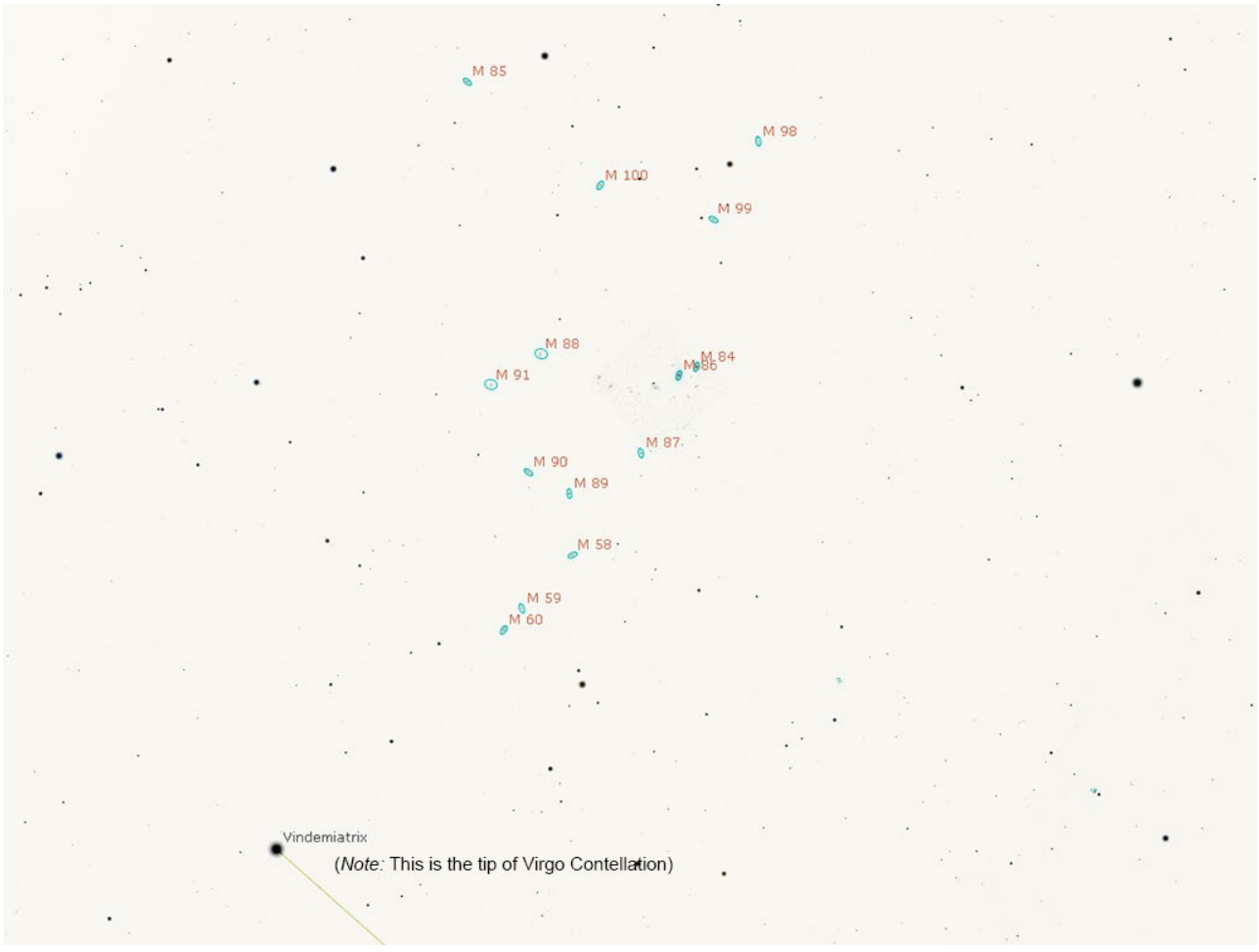


M65 & M66 Closer View –



Overview of Virgo Cluster –



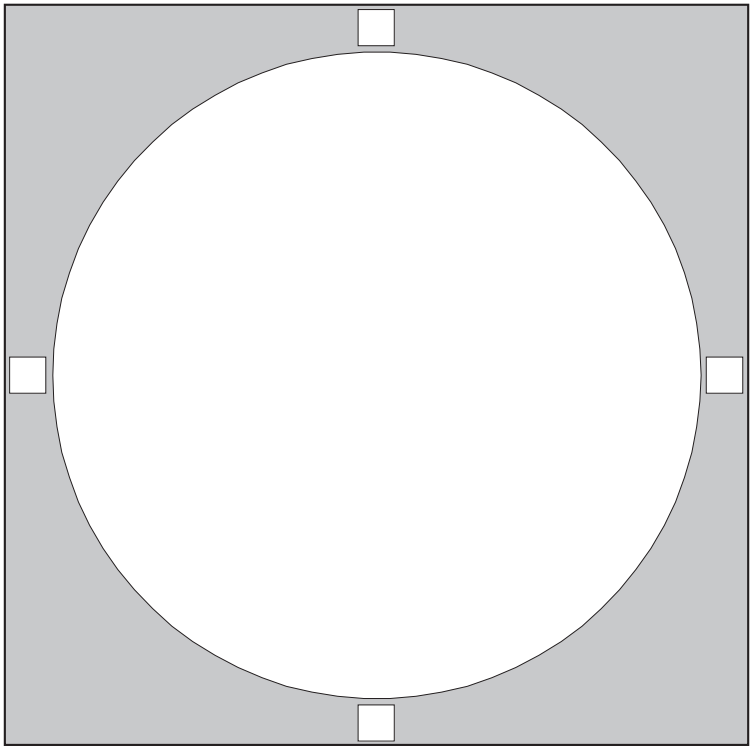


M86, M84, M87, M89, M58, M59, M60, M90 Closer View –

M91, M88, M100, M99, M98, M85 Closer View –

RASC Messier Objects - M86

Messier Object	**M86**		
NGC	**4406**		
Constellation	**Virgo**		
Type	**Elliptical Galaxy (G-E3)**		
Magnitude	**8.9**		
Distance (Kilo light-years)	**60000**		
RA	**12 26.2**		
Dec	**+12:57**		
Size	**12.0' x 9.0'**		
UM I	UM II	**193**	**91,A13**
SA	**13, 14, B1**		
Remarks	**!! with many NGC galaxies in Chain**		
Time (hh:mm)			
Seeing	1 2 3 4 5		
Transparency	1 2 3 4 5		
Observing Location			
Telescope			
Date (dd:mm:yyyy)			

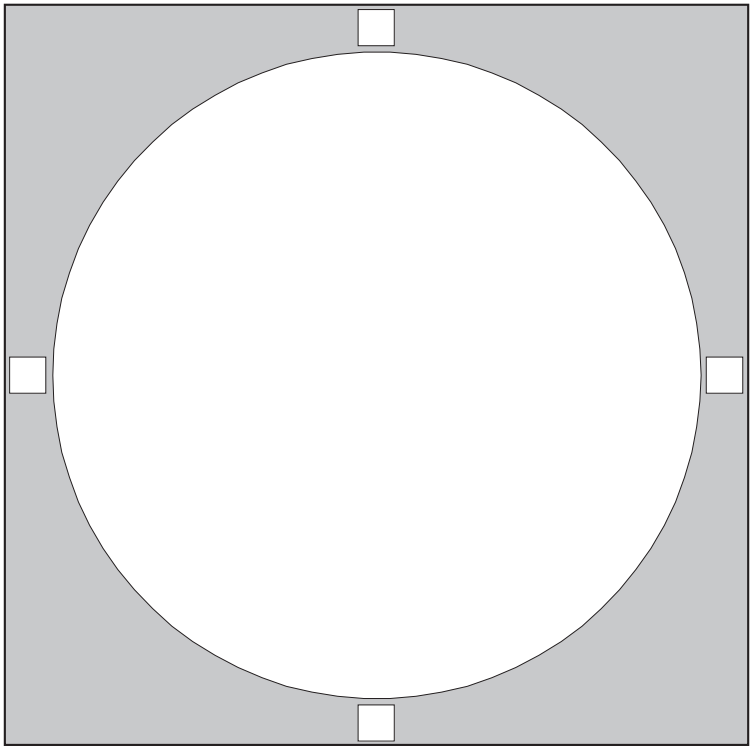


Notes

PN: Planetary Nebula	RN: (diffuse) Reflection Nebula	Seeing: 1 = Best 5 = Poor	* = Number of stars in cluster
