

















Magnification & aperture of an astronomical telescope, along with the considerable effect of night sky viewing conditions, determines the image details you see in the eyepiece. The following tables give examples of what may be viewed through the eyepiece for the given magnification & aperture.





	<b>The Moon</b>	Aperture	Low Powers (30x-70x)	Middle Powers (70x-140x)	High Powers (over 140x)
		~60mm	Entire moon can be seen in the field of view	Lunar craters & seas can be seen	High powers can only be used when seeing is good
		80mm	Entire moon can be seen with distinct features	Craters & mountains can be seen distinctly	Half of the moon is seen in the field of view
		100mm	" ditto "	Small craters can be observed	Many mountain & valley details can be observed
		150mm~	" ditto "	Details of small craters can be observed	Small hills & details of valleys can be observed
<b>Suggested Scopes :</b>		 <a href="#">Skywatcher Capricorn 70</a>	 <a href="#">Skywatcher Startravel 102</a>	 <a href="#">Avian StarSeeker</a>	

	<b>Saturn's Rings</b>	Aperture	Low Powers (30x-70x)	Middle Powers (70x-140x)	High Powers (over 140x)
		~60mm	Entire Saturn can be seen small in the field of view	It's easy to see Saturn's rings & the satellite Titan	Saturn's bands may be visible
		80mm	Low powers are mainly used when centring the planet in the field of view	Saturn's bands, shading of rings & Cassini's division can be seen	When making a sketch, a power of more than 150x is recommended
		100mm	" ditto "	" ditto " & two satellites are visible	Saturn's bands & three separated rings can be seen
		150mm~	" ditto "	" ditto " & three satellites are visible	Saturn's bands can be seen, & the most outside ring can be observed distinctly
<b>Suggested Scopes :</b>		 <a href="#">Meade ETX 80</a>	 <a href="#">Skywatcher Explorer 130PM</a>	 <a href="#">Meade ETX 90</a>	

	<b>Jupiter</b>	Aperture	Low Powers (30x-70x)	Middle Powers (70x-140x)	High Powers (over 140x)
		~60mm	Suitable for viewing the four largest satellites	It is easy to see a satellite crossing the planet & two or three cloud bands	High powers can only be used when seeing is good
		80mm	" ditto "	Rough structure of cloud bands can be detected	When making a sketch, a power of more than 150x is recommended
		100mm	" ditto "	Detailed structure of cloud bands can be detected	When making a sketch, a power of more than 200x is recommended
		150mm~	Too bright to observe	Suitable for observing the four largest satellites	Detailed structure & changing of cloud bands can be observed
<b>Suggested Scopes :</b>		 <a href="#">Skywatcher Skyhawk 1145PM</a>	 <a href="#">Skywatcher Explorer 150P</a>	 <a href="#">Meade ETX 125</a>	

 <b>Venus &amp; Mercury</b>		Aperture	Low Powers (30x-70x)	Middle Powers (70x-140x)	High Powers (over 140x)
		~60mm	Low powers are mainly used when centering the planets in the field of view	Cycle of phases on Venus is observable. At greatest elongation from the Sun, Mercury appears like a half moon	Venus is easy to see when seeing is good. For observation of Mercury, these powers are too high
80mm	" ditto "	" ditto "	Venus & Mercury are easy to see when they are at high altitude		
100mm	" ditto "	Middle powers should be used when seeing is not good	Brightness at edge, white spot & tint of Venus are visible. Cycle of phases on Mercury is observable		
150mm~	" ditto "	" ditto "	Brightness at edge, white spot & tint of Venus are visible. Faint patters of Mercury may be visible		
<b>Suggested Scopes :</b>		 <a href="#">Skywatcher Skyhawk 1145PM</a>	 <a href="#">Celestron NexStar 114 SLT</a>	 <a href="#">Skywatcher Skymax 127 STA</a>	

These planets are observable to a beginner with a telescope. They are observable only in the west at dusk or the east just before dawn.  
(Vixen pictured at left)

 <b>Mars</b>		Aperture	Low Powers (30x-70x)	Middle Powers (70x-140x)	High Powers (over 140x)
		~60mm	Low powers are mainly used when centring an object in the field of view	At Mars opposition, Syrtis Major & polar ice caps are visible	Mars is easy to see when sky conditions are good
80mm	" ditto "	Polar ice caps & a few contrasting surface patters are visible	When making a sketch, a power of more than 150x is recommended		
100mm	" ditto "	Middle powers should be used when seeing is not good	When Mars comes close to Earth, various surface patterns can be identified		
150mm~	" ditto "	" ditto "	At greater than 200x power, various features can be identified		
<b>Suggested Scopes :</b>		 <a href="#">Skywatcher Skymax 80</a>	 <a href="#">Meade ETX 90</a>	 <a href="#">Skywatcher Skyliner 200P</a>	

Mars' appearance changes over time. The best observation opportunities occur every 26 months at opposition when Mars is closest to Earth. Surface patterns & polar ice caps are visible then, even through small telescopes, at the powers of 150x or more.

**Nebulas & Star Clusters**


Powers of less than 50x are suitable for observation of most nebulas & star clusters. For observation of the Andromeda Nebula & Orion Nebula, powers of 20x to 30x are suitable. Larger aperture makes the image brighter.



[William Optics Megrez 90](#)

**Multiple Stars, Variable Stars & Comets**

Many other celestial objects can be seen with a telescope by the beginning observer. A comet is too faint to see when far away from the sun. Approaching close to the sun, the comet becomes an expanded object like a nebula.



[Meade LX 90](#)

**The Sun**

Never look directly at the sun with a telescope. For observation of the sun, use a sun projector screen. The sun projector screen can be used with a refractor, but it cannot be used with reflecting type & catadioptric type telescopes.



[Coronado PST](#)

**Increased Magnification Does Not Always Lead To Good Observation**

Theoretically, telescope magnification can be increased to any arbitrary high power. However, at an immoderately high power, the image becomes blurred & losses clarity. It is advisable to make observation at a moderate power.

A high power telescope does not mean a high performance telescope. The maximum appropriate power is 2.5x the objective's "effective diameter" in millimetres. For example, the maximum appropriate power of a telescope with the effective diameter 60mm is 150 (= 2.5 x 60). At powers greater than 150x the image becomes blurred & indistinct.




Image at an appropriate power




Image at too high a power

**Effective Diameter Of Objective Lens Or Primary Mirror Affects Image Quality**

The larger the effective diameter the higher the light gathering power & resolving power of the telescope. Therefore, a telescope with large aperture yields a bright & high contrast image. For observation of the faint nebulas or star clusters, such a telescope is perfect.

The larger the diameter of an objective lens or primary mirror, the better the optical performance. The image of a larger aperture telescope is sharp & bright as shown in the picture below. The image quality is also affected by optical performance of the objective lens, primary mirror & eyepiece used on a telescope.




Image through a large aperture telescope at high power

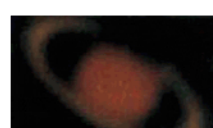


Image through a small aperture telescope at high power