

# *The Eldorado Star Party*

## *2023 Telescope Observing Club*

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### **Purpose and Rules**

Welcome to the Annual ESP Telescope Club! The main purpose of this club is to give you an opportunity to observe some of the showpiece objects of the fall season under the pristine skies of Southwest Texas. We have also included a few items on the observing lists that may challenge you to observe some fainter and more obscure objects that present themselves at their very best under the dark skies of the Eldorado Star Party.

The rules are simple; just observe the required number of objects on the observing list while you are at the Eldorado Star Party to receive a club badge.

### **Why Not?**

Charles Messier published his first catalog of 45 celestial objects in 1774. His final version of the catalog was published in 1781 and contained 103 objects. Messier was an avid comet hunter, and the primary purpose of Messier's catalog was to make comet hunting easier by compiling a list of nebulous objects that could be easily confused as comets. However, there are a number of objects in the Messier catalog that are obviously not comets. For example, objects like the Pleiades (M 45), the Beehive (M 44) and the Orion Nebula (M 42) could hardly be confused as comets but nonetheless made it into the catalog. There are also many other bright nebulous objects in the night sky that could have been observed by Messier but did not make it into his catalog.

The Telescope Observing Club program for this year's Eldorado Star Party is "**Why Not?**" The program is a list of objects that did not make it into Messier's catalog. As you observe each object in the list, ask yourself why the object did not make it into the Messier catalog. Was it too dim? Was it too small? Was it obviously not a comet? Or did Messier and the other observers contributing to the catalog just never see the object? While you are encouraged to observe all the objects, you need to observe only **21 of the 25** objects on the list to qualify for the ESP Telescope Observing Club badge.

### **Previous ESP Observing Clubs**

Please note that all previous observing programs offered at ESP from 2004 onward are still available. Club badges from these earlier programs (*with the exception of 2009 - Texas Hash*) are also available and will be awarded to anyone completing them at ESP. Check the Eldorado Star Party website at [www.eldoradostarparty.org](http://www.eldoradostarparty.org) to select one (or more!) of these observing lists.

### **Club Badges**

Any size telescope or binocular can be used to complete the observing programs. Again, all observations must be made at the Eldorado Star Party in order to qualify for an ESP observing badge. To receive your badge, please turn in your observations to Bill Flanagan any time during ESP. I will try to be available on the observing fields as well as in the Lodge prior to the meals and talks. If you finish the list on the last night of ESP, or I am not available to give you your badge, just mail a copy of your observations to me at 815 Azalea, Houston, TX 77018, and I will send you your badge.

Good Luck and Good Observing!

## *Why Not?*

Primary ID	Alternate ID	Type	Con	RA 2000	Dec 2000	Mag	Size	Distance	Date	Time
Turtle Nebula	NGC 6210	PNe	Her	16h44m30s	+23°48'00"	9.7	20"	6,500 ly		
Cat's Eye Nebula	NGC 6543	PNe	Dra	17h58m33s	+66°37'59"	8.3	22"	3,300 ly		
Blue Racquetball	NGC 6572	PNe	Oph	18h12m06s	+06°51'12"	8.0	15"	3,500 ly		
NGC 6712		Glob	Sct	18h53m04s	-08°42'18"	8.1	9.8'	26,000 ly		
Blinking Planetary	NGC 6826	PNe	Cyg	19h44m48s	+50°31'30"	8.8	27"	3,600 ly		
NGC 6891	PN G054.1-12.1	PNe	Del	20h15m09s	+12°42'16"	10.5	15"	7,800 ly		
NGC 6934		Glob	Del	20h34m11s	+07°24'18"	8.9	7.1'	52,000 ly		
Fireworks Galaxy	NGC 6946	Gal	Cyg	20h34m53s	+60°09'14"	9.8	10.5'x10.0'	22 Mly		
NGC 7006		Glob	Del	21h01m29s	+16°11'18"	10.6	3.6'	137,000 ly		
NGC 7048	PN G088.7-01.6	PNe	Cyg	21h14m15s	+46°17'18"	11.0	1.0'	5,300 ly		
NGC 7217	MCG 5-52-1	Gal	Peg	22h07m52s	+31°21'33"	11.1	3.9'x3.3'	50 Mly		
Helix	NGC 7293	PNe	Aqr	22h29m38s	-20°50'14"	6.3	16.0'	655 ly		
NGC 7331	MCG 6-49-45	Gal	Peg	22h37m04s	+34°24'59"	10.2	9.1'x3.4'	40 Mly		
NGC 7479	MCG 2-58-60	Gal	Peg	23h04m57s	+12°19'22"	11.7	3.7'x2.8'	105 Mly		
Little Sombrero	NGC 7814	Gal	Peg	00h03m15s	+16°08'42"	11.6	4.9'x2.1'	40 Mly		
NGC 40	PN G120.0+09.8	PNe	Cep	00h13m01s	+72°31'19"	10.7	1.0'	5,280 ly		
NGC 246	Skull Nebula	PNe	Cet	00h47m03s	-11°52'19"	10.4	4.0'	1,600 ly		
NGC 247	MCG -4-3-5	Gal	Cet	00h47m09s	-20°45'38"	9.7	20.0'x5.0'	11 Mly		
NGC 188	Collinder 6	Open	Cep	00h47m28s	+85°15'18"	9.3	17.0'	5,400 ly		
NGC 559	Collinder 13	Open	Cas	01h29m31s	+63°18'24"	7.4	6.0'	7,200 ly		
NGC 663	Collinder 20	Open	Cas	01h46m09s	+61°14'06"	6.4	14.0'	6,800 ly		
NGC 891	MCG 7-5-46	Gal	And	02h22m34s	+42°20'46"	10.9	11.7'x2.3'	28 Mly		
NGC 936	MCG 0-7-17	Gal	Cet	02h27m38s	-01°09'20"	11.2	4.5'x3.4'	68 Mly		
NGC 1023	Arp 135	Gal	Per	02h40m24s	+39°03'48"	9.6	7.6'x2.8'	34 Mly		
NGC 1055	MCG 0-7-81	Gal	Cet	02h41m45s	+00°26'32"	11.4	6.2'x2.9'	52 Mly		