SNR: Supernova Remnant	EN: (diffuse) Emission Nebula	Transparency: 1 = Best 5 = Poor	** p = Photographic Magnitude
GC: Globular Cluster	G-: Galaxy, with Hubble type given	Time: DD:MM:YYYY	*** !! = Showpiece Object
OC: Open Cluster	E/RN: Diffuse emission and reflection Nebula	Date: Specify Time Zone or UT	http://www.rasc.ca

RASC Messier Objects - M84

Messier Object	**M84**		
NGC	**4374**		
Constellation	**Virgo**		
Type	**Elliptical Galaxy (G-E1)**		
Magnitude	**9.1**		
Distance (Kilo light-years)	**60000**		
RA	**12 25.1**		
Dec	**+12:53**		
Size	**5.1' x 4.1'**		
UM I	UM II	**193**	**91,A13**
SA	**13, 14, B1**		
Remarks	**!! with M86 in Markarian's Chain**		
Time (hh:mm)			
Seeing	1 2 3 4 5		
Transparency	1 2 3 4 5		
Observing Location			
Telescope			
Date (dd:mm:yyyy)			



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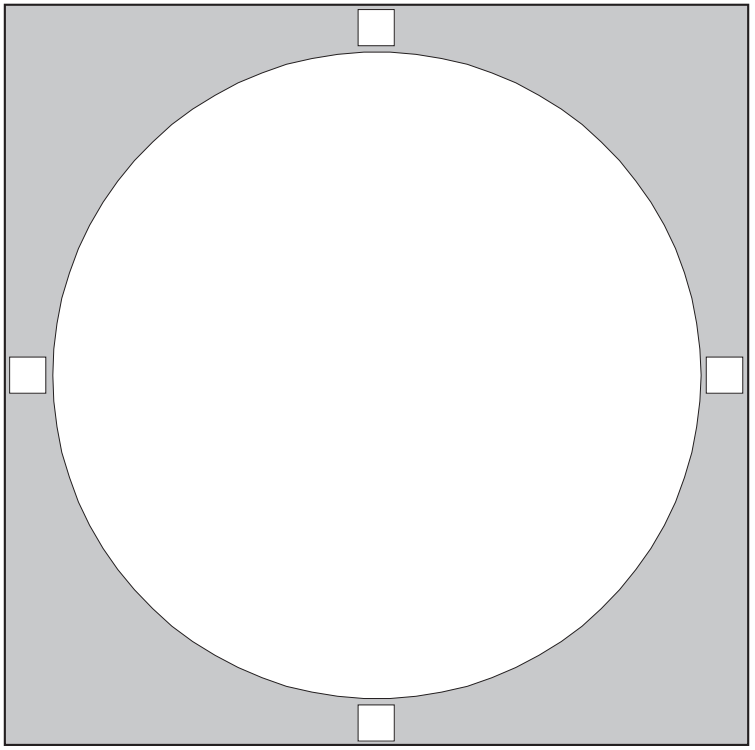
RASC Messier Objects - M87

