

# **Astronomy Observation Log of:**

Your name here

Keeping a log will teach you patience in observing. By accurately recording your observations, you will be spending more identifying faint details that you would otherwise miss with casual observing.

As an added benefit, you'll find that your observational skills will improve. Over time, you'll train your eye to see more detail, and fainter objects that you may have not seen before. What once was only visible with averted vision, you may find you can see directly. Sketching your observations will hone you astronomy viewing and navigation skills.

## Seeing and Transparency Scales, Magnitude and Brightness Scale, Filters for Visual Observation

(http://www.astromax.org/faq/aa01faq14.htm)

Use the following scales for astronomical seeing and transparency when filling out your observing logs.

#### **ASTRONOMICAL SEEING**

- LEVEL 1 Severely disturbed skies: Even low power\* views are uselessly shaky. Go read a good book.
- LEVEL 2 Poor seeing: Low power images are pretty steady, but medium powers are not.
- LEVEL 3 Good seeing: You can use about half the useful magnification of your scope. High powers\* produce fidgety planets.
- LEVEL 4 Excellent seeing: Medium-powers are crisp and stable. High-powers are good, but a little soft
- LEVEL 5 Superb seeing: Any power eyepiece produces a good crisp image.
  - \* The **PRACTICAL LOWEST** power magnification for any telescope is approximately 7 times for each inch of aperture. Example: 28X for a 4-inch (100mm) diameter telescope.
  - \* The **PRACTICAL HIGHEST** power magnification for any telescope is approximately 50 times for each inch of aperture. Example: 200X for a 4-inch (100mm) diameter telescope.

#### TRANSPARENCY SCALE

- **0. Do Not Observe** Completely cloudy or precipitating.
- 1. Very Poor Mostly Cloudy.
- 2. Poor Partly cloudy or heavy haze. 1 or 2 Little Dipper stars visible.
- 3. Somewhat Clear Cirrus or moderate haze. 3 or 4 Little Dipper stars visible.
- 4. Partly Clear Slight haze. 4 or 5 Little Dipper stars visible.
- 5. Clear No clouds. Milky Way visible with averted vision. 6 Little Dipper stars visible.
- **6. Very Clear** Milky Way and M31 visible. 7 Little Dipper tars visible.
- 7. Extremely Clear M33 and/or M81 visible.

#### **BRIGHTNESS SCALE**

Magnitude*	Comments	
very bright stars		
-4	Venus at its brightest	
-3	Jupiter at its brightest	
-2	Sirius in Canis Major, the brightest star in the sky	
-1	Betelgeuse in Orion	
0	Vega in Lyra	
+1	Spica in Virgo, Deneb in Cygnus, Pollux in Gemini	
+2	Polaris, the North Star	
+3	Megrez, the faintest star in the Big Dipper	
+4		
+5	Probable naked eye limit in the suburbs	
+6	Probable naked eye limit in the country	
+7		
+8	Neptune	
+9	Approximate limit of typical binoculars	(Comments: assume as
+10	Approximate limit of a 60-mm telescope	dark a sky as possible.)
+11	Approximate limit of a 3-inch telescope	
+12	Approximate limit of a 4-inch telescope	
+13	Approximate limit of a 6-inch telescope	
+14	Approximate limit of an 8-inch telescope	
very dim stars		

<sup>\*</sup> Magnitudes are approximate

## Object Type Abbreviation Key

CLD	Star Cloud
DBL	Double Star
GC	Globular Cluster
Glx	Galaxy
Moon	Planetary Moon
NbDF	Diffuse Nebula
NbDRK	Dark Nebula
NbEM	Emission Nebula
NbOC	Nebula/Open Cluster
NbRF	Reflection Nebula
OC	Open Cluster
Pla	Planet
PN	Planetary Nebula
QSR	Quasar
SNR	Super Nova Remnant
VAR	Variable Star

#### FILTERS FOR VISUAL OBSERVATION

A good resource at the telescope is a set of colored filters. Filters can be acquired from various sources. Consult your astronomy magazines. Kodak's Wratten series can be purchased in over a hundred colors and densities, and can be mounted in slide mounts and simply be held between the eyepiece and the eye. For longer observations, as when sketching, screw-in filters are available for both 1-1/4 and 2-inch eyepieces. You don't need to choose between dozens of colors, though; only a few will do.

Filters can reduce glare, improve image definition, and enhance tonal contrast. Here are some suggestions.

- A BLUE filter, such as a Wratten #44A, 47B or 80A, can be used for the detection of high altitude clouds on Mars, white ovals and spots in the belts of Jupiter, and the zones of the clouds of Saturn. It can also be used to cut down glare on a bright Moon.
- A GREEN filter, such as a Wratten #58, allows you to see more clearly the edges of the Martian polar caps, and enhances the belts and Great Red Spot in the clouds of Jupiter.
- A YELLOW filter, such as a Wratten #8, 12, or 15, can improve markings in the clouds of Venus and enhance Martian dust storms.
- An ORANGE filter, such as a Wratten #21, is one of the more useful ones you can have. It is used for bringing out detail on Mars, and enhancing some of the zonal detail on Jupiter. An orange filter also darkens the blue sky, so daytime observations of Jupiter, Venus, and the Moon are much improved.
- A RED filter, such as a Wratten #23A, 25, or 25A, can also be used to enhance contrast on Mars, Jupiter, and Saturn. A red filter, however, is fairly dark, so it works best on larger aperture telescopes which give brighter images. Flipping back and forth between red and blue filters can sometimes bring out subtle colorations on the Moon.
- A POLARIZING filter can cut down glare when observing a nearly full Moon, making it easier to see ray structure. It will also cut down day-time glare.
- LIGHT POLLUTION and O-III filters are good for planetary and emission nebulae.

## Calculating Magnification (power)\*

To determine power in a telescope, divide the focal length of the telescope by the focal length of the eyepiece. By exchanging an eyepiece of one focal length for another, you can increase or decrease the power of the telescope. For example, a 25mm eyepiece used on a telescope with a 1000mm focal length would yield a power of 40x (1000 / 25 = 40) and a 10mm eyepiece used on the same telescope would yield a power of 100x (1000 / 10 = 100). Since eyepieces are interchangeable, a telescope can be used at a variety of powers for different applications.

There are practical lower and upper limits of power for telescopes. These are determined by the laws of optics and the nature of the human eye. As a rule of thumb, the maximum usable power is equal to 60 times the aperture of the telescope (in inches) under ideal conditions. Powers higher than this usually give you a dim, lower contrast image. For example, the maximum power on a 60mm telescope (2.4" aperture) is 142x. As power increases, the sharpness and detail seen will be diminished. The higher powers are mainly used for lunar, planetary, and binary star observations.

\*(http://www.telescopes.com/telescopes/magnificationandusingeyepiecesarticle.cfm)



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