

International Comet Quarterly


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The astronomical magnitude scale.

The scale below is given as an instructive tool, to give a general idea of how the [magnitude](#) scale works. The scale below is intended to be roughly visual; the human eye's (dark-adapted) detection efficiency peaks around 495 nanometers, while the formal photoelectric V peak (a filtered band intended to be close to visual) is around 550 nm; CCDs tend to peak around 700 nm. The examples are given for integer values are not "exact", in that celestial objects are often measured to a precision of 0.1 or 0.01 magnitude; for example, Sirius shines at $V = -1.47$ (*Yale Bright Star Catalogue*), and the planet Venus varies in brightness generally from magnitude -4.5 to -3.7. Note that a comet of magnitude 5 will not be as easy to see as a star of magnitude 5, because that same amount of brightness that is concentrated in a point for the star is spread out over a region of the sky for a diffuse comet with a relatively-large coma.

Magnitude	Needed to see an object of this brightness*	Examples
-26		the sun
-13		full moon
-6		crescent moon
-4	naked eye: easy even from large cities	planet Venus
-2	naked eye	planet Jupiter
-1	naked eye	brightest star, Sirius; totally-eclipsed moon; C/1995 O1 (Hale-Bopp) near peak
0	naked eye: difficult if near bright artificial lights but generally visible even from large cities	summer evening star Vega; C/1996 B2 (Hyakutake) at peak
+1	naked eye: brilliant as seen from dark, rural areas	planet Saturn
+2	naked eye: difficult but visible from small cities and suburbs; diffuse objects such as comets may require small binoculars from urban areas	stars of Big Dipper Halley's comet in 1986 near peak
3	naked eye: rural, suburban, small city binoculars: bright, urban areas	faintest naked-eye stars visible from many smaller cities/inner suburbs;
4	naked eye: (outer) suburbs binoculars: cities (stars), suburban areas (diffuse objects such as comets)	faintest naked-eye stars visible from many smaller cities/(outer) suburbs
5	generally binocular objects from urban and suburban areas; faintest naked-eye	moons of Jupiter

	stars visible from "dark" rural areas some 40 miles (60 km) from cities	
		
6	binocular objects from suburban areas; faintest naked-eye stars visible from "dark" rural areas located some 100 miles (150 km) from major cities	planet Uranus
7	binoculars; faintest naked-eye stars visible from "dark" rural areas located some 140 miles (200 km) from major cities and some 30 miles (50 km) from nearest town of population 5000 or so	brightest minor planet (asteroid) and about 1-2 comets each year
8	binocular objects; from urban areas, such objects may only be visible with small telescopes	planet Neptune
10	from dark sky, objects visible with 20x80 binoculars; from brighter sites, a larger telescope is needed	at any given time, there are usually a couple of comets this bright
11	general limiting visual brightness# of comets with a 15-cm-aperture reflector	
12	general limiting visual brightness# of comets with a 20-cm-aperture reflector	at any given time, there are usually a half dozen comets this bright
13	general limiting visual brightness# of comets with a 25-cm-aperture reflector	
14	general limiting visual brightness# of stars with a 20-cm-aperture reflector	Pluto at its brightest
15	general limiting visual brightness# of comets with a 50-cm-aperture reflector	
19	general limiting photographic brightness# of comets with a 50-cm-aperture reflector	
21	general limiting brightness of stars with a 60-cm-aperture reflector + CCD	
22	general limiting brightness# of comets with a CCD and 150-cm-aperture reflector	

* naked-eye viewing assumes 20-20 vision (corrected or uncorrected)
from a dark, rural site; "visual" as compared to "photographic" or
"CCD-detected"; "reflector" means "reflecting telescope"

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