Virgo A

Messier Object	**M87**		
NGC	**4486**		
Constellation	**Virgo**		
Type	**Elliptical Galaxy (G-E0-1)**		
Magnitude	**8.6**		
Distance (Kilo light-years)	**60000**		
RA	**12 30.8**		
Dec	**+12:24**		
Size	**7.1' x 7.1'**		
UM I	UM II	**193,194**	**91,A13**
SA	**13, 14, B1**		
Remarks	**the one with famous jet and black hole**		
Time (hh:mm)			
Seeing	1 2 3 4 5		
Transparency	1 2 3 4 5		
Observing Location			
Telescope			
Date (dd:mm:yyyy)			



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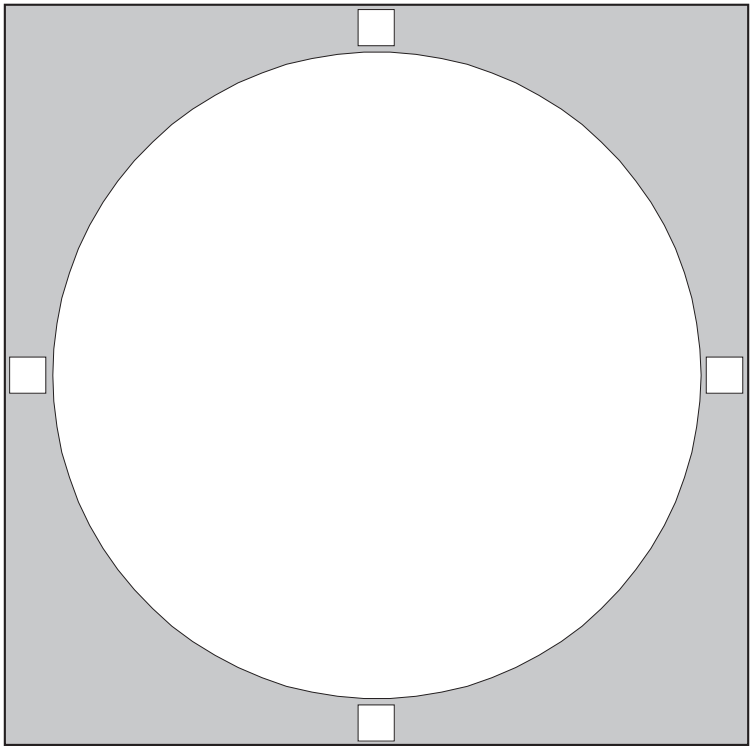
RASC Messier Objects - M89

Messier Object	**M89**		
NGC	**4552**		
Constellation	**Virgo**		
Type	**Elliptical Galaxy (G-E)**		
Magnitude	**9.8**		
Distance (Kilo light-years)	**60000**		
RA	**12 35.7**		
Dec	**+12:33**		
Size	**3.4' x 3.4'**		
UM I / UM II	**193,194**	**90,91,A13**	
SA	**13, 14, B1**		
Remarks	**elliptical; resembles M86 but smaller**		
Time (hh:mm)			
Seeing	1 2 3 4 5		
Transparency	1 2 3 4 5		
Observing Location			
Telescope			
Date (dd:mm:yyyy)			



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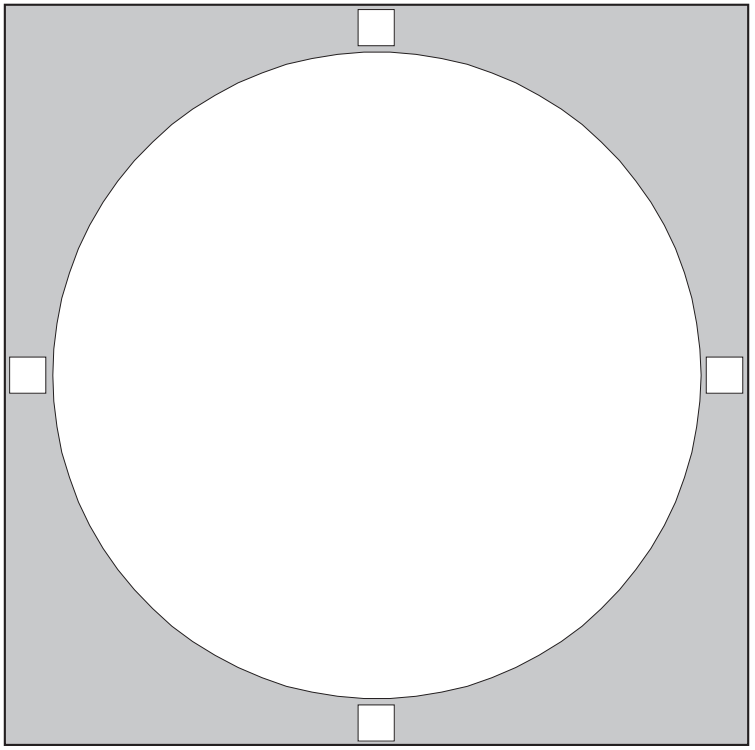
RASC Messier Objects - M58