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**Turtle Nebula (NGC 6210)** Located in the constellation Hercules about 6,500 light years distant, the Turtle Nebula is relatively bright. The brighter portion has a somewhat irregular box shape with some protrusions that look like the feet of the turtle. Visually, the outer glow of the nebula appears mostly round and about 30" in size, but no central star was visible in a 14" telescope. At 300x, it begins to show some structure, so if seeing permits, use high power to bring out some of the intricate structure of this planetary nebula.

**Cat's Eye Nebula (NGC 6543)** Located in Draco, the Cat's Eye Nebula, or NGC 6543, is a planetary nebula about 3,300 light years distant from us. In the telescope, the Cat's Eye first shows as a relatively bright round glow about 20" in diameter. Averted vision will show extensions of the nebula on the north and south ends. The nebula is brighter toward the center and will show the central star on good nights. The outer halo of the nebula is quite big and dim, but the clear dark skies of ESP may allow you to observe a bright patch (IC 4667) in the outer portion of the halo located about 1.8' to west of the center of the Cat's Eye.

**Blue Racquetball (NGC 6572)** Located in the constellation Ophiuchus, the distance estimates for the planetary nebula NGC 6572 range from 1,400 to 6,400 light years. In moderate sized telescopes it appears as a round, relatively bright blue glow about 15" in diameter, somewhat smaller than the Cat's Eye. The central star is visible, and the nebula has an almost 3D spherical appearance with averted vision.

**NGC 6712** A globular cluster located in the constellation Scutum, about 26,000 light years from us, NGC 6712 shows as a roundish glow, about 8' in diameter, with a somewhat irregular shape. The core of the globular has two concentrations, one to the northwest and the other to the southeast. A moderate size telescope of 14" will show some resolved stars on top of the dim glow produced from the dimmer stars of the cluster.

**Blinking Planetary (NGC 6826)** The "Blinking Planetary" is a relatively bright planetary nebula in Cygnus with an apparent diameter of 25". It is about 3,600 light years from us and likes to play games with our observing skills. If you stare at it at medium powers, the nebula fades out and all you see is the bright, magnitude 10.4, central star. Look away from the object and the nebula pops back into view with your averted vision. Alternating between direct vision and averted vision will make the nebula "blink" on and off. Try different magnifications to see which power shows the best detail in the nebula and which power brings out the blinking effect the best.

**NGC 6891** A nice little planetary nebula in Delphinus about 7,800 light years distant. At 15" in size, you will need about 100x to identify it as a planetary nebula from the background stars. At 450x in a 14" telescope, the central star is visible, and the nebula appears slightly mottled.

