Monthly Sky Maps:
Monthly sky maps can be found in newspapers, magazines, and a variety of other places. Magazines such as Sky & Telescope or Astronomy are good sources of astronomical news and also have excellent nontechnical articles on astronomy, telescopes, *etc*. Both are available at most local bookstores and magazine stands. Sky maps are also available on the web; try http://skymaps.com/downloads.html

To use these maps, face south, holding the map upward in front of you, then raise it so it is overhead. East will then be to your left. These maps show only the brighter stars and constellations. Maps from some of the sources mentioned above will show greater detail - and can be correspondingly more confusing. It is a useful exercise to try to identify on the sky almost everything shown on the map. What you see on the sky changes slowly with season and depends upon the time of night as well; note the changes that occur over an hour or two. The map for a given month will also be good for that same month every year insofar as the "fixed stars" are concerned, but the planets and the Moon will have different locations and phases.

Observing the Sky:
Viewing conditions are best if the sky is clear and you are well away from bright light sources. These lights both (temporarily) destroy your "dark vision" and light up the sky. Fainter stars, clusters, and nebulosities are easily lost against a bright background sky. Find the least obstructed and darkest location you can.

Daytime observations are generally limited to the Sun, Moon, and atmospheric phenomena such as rainbows, halos, and glories. Sunspots can usually be seen (using adequate ultraviolet and infrared protection for the eye) through small telescopes or sometimes without magnifying instruments of any kind. Venus and Jupiter are occasionally visible in the daytime sky - if you know where to look.

You can see many things other that just stars, the Moon, and planets with the unaided eye. One can see many faint fuzzy patches or nebulae (Latin for "clouds"), particularly along the Milky Way (our own galaxy seen edge-on from within). Some of these are in fact clouds of glowing gas, fluorescing due to ultraviolet light from nearby hot stars. Other nebulae are actually star clusters, and some are external galaxies. The dark streaks along the Milky Way are caused by "dark nebulae", clouds of dust which obscure the background stars in our galaxy. Note the apparent motion of the sky with time, the rising and setting of stars, seasonal changes in the constellations, motions of the Moon and planets with respect to the "fixed" stars, and the changing lunar phases. Meteors ("shooting stars") are common nightly events. The appearance of a naked-eye comet, on the other hand, is a rare, almost "once-in-a-lifetime" occurrence.

Telescopes, etc.:
A pair of binoculars brings many more things into view than you can see with the unaided eye. The popular 7x50 size works quite well. You can discern craters and other features on our Moon and, if you can hold the binoculars steady enough, possibly the moons of Jupiter and maybe the rings of Saturn. Binoculars provide an excellent introduction to the skies. They are also useful for watching birds, people, and other forms of wildlife. They have enough light gathering power to reveal many faint star clusters and nebulae. Binoculars typically magnify 6 to 15 times. (7x50 binoculars magnify 7 times and have 50 millimeter diameter objective lenses; the larger the latter, the greater the light gathering power.) At the higher end of this magnification range the instrument must be firmly braced or tripod-mounted to avoid unacceptably large image motions. Because of their versatility and ease of use, binoculars are the recommended as excellent "first telescopes" for those with an newly found interest in astronomy.

Details of the planets, such as the Martian markings and polar caps, the atmospheric bands of Jupiter, the rings of Saturn, *etc.*, generally require more magnification than is provided by binoculars. A small telescope can provide this; magnifications of 50x or so are quite adequate for most purposes but large magnifications (more than 300x, say) are often limited by atmospheric blurring. As with binoculars, the diameter of the objective lens determines the light gathering power and the ability to discern faint objects. The most important part of a small telescope is probably its mounting; it is extremely frustrating to try to use a telescope that oscillates wildly at the slightest touch. Moreover, telescopes must be able to move smoothly to track the motion of the celestial sphere. (Fancier models come equipped with motor drives.)

Finding Neighboring Planets

Five of the planets of our solar system are easily visible on the sky to the unaided eye under the right conditions. These are Mercury, Venus, Mars, Jupiter, and Saturn. (A sixth is also visible if you look straight down.) Three others, Uranus, Neptune, and Pluto can be seen in a telescope of modest size. (Under exceptional circumstances, Uranus might be visible to those with very good eyesight.) Over two hundred planets have been found orbiting other stars but these cannot be observed directly, even with the largest telescopes. However, many of the stars hosting these planets are near enough and bright enough to be seen without a telescope. Our naked-eye planets are generally easy to find when they are above the horizon at night or at twilight. So how do you find them and how do you recognize a planet?

Recognizing These Planets

Planets are distinguishable from stars in that they move (albeit slowly) relative to the stars, are found on or near the ecliptic, are usually bright (but slowly vary in brightness), and tend not to twinkle.

The naked-eye planets are usually easy to find if only because of their brightness - which will usually equal or exceed that of all but the brightest few stars visible on the sky. Indeed, of the half-dozen brightest "stars" visible on the sky at any given time it is quite likely that one or two are really planets. Indeed, Venus and Jupiter can be bright enough to cast a noticeable shadow under some circumstances .

Planets usually don't "twinkle". Twinkling (more formally called "scintillation") results from the passage of turbulent cells of air in the terrestrial atmosphere across the line of sight. Because the planets have substantial angular sizes (although not noticeable to the unaided eye) they are much less subject to scintillation than are the more pointlike stars. Of course, stellar scintillation might not be noticeable under very stable conditions and even planets can twinkle if the atmosphere above you is extremely turbulent.

The ecliptic is the annual path of the Sun on the celestial sphere. It is often shown on maps of the night sky to assist in planet finding. The Sun moves eastward along this great circle path through the fixed stars (and the 12 constellations of the zodiac) at a rate of about one degree per day, completing a circuit once per year. The planets of our solar system, including those only visible through telescopes, are always found on or near this path. The same is true of the Moon, asteroids, and short period comets. Thus a bright non-twinkling "star" observed to be on or near the ecliptic is very likely to be a planet.

What really always distinguishes the planets from the "fixed stars" are their motions. Indeed, the word "planet" derives from the Greek word for "wanderer". The paths of this apparent motion are fairly complicated and slow, but the changing position of a planet relative to the stars around it usually becomes noticeable after a few days or a week of observation. This apparent motion results from a combination of the planet's motion about the Sun and our own orbital motion. Again, if you see a brightish "star" in a constellation of the zodiac where your star map indicates no star, you are almost certainly looking at a planet. (The twelve constellations of the zodiac are those which happen to lie along the ecliptic.)

Finally, you can go looking for planets in their locations as might be indicated on a monthly star map. This approach is best if you are seeking an object which requires binoculars or a telescope.

What Else?

Venus and, particularly, Mercury will always be close to the Sun on the sky and are best observed at morning or evening twilight. The other planets will be at their brightest when nearly opposite the Sun on the sky. Planets are generally bright enough to trigger the color response of the human eye, but only a few stars are bright enough to do so. Mercury and Venus, nonetheless, tend to look white or blue white. Jupiter and Saturn have a yellowish aspect, and Mars appear distinctly reddish. These colors (and those of the stars) are enhanced with the use of binoculars or a telescope. Even a small telescope can show the polar caps and surface markings on Mars, cloud belts on Jupiter (and the famous "red spot"), the rings of Saturn, and the brighter satellites of Jupiter and Saturn. Mercury and Venus appear rather featureless but both show the full sequence of phases (new, crescent, half, gibbous, full, gibbous, half, crescent, new) exhibited by our Moon in the course of a month.