Messier Object	**M58**		
NGC	**4579**		
Constellation	**Virgo**		
Type	**Spiral Galaxy (G-SABb)**		
Magnitude	**9.7**		
Distance (Kilo light-years)	**60000**		
RA	**12 37.7**		
Dec	**+11:49**		
Size	**5.5' x 4.6'**		
UM I	UM II	**194**	**90,91,A13**
SA	**13, 14, B1**		
Remarks	**bright barred spiral; M59 and M60 one degree E**		
Time (hh:mm)			
Seeing	1 2 3 4 5		
Transparency	1 2 3 4 5		
Observing Location			
Telescope			
Date (dd:mm:yyyy)			



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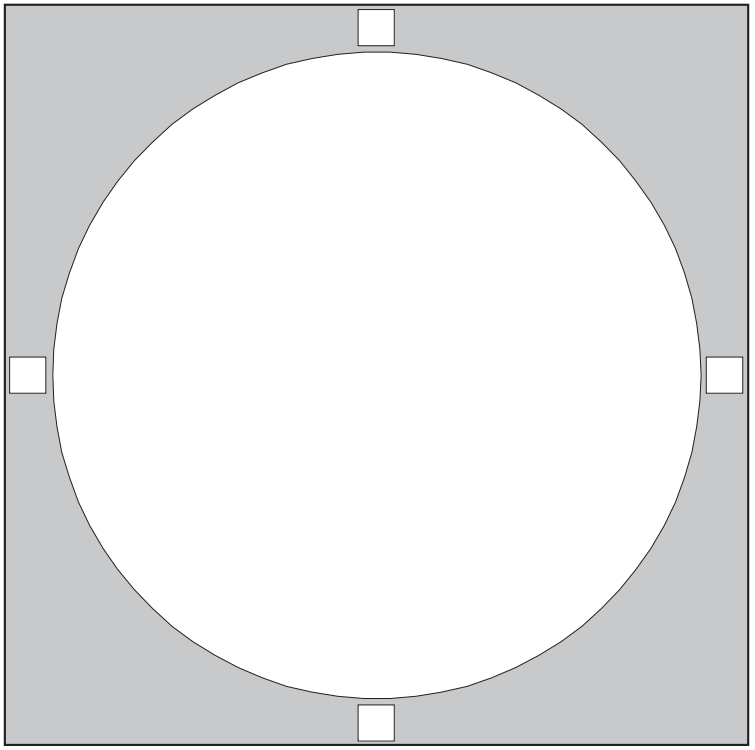
GC: Globular Cluster	G-: Galaxy, with Hubble type given	Time: DD:MM:YYYY	*** !! = Showpiece Object
OC: Open Cluster	E/RN: Diffuse emission and reflection Nebula	Date: Specify Time Zone or UT	http://www.rasc.ca

RASC Messier Objects - M59

Messier Object	**M59**		
NGC	**4621**		
Constellation	**Virgo**		
Type	**Elliptical Galaxy (G-E5)**		
Magnitude	**9.6**		
Distance (Kilo light-years)	**60000**		
RA	**12 42.0**		
Dec	**+11:39**		
Size	**4.6' x 3.6'**		
UM I	UM II	**194**	**90**
SA	**13, 14, B1**		
Remarks	**bright elliptical paired with M60**		
Time (hh:mm)			
Seeing	1 2 3 4 5		
Transparency	1 2 3 4 5		
Observing Location			
Telescope			
Date (dd:mm:yyyy)			



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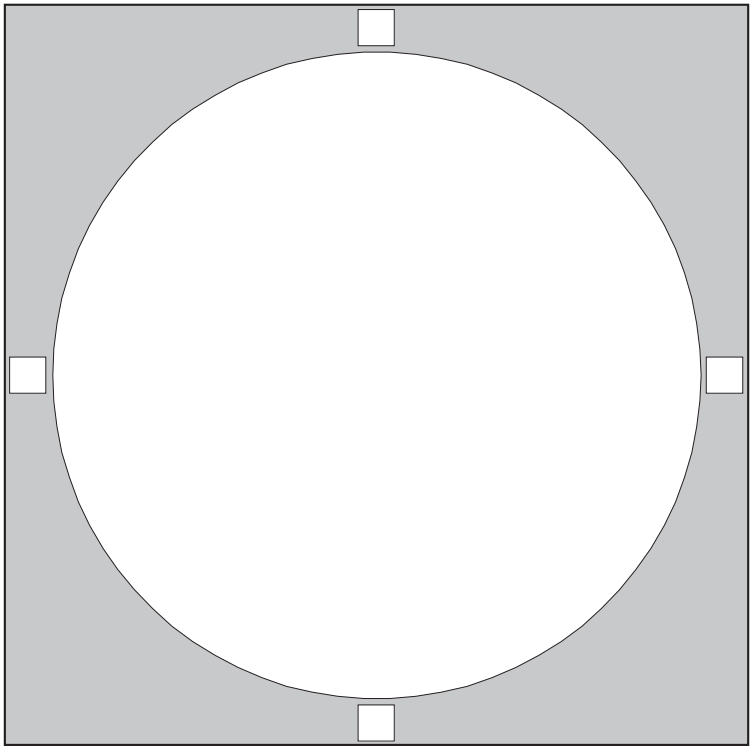
OC: Open Cluster	E/RN: Diffuse emission and reflection Nebula	Date: Specify Time Zone or UT	http://www.rasc.ca