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**NGC 6934** Situated about 52,000 light years from us in the constellation Delphinus, NGC 6934 is one of the more distant globular clusters that is easily visible through amateur telescopes. Once located at low power, the cluster will show as a fuzzy patch of light about 4' in diameter. In a 14" scope the stars in the cluster are resolvable at 300x. Visually the core of the cluster seems to be elongated east to west.

**NGC 6946** This bright face on spiral galaxy is on the border of Cygnus and Cepheus and situated about 52 million light years from us. It is known as the "Fireworks Galaxy" because of the high frequency of supernova occurring in it. There have been 10 recorded supernovae in NGC 6946 over the last 100 years. NGC 6946 contains only half the number of stars as the Milky Way but its rate of supernova occurrence is about 100 times greater than the rate in the Milky Way. The last observed supernova in NGC 6946 was as recent as May 2017. See if the dark skies of ESP allow you to see the spiral arms of this galaxy.

**NGC 7006** At a distance of approximately 137,000 light years, globular cluster NGC 7006 is smaller and dimmer than its compadre in Delphinus, NGC 6934. In smaller scopes it appears as a dim round glow, about 3' in diameter with irregular edges. Not really resolvable but having a grainy and mottled appearance. Telescopes larger than around 14" will begin resolving stars in the cluster at higher powers. A really neat globular considering that it is 137,000 light years away from us!

**NGC 7048** Located in Cygnus at a distance of 5,300 light years, this planetary nebula shows as a ghostly round glow in a moderate size telescope of 14". It is about 1' diameter and has a somewhat irregular edge. No central star was visible in the 14" and the surface brightness is uniform but dim. NGC 7048 can be found by locating four fairly bright stars forming a rectangle, with the planetary nebula nestled in the northwest end of the rectangle.

**NGC 7217** This face on spiral galaxy is located in Pegasus about 50 million light years away from us. In the telescope, it shows as a relatively bright round patch of light about 3' in diameter. The surface brightness is smooth and does not show much core concentration or mottling.

**Helix (NGC 7293)** The Helix is a large beautiful planetary nebula located in Aquarius at a distance of 655 light years. In the telescope it will appear as a dim, large, mostly round glow of light about 15' in diameter. The center of the glow is less bright, giving the impression of a large doughnut with icing on it. Try using a UHC or OIII filter to bring out the details of the nebula. With dark skies and good seeing, see if you can detect the central star and radial spokes on the inside of the nebula.

**NGC 7331** NGC 7331 is a fine spiral galaxy about 40 million light years from Earth. It is elongated, 8' x 3' in size, and oriented mostly NS. The core is prominent and appears stellar at the center. There is some mottling in the glow of the galaxy and perhaps a hint of a dust lane on the SW side. In a 14" telescope, three faint galaxies, NGC 7337, 7340, 7335 can also be seen with averted vision. They are located on the east side of

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7331 and are arranged in a triangular pattern. There is a fourth smaller and dimmer galaxy, NGC 7336, that is also located on the east side of 7331 just north of the triangle composed of 7337, 7340 and 7335. These four galaxies are often referred to as the “fleas”. Although they appear to be associated with NGC 7331, the fleas are actually background galaxies located some 300 million light years away from us.

**NGC7479** A barred spiral galaxy in the constellation Pegasus about 105 million light years from Earth. It is classified as a Seyfert galaxy and is undergoing intense star formation. NGC 7479 is a nice example of a barred galaxy. The bar is obvious in a moderate size telescope. The galaxy is elongated in the N-S direction about 3' x 2' in size, with the bar running N-S in the center of the halo. Averted vision clearly shows two arms on the north and south ends. The arm on the south end of the galaxy arcs westward and then northward. The arm on the north end is broader and dimmer, arcing eastward and then to the south.

**Little Sombrero (NGC 7814)** Located in Pegasus about 40 million light years away, the galaxy NGC 7814 should be relatively easy to find. It is a spiral galaxy that is oriented edge-on to us and is quite often called the “Little Sombrero” for its resemblance to M 104, the “Sombrero Galaxy”. NGC 7814 has an oval shape about 3.5' x 2' oriented NW-SE. The core is bright but not stellar and appears as a bulge in the center of the galaxy. Averted vision should show a thin dark lane running through the center. A straight line of six dim 13th to 14th magnitude stars runs NE- SW on the east side of the galaxy making for an interesting field.

**NGC 40** A nice, bright planetary nebula located in the constellation Cepheus about 5,280 light years from Earth. It first appears as a bright blueish glow about 1' in diameter with a bright central star! The ring structure of NGC 40 is easy to see. The dark ring appears more prominent on the east and west sides of the nebula. It also appears to have a feathery extension out of the SSW side.

