

Tips for Selecting Your First Telescope

Selecting your first telescope can be a daunting task. There are so many to choose from. This guide will give you some important facts that you will find useful when looking for a telescope.

1. **Never buy** a telescope in a department store or close out catalog. Make sure you deal with someone that specializes in astronomical equipment. Telescopes that cost under \$100 are generally not good scopes for observing the night sky.
2. **Magnification** or **Power** by itself is meaningless. Never choose a telescope that boasts high power or high magnification. High power makes the image darker and the field of view smaller which makes finding objects nearly impossible. High magnification is only useful for objects like the moon and planets.
3. The primary function of a telescope is to **gather light**, not to magnify the image to make it bigger. The more light a scope gathers, the more detail you will see in galaxies, star clusters, and nebula.
4. Get the scope with the **largest mirror** or lens (**aperture**) that you can afford. The larger the aperture, the more light that enters your telescope thus allowing you to see fainter objects. **However**, keep in mind that larger telescopes are heavier and may not be used as often as smaller lighter weight telescopes.
5. Besides the telescope, you will need to purchase a few accessories to go along with it. The **number one accessory** for a telescope is a good eyepiece. A good eyepiece can make all of the difference in image quality so don't settle for the cheapest one or the one that comes with your telescope. Eyepieces vary the magnification of the image. You will want to purchase 2 or 3 eyepieces to start with. Make sure one of your eyepieces is in the range of 32mm to 40mm because it will give you a wider field of view in the telescope making it easier to find objects. You will find that this eyepiece will be used most of the time. Other eyepieces like those in the range of 15mm to 20mm and 6mm to 9mm will give you higher magnification views which are useful when viewing the moon and the planets.
6. Make sure the scope you select has a **good stable mount**. This is as important as the scope itself. Cheaper telescopes come with mounts that are not stable and shake the telescope. Without a good solid mount, you cannot even focus properly,

let alone view the object.

7. Keep in mind the **size** of the telescope. Some larger scopes can be over 100 pounds. Often a smaller scope will get used more often because it is easier to move and set up.
8. Newer small computerized “**GOTO**” style telescopes will automatically position the telescope to an object you select in its internal database. These scopes work pretty well when properly aligned, however the big problem is that most have a database of many thousands of objects, most of which are invisible (or very nearly so -- particularly to a novice).
9. A major obstacle people getting into the hobby have to overcome is their expectations of what they should see in their telescopes. The image through the scope will never be as nice as the pretty picture shown on their box or in magazines. This is because those images were taken with longer exposures than is capable with the human eye.
10. There is no substitution for **optical quality**. A small telescope with excellent optics will out perform a larger scope with poor optics.
11. There is no substitution for **dark sky observing**. If you live in the city, the sky is often a glow with thousands of mercury vapor or sodium street lights. If you have to choose between a large scope that sits in your light polluted backyard, and a smaller scope that is easily transported to a darker location (i.e. the countryside), go with the smaller scope. No scope, no matter how large, will be of much use in the city.
12. Study the wide variety of **telescope designs**. Some scopes are better for viewing the moon and planets, while other scopes are good for viewing fainter objects like galaxies. Typically, a good quality refractor or a Schmidt-Cassegrain style scope are better suited for viewing the planets under high magnification, whereas Newtonian style scopes are better for deep sky objects like galaxies, nebula, etc.
13. Many communities have **astronomy clubs**. Try and find one in your area and attend one of the meetings. Some of the best information for buying a telescope will come from other people who already have telescopes.

14. Before investing money in a telescope, learn to **identify a few constellations** in the night sky like the *Big Dipper* (Ursa Major) or the constellation of Orion and then try to find an object like the very popular and easy to find Orion Nebula. If you can't find a constellation like Orion or the Orion Nebula, how do you expect to point a telescope (which has a much narrower field of view) there?

15. Subscribe to either **Night Sky** <http://nightskymag.com> or Astronomy magazine <http://www.astronomy.com> . These magazines will help you get started finding celestial objects and they will acquaint you with the variety of equipment available in the marketplace. If you have to pick one, my recommendation is to subscribe to Night Sky.

16. Consider starting out using a pair of **10 x 50 binoculars**. The 10 is the magnification factor and the 50 is the aperture of each objective lens in mm. Binoculars have a very wide field of view so when you look through them you see a large area of the sky. This makes it easy to look around the night sky and spot some of the brighter objects out there. Binoculars are also excellent for viewing comets. In fact, in most cases, binoculars will be your tool of choice for comet viewing. While binoculars purchased at your local store will work fine for observing, you may want to invest in a higher quality pair which can be found at stores online - <http://www.telescope.com> Binoculars labeled for astronomical use will usually provide better image quality than those found at a local store.

Types of Telescopes

- **Refractor** – the refractor was invented by Galileo and is what most people think of when they hear the word telescope. Refractors work by gathering light with an objective lens at one end and focus the light at the eyepiece at the other end. Refractors will often yield the best images out of all of the telescope types especially on the moon and planets. However, the size of the objective lens is limited to around 4". Other telescope designs allow much larger aperture and are usually preferred in most cases.



- **Newtonian Reflector** – the Newtonian reflector was invented by Sir Isaac Newton and uses a parabolic mirror at the end of the tube which focuses the light back at the front where the eyepiece is located. The advantage of this design is that they are cheaper to make, more portable, and allow for larger aperture. The disadvantage is that some loss of contrast is normal because of the secondary obstruction used in the mirror system. The mirrors also require periodic alignment to keep the images looking good.



- **Schmidt-Cassegrain** – this design is probably one of the most popular and uses both mirrors and lenses to fold the optical path back onto itself resulting in a more compact telescope tube. The advantages for this design include a very compact tube which is easier to transport, less expensive than refractors, can be computer driven, and offers many after-market accessories. Some disadvantages are that there is also some loss of

contrast due to a secondary obstruction, they are more expensive than Newtonian reflectors, and are often prone to nighttime dew.



- **Dobsonian** – this design is really the same as a Newtonian reflector, but is often easier to use because of the stability of the mount. The nice thing about a Dobsonian scope is that they are much less expensive for the size of telescope you get. Dobsonians can have mirrors as large as 2 or 3 feet across, giving you incredible light gathering power. An 8" dobsonian scope like the one shown below is a good starter scope for most people and can be purchased for under \$400.



- **Rich Field Telescopes** – My personal recommendation for the beginner is the rich field telescope, like the Edmund Astroscan. This is a Newtonian reflector based telescope that offers low power, wide views of the night sky. This telescope is an awesome deal because it is inexpensive, very portable, has a wide field of view, and good light gathering for its size. In my opinion, this scope is one of the easiest scopes to learn and use. The reason for this is its 3 degree 16x low power field of view makes it easy to point and find objects. When you are first learning the night sky, having a scope like this really helps. And remember, it's not about power or magnification. It's about wide field of view and light gathering power. Next to a good pair of binoculars, this is the best scope to use to view comets.



The Edmund Astroscan

- **2 Great Starter Scopes For Beginners**
 - Edmund Astroscan available at <http://www.scientificsonline.com> for \$199
 - Orion StarBlast available at <http://www.telescope.com> for around \$170



The Orion Star Blast