RASC Messier Objects - M60

Messier Object	**M60**		
NGC	**4649**		
Constellation	**Virgo**		
Type	**Elliptical Galaxy (G-E2)**		
Magnitude	**8.8**		
Distance (Kilo light-years)	**60000**		
RA	**12 43.7**		
Dec	**+11:33**		
Size	**7.1' x 6.1'**		
UM I	UM II	**194**	**90**
SA	**13, 14, B1**		
Remarks	**bright elliptical with M59 and NGC 4647**		
Time (hh:mm)			
Seeing	1 2 3 4 5		
Transparency	1 2 3 4 5		
Observing Location			
Telescope			
Date (dd:mm:yyyy)			



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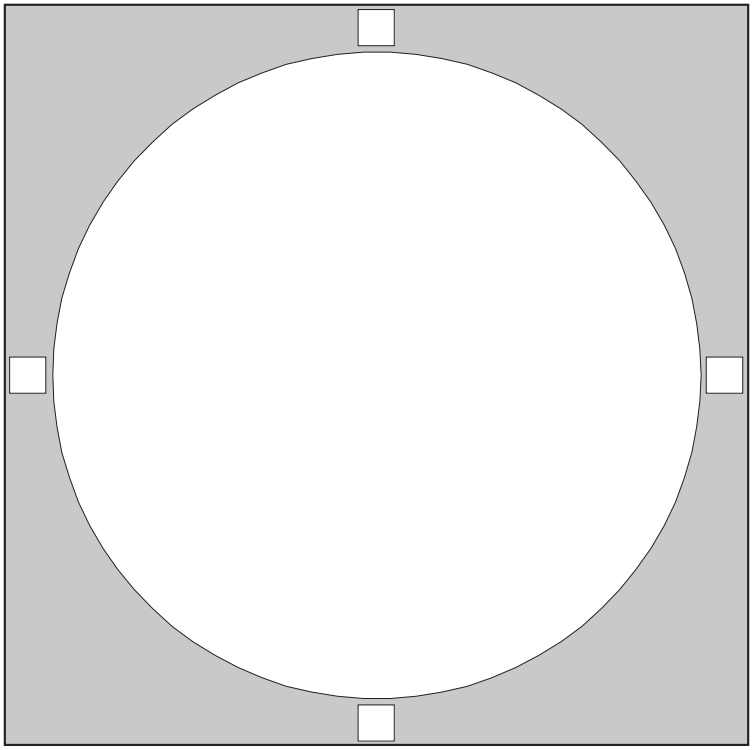
OC: Open Cluster	E/RN: Diffuse emission and reflection Nebula	Date: Specify Time Zone or UT	http://www.rasc.ca

RASC Messier Objects - M90

Messier Object	**M90**		
NGC	**4569**		
Constellation	**Virgo**		
Type	**Spiral Galaxy (G-SABab)**		
Magnitude	**9.5**		
Distance (Kilo light-years)	**60000**		
RA	**12 36.8**		
Dec	**+13:10**		
Size	**10.0' x 4.0'**		
UM I	UM II	**194**	**90,91,A13**
SA	**13, 14, B1**		
Remarks	**bright barred spiral near M89**		
Time (hh:mm)			
Seeing	1 2 3 4 5		
Transparency	1 2 3 4 5		
Observing Location			
Telescope			
Date (dd:mm:yyyy)			



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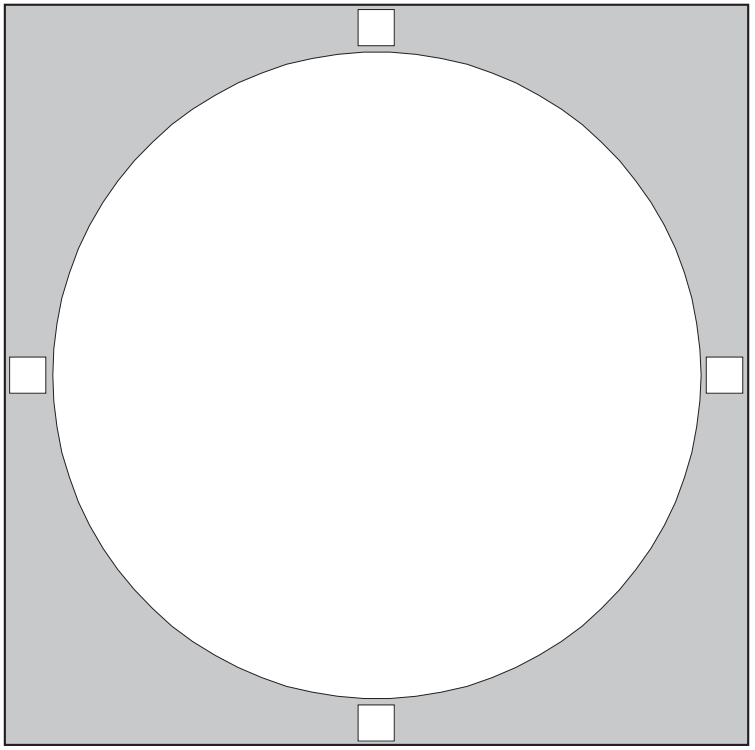
RASC Messier Objects - M91

Messier Object	**M91**		
NGC	**4548**		
Constellation	**Coma Berenices**		
Type	**Spiral Galaxy (G-SBb)**		
Magnitude	**10.2**		
Distance (Kilo light-years)	**60000**		
RA	**12 35.4**		
Dec	**+14:30**		
Size	**5.0' x 4.1'**		
UM I	UM II	**193,194**	**90,91,A13**
SA	**13, 14, B1**		
Remarks	**some lists say M91 = M58, not NGC 4548**		
Time (hh:mm)			
Seeing	1 2 3 4 5		
Transparency	1 2 3 4 5		
Observing Location			
Telescope			
Date (dd:mm:yyyy)			



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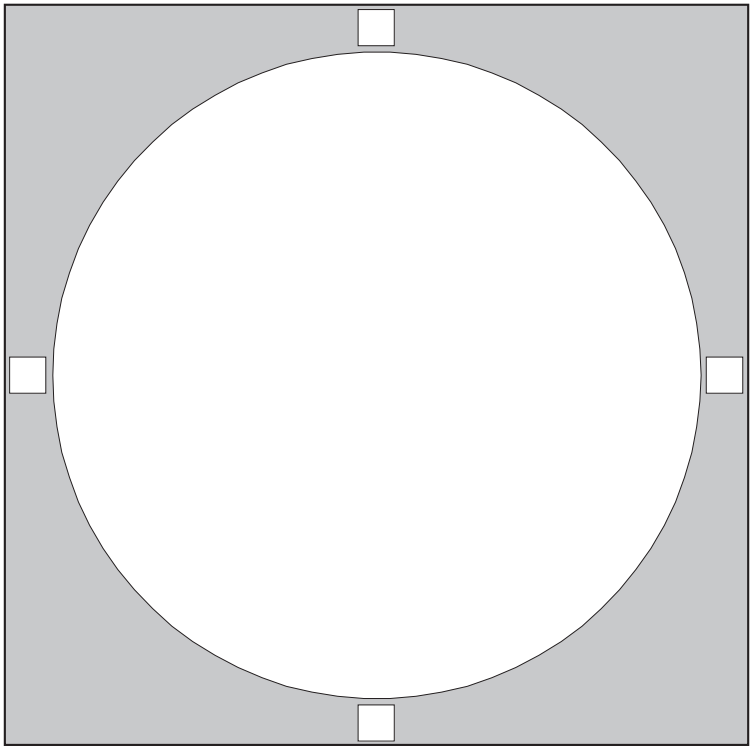
GC: Globular Cluster	G-: Galaxy, with Hubble type given	Time: DD:MM:YYYY	*** !! = Showpiece Object
OC: Open Cluster	E/RN: Diffuse emission and reflection Nebula	Date: Specify Time Zone or UT	http://www.rasc.ca

RASC Messier Objects - M88

Messier Object	**M88**		
NGC	**4501**		
Constellation	**Coma Berenices**		
Type	**Spiral Galaxy (G-SAb)**		
Magnitude	**9.6**		
Distance (Kilo light-years)	**60000**		
RA	**12 32.0**		
Dec	**+14:25**		
Size	**6.1' x 2.8'**		
UM I / UM II	**193,194**	**90,91,A13**	
SA	**13, 14, B1**		
Remarks	**bright multiple arm spiral**		
Time (hh:mm)			
Seeing	1 2 3 4 5		
Transparency	1 2 3 4 5		
Observing Location			
Telescope			
Date (dd:mm:yyyy)			

