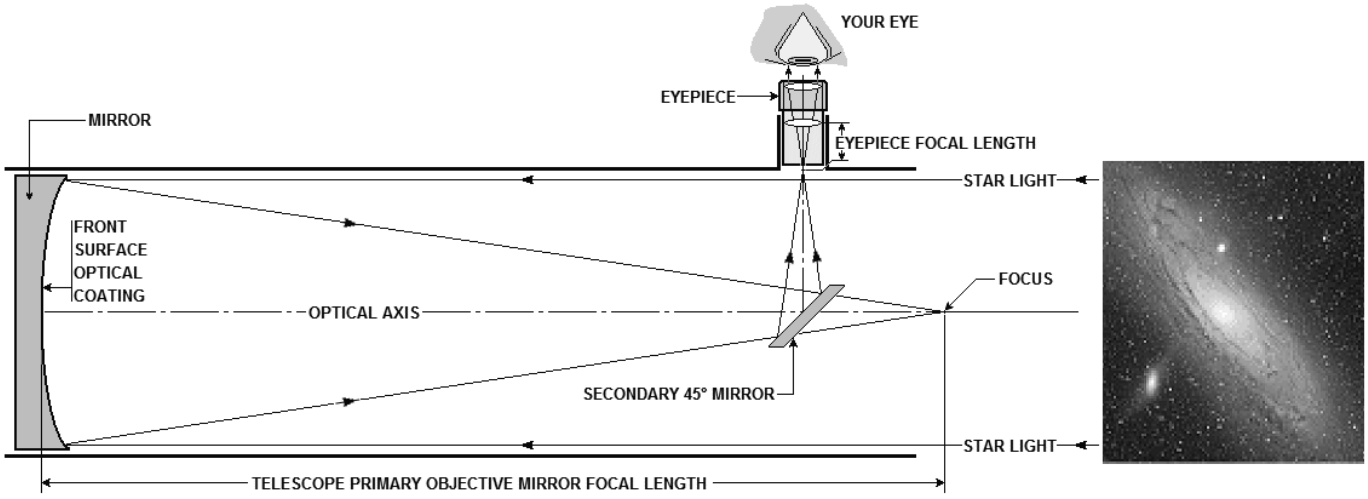
The Newtonian Reflecting Telescope

There are two basic types of Telescope, the Refractor, which uses a Lens as its' primary light gathering objective (binoculars are an example of this type) and the Reflector, which uses a Mirror to collect the light. Within each group there are many sub-divisions. However, the most popular type that many amateur astronomers begin with is known as a Newtonian Reflecting Telescope, named