**NGC 246** Sometimes referred to as the Skull Nebula, NGC 246 is located in the constellation Cetus about 1,600 light years away. It is a relatively big planetary nebula, about 4' in diameter. Although it has moderately low surface brightness, the dark skies of ESP should allow it to be easily observed in moderate sizes telescopes without the aid of a filter. The central star is magnitude 11.9 and shines bright relative to the nebula. There are two other magnitude 11 stars embedded in the nebula. Moderate power (200x) with a UHC filter will show a lot of detail in the nebula. See if you can detect the dark lanes in the interior of the nebula and the major dark lane that runs through the center of the nebula and appears to break out on the southeast side.

**NGC 247** A spiral galaxy about 11 million light years from us in the constellation Cetus. In a 14” telescope it appears as a broad dim smudge of light about 15' x 5' in size oriented in a north-to-south direction. The northern end appears broader and the southern end pointier with a bright magnitude 9 foreground star embedded in it. The surface brightness is low, but averted vision seems to show some mottling and there is some concentration of the glow toward the center of the galaxy.

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**NGC 188** Discovered by John Herschel in 1825, NGC 188 is an open cluster in the constellation Cepheus located 5,400 light years from Earth. In a telescope it appears as a moderately dense collection of about 50 to 100 stars, varying in brightness from magnitude 10 to magnitude 15. The cluster is about 15' in size and seems to show best at lower powers of around 90x.

**NGC 559** Also known as Caldwell 8, NGC 559 is an open cluster in the constellation Cassiopeia about 7,200 light years from Earth. It is a moderately loose collection of about 50 stars ranging from magnitude 12 to magnitude 15. It is about 5' in size and will first show as an increase in the concentration of stars in the portion of the Milky Way that runs through Cassiopeia. The brighter stars of the cluster on the east side are arranged in an arc swooping south to west.

**NGC 663** Also known as Caldwell 10, NGC 663 is another open cluster in the constellation Cassiopeia about 6,800 light years from Earth. In the telescope it will appear as a large loose cluster of about 100 stars ranging from magnitude 8 to magnitude 14. The size of the cluster is 16', but the background stars of the Milky Way make it appear much larger.

**NGC 891** An edge on spiral galaxy in the constellation Andromeda, located some 28 million light years from Earth. It will appear in the telescope as a long thin streak of light about 10' x 2', oriented in a mostly north-south direction. It will show best at powers of around 90x. It has a relatively even surface brightness that shows some mottling. There is a dark lane visible running along the north-south centerline of the galaxy. The core of the galaxy shows a slight bulge at the center.

**NGC 936** A barred lenticular galaxy in Cetus, 57 million light years away from us. Through the telescope it appears as a mostly round glow about 3.5' diameter. There is some core concentration that is almost stellar. NGC 941 is in the same field of view, just 12.5' to the east of NGC 936. NGC 941 is dimmer and smaller with no core concentration. A third galaxy, UGC 1945, shines at magnitude 14 and may be visible 14.5' to the southeast of NGC 936. Try using averted vision and patience to see if you can also detect UGC 1945.

**NGC 1023** Another barred lenticular galaxy in the constellation Perseus, NGC 1023 is roughly 34 million light years from Earth. In a moderate size telescope, it first appears as an oval patch of light about 5' x 1.5' running mostly east-to-west. The core is bright with some concentration, but not quite stellar and appears elongated perpendicular to the rest of the galaxy, perhaps showing the bar. Large telescopes may show its companion, NGC 1023A, as a faint smudge of light just on the east end of NGC 1023. M 77 is located just 23' to the SSW of NGC 1023 and both objects can be placed in the same field of view at lower powers.

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**NGC 1055** An edge-on spiral galaxy in the constellation Cetus about 52 million light years from Earth. NGC 1055 is relatively easy to locate at the southern tip of an equilateral triangle formed with two bright magnitude 7 and 8 stars 6.5' to the north of the galaxy. The galaxy appears as a moderately thin wisp of light running mostly east-west, about 4' x 1' in size. No real core concentration, but it shows some brightening towards the core. It's located just south of a magnitude 11 star which makes for an interesting view. See if you can also spot the dark dust lane that runs on the northern side of the galaxy. M 77 is located 30' SSE of NGC 1055. Try using a wide-angle eyepiece to see if you can place both objects in the same field of view.