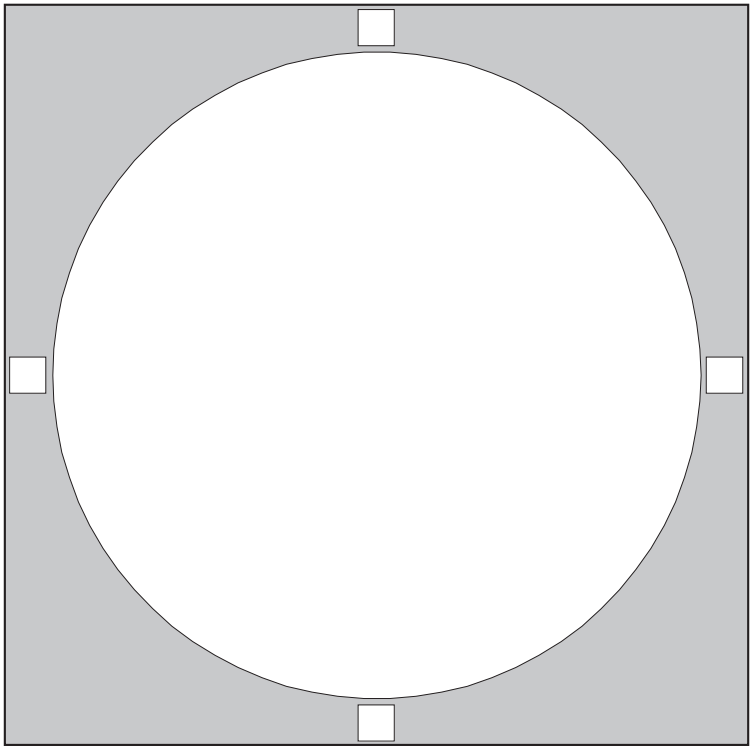


Notes

PN: Planetary Nebula	RN: (diffuse) Reflection Nebula	Seeing: 1 = Best 5 = Poor	* = Number of stars in cluster
SNR: Supernova Remnant	EN: (diffuse) Emission Nebula	Transparency: 1 = Best 5 = Poor	** p = Photographic Magnitude
GC: Globular Cluster	G-: Galaxy, with Hubble type given	Time: DD:MM:YYYY	*** !! = Showpiece Object
OC: Open Cluster	E/RN: Diffuse emission and reflection Nebula	Date: Specify Time Zone or UT	http://www.rasc.ca

RASC Messier Objects - M100

Messier Object	**M100**		
NGC	**4321**		
Constellation	**Coma Berenices**		
Type	**Spiral Galaxy (G-SABbc)**		
Magnitude	**9.3**		
Distance (Kilo light-years)	**60000**		
RA	**12 22.9**		
Dec	**+15:49**		
Size	**6.2' x 5.3'**		
UM I	UM II	**193**	**91,A13**
SA	**7, 13, 14, B1**		
Remarks	**face-on spiral with starlike nucleus**		
Time (hh:mm)			
Seeing	1 2 3 4 5		
Transparency	1 2 3 4 5		
Observing Location			
Telescope			
Date (dd:mm:yyyy)			



Notes

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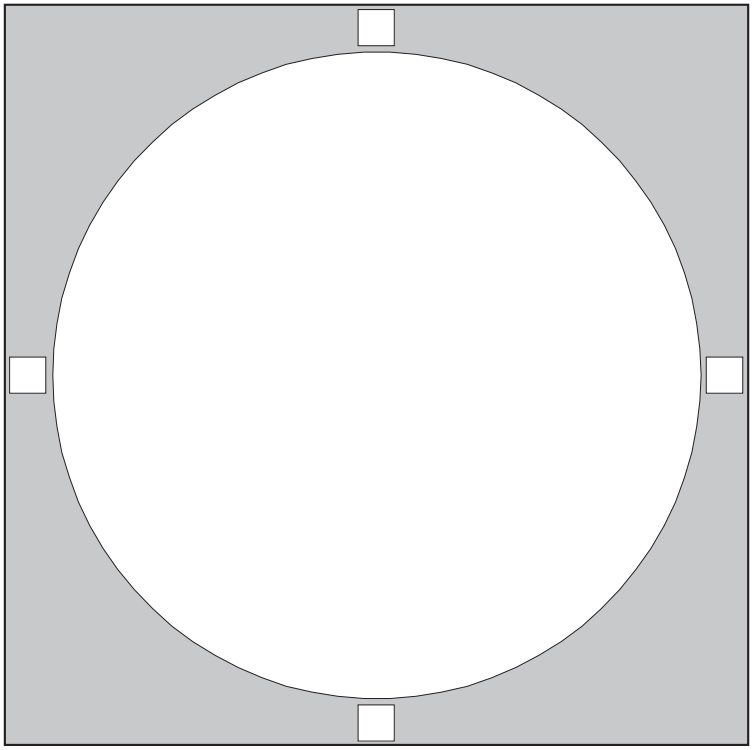
RASC Messier Objects - M99

Messier Object	**M99**		
NGC	**4254**		
Constellation	**Coma Berenices**		
Type	**Spiral Galaxy (G-SAC)**		
Magnitude	**9.9**		
Distance (Kilo light-years)	**60000**		
RA	**12 18.8**		
Dec	**+14:25**		
Size	**4.6' x 4.3'**		
UM I	UM II	**193**	**91,A13**
SA	**7, 13, 14, B1**		
Remarks	**nearly face-on spiral near M98**		
Time (hh:mm)			
Seeing	1 2 3 4 5		
Transparency	1 2 3 4 5		
Observing Location			
Telescope			
Date (dd:mm:yyyy)			



Notes

PN: Planetary Nebula	RN: (diffuse) Reflection Nebula	Seeing: 1 = Best 5 = Poor	* = Number of stars in cluster
SNR: Supernova Remnant	EN: (diffuse) Emission Nebula	Transparency: 1 = Best 5 = Poor	** p = Photographic Magnitude
GC: Globular Cluster	G-: Galaxy, with Hubble type given	Time: DD:MM:YYYY	*** !! = Showpiece Object
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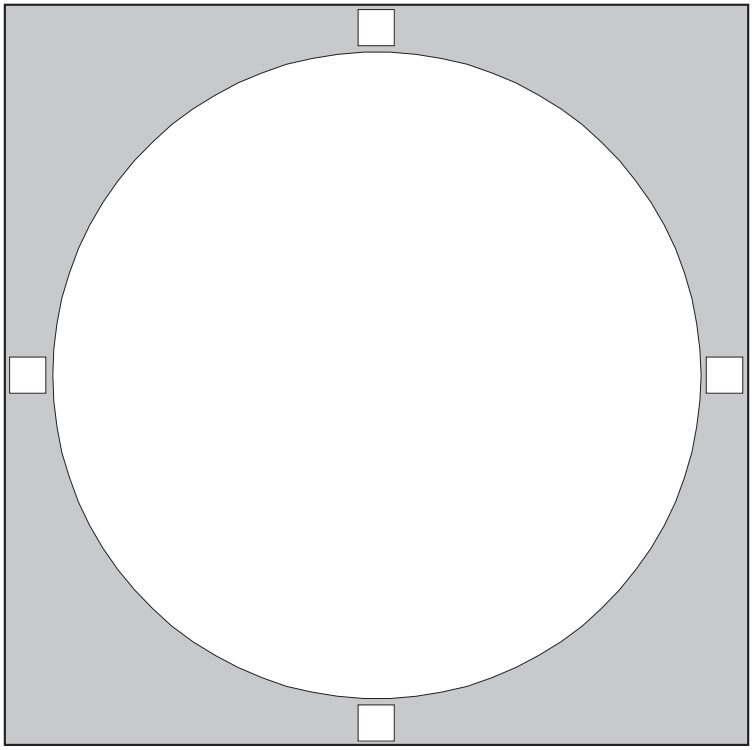
RASC Messier Objects - M98

