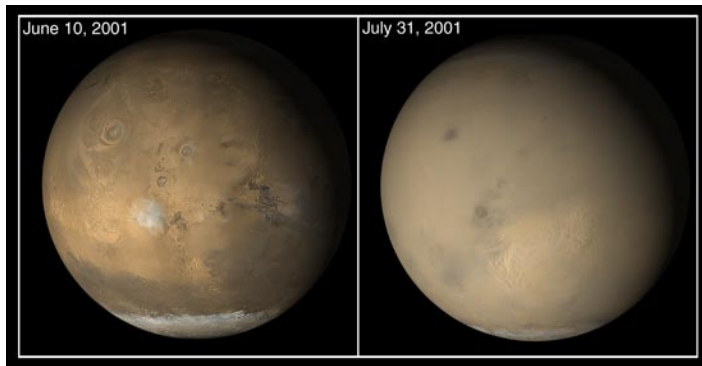




## What You Can See

Mars has always attracted a lot of attention among skywatchers. Its appearance through a telescope changes dramatically. This amazing change happens for three reasons. The first is that Mars, like Earth, is tilted on its axis. So it has seasons. Polar ice caps grow and shrink. And you can see the change with amateur-size telescopes.

Another dynamic feature of Mars' climate can cause a second shift of appearance: global dust storms. Mars surface is very dry, compared with Earth. Martian winds can whip up the fine reddish dust into quite a frenzy! Disturbances range from small, local dust devils to continent-sized dust-typhoons that can enshroud just about all of the planet. When that happens, Mars looks featureless to Earthbound observers.

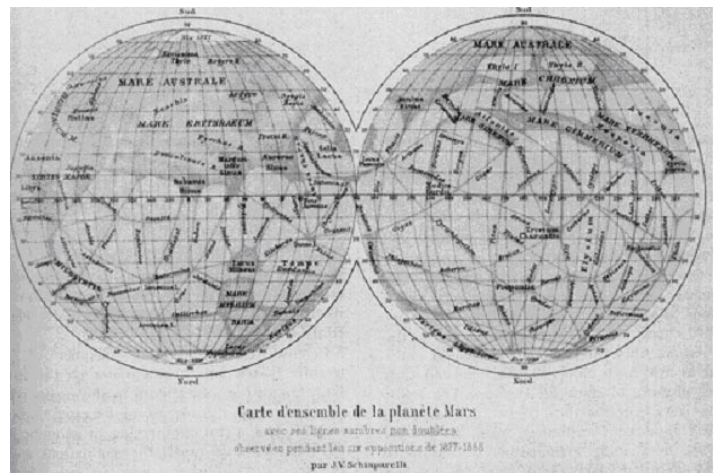


Wide-angle cameras from the Mars Orbiter Camera show Mars in June on a clear day and then a month later with dust storms so severe, surface features weren't visible for 3 months. NASA/JPL/Malin Space Science Systems.

The third cause of Mars' shifting appearance is its orbital relationship with Earth. It takes Mars just under two Earth-years to make one trip around the Sun. So sometimes it seems quite small and dim. Sometimes it "hides" entirely behind the Sun. And approximately every two years Mars comes close to Earth (at opposition). During these few weeks, Mars can seem very bright and telescopes can reveal marvelous details on its surface. For instance, when Mars is very clear, a series of dark markings can be seen across the surface of the planet. These dark

### Mad Mars Facts

- 1 Mars Day (called Sol)= 24 hours 37 minutes
- 1 Mars Year= 686.98 Earth days
- Mars Gravity= .386 Earth (If you weigh 100 pounds on Earth, you'll weigh 38.6 on Mars)



Giovanni Schiaparelli. Map of the planet Mars. 1888.

markings were thought by some in the late 19th century to be man-made "canals," but they were later determined to be merely optical illusions.

Even with Mars at opposition, a magnification of 200x or more will be needed to see fine details, demanding a high-quality telescope, good eyepieces and, of course, clear, dark skies. During an opposition, 4-inch and larger telescopes can certainly show Mars' two white polar caps as well as some amorphous surface features. The easiest dark marking to spot on Mars is called Syrtis Major, which looks like a triangular wedge extending North and South. A second, smaller feature is called Meridiani Sinus, which looks a little like a claw. Finally, take a look for the "Eye of Mars," Solis Lacus, a bright, circular area surrounding a dark middle. This diagram (next page) shows some surface features you might see in a good telescope. Mars rotates, of course, so you might see different features at different times.



## Using Filters

Planets are colorful objects. So different colored filters can really help reveal different planetary features. A color filter zeros in on a narrow region of the spectrum, reducing the scattering of interfering wavelengths.

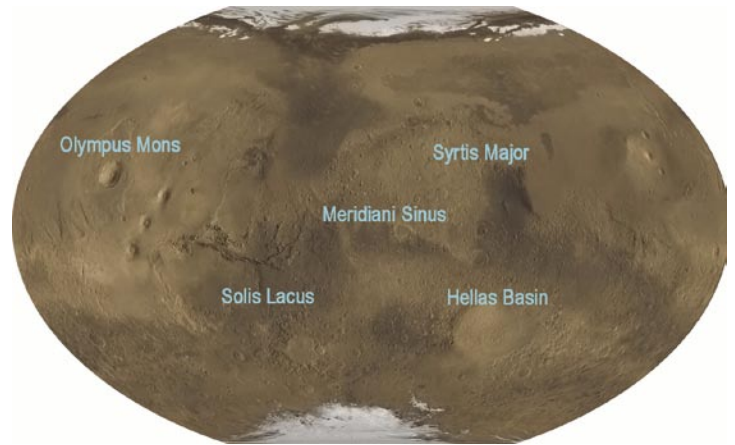
Each filter passes its characteristic color of light while blocking complementary colors. Green objects will appear bright (pale) through a green filter, and dark through a blue or red filter. Red features will appear bright through a red filter and dark through a green or blue filter. For example, Mars is reddish. So it makes sense that the Red Planet is most effectively enhanced with a green filter.



The filters thread into the barrel of an eyepiece. Usually the aluminum cell holding the filter is threaded such that two or more can be “stacked,” to achieve simultaneous filtering of more than one color.

For viewing Mars, #25 Red passes the predominant reflections of surface plains and maria, and #21 Orange is good for reducing the intense glare to enhance detail and mottling. The polar caps stand out with #15 Deep Yellow and #80A Medium Blue; examine the melt lines with #58 Green.

If you enjoy even a moderate amount of observing, you will benefit by having a few filters at your disposal. Chances are, you will reach for a filter for your telescope as often as you reach for sunglasses for your eyes on a sunny day. They almost always improve the view.



*This map of Mars was produced in a collaborative effort by the Mars Global Surveyor MOLA and MOC teams for the National Geographic Society. Image Credit: National Geographic Society, MOLA Science Team, MSS, JPL, NASA.*

## Using Starry Night®

Having a hard time finding Mars? Try Starry Night® software from Imaginova. All of the versions of the software have a “Find” pane where you can select Mars, turn on the orbit, and track its movement across the sky. You can also print out star charts for the exact location of Mars while viewing from your own backyard. In Starry Night® Pro, use the ephemeris generator to generate exact coordinates for Mars from your location.

## Quick Reference Telescope Filter Guide from Orion® Telescopes & Binoculars

Filter Color	Feature
Red, Orange	Surface Features
Yellow	Deserts, Dust Storms
Green	Polar Cap, Frost
Blue, Violet	Clouds, Hazes

Read more about how to make the most of Mars this season with “Viewing Mars” and “Mars Photography”.

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