Messier Object	**M98**		
NGC	**4192**		
Constellation	**Coma Berenices**		
Type	**Spiral Galaxy (G-SABab)**		
Magnitude	**10.1**		
Distance (Kilo light-years)	**60000**		
RA	**12 13.8**		
Dec	**+14:54**		
Size	**9.1' x 2.1'**		
UM I	UM II	**193**	**91**
SA	**7, 13, 14, B1**		
Remarks	**nearly edge-on spiral near star 6 Comae Berenices**		
Time (hh:mm)			
Seeing	1 2 3 4 5		
Transparency	1 2 3 4 5		
Observing Location			
Telescope			
Date (dd:mm:yyyy)			

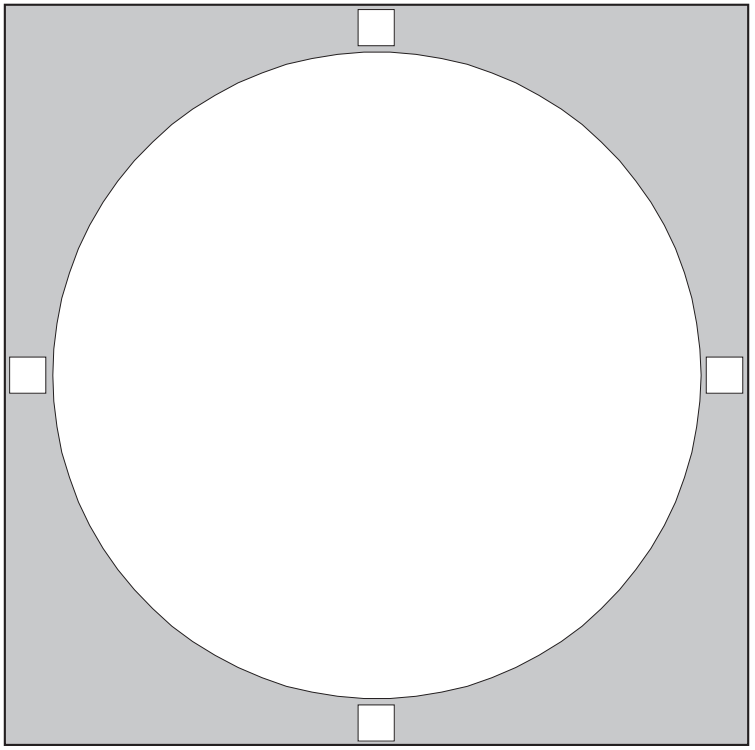


Notes

PN: Planetary Nebula	RN: (diffuse) Reflection Nebula	Seeing: 1 = Best 5 = Poor	* = Number of stars in cluster
SNR: Supernova Remnant	EN: (diffuse) Emission Nebula	Transparency: 1 = Best 5 = Poor	** p = Photographic Magnitude
GC: Globular Cluster	G-: Galaxy, with Hubble type given	Time: DD:MM:YYYY	*** !! = Showpiece Object
OC: Open Cluster	E/RN: Diffuse emission and reflection Nebula	Date: Specify Time Zone or UT	http://www.rasc.ca

RASC Messier Objects - M85

Messier Object	**M85**		
NGC	**4382**		
Constellation	**Coma Berenices**		
Type	**Spiral Galaxy (G-Sa0+)**		
Magnitude	**9.1**		
Distance (Kilo light-years)	**60000**		
RA	**12 25.4**		
Dec	**+18:11**		
Size	**7.5' x 5.7'**		
UM I	UM II	**148**	**72**
SA	**7, 13, 14, B1**		
Remarks	**bright elliptical shape**		
Time (hh:mm)			
Seeing	1 2 3 4 5		
Transparency	1 2 3 4 5		
Observing Location			
Telescope			
Date (dd:mm:yyyy)			



Notes

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SNR: Supernova Remnant	EN: (diffuse) Emission Nebula	Transparency: 1 = Best 5 = Poor	** p = Photographic Magnitude
GC: Globular Cluster	G-: Galaxy, with Hubble type given	Time: DD:MM:YYYY	*** !! = Showpiece Object
OC: Open Cluster	E/RN: Diffuse emission and reflection Nebula	Date: Specify Time Zone or UT	http://www.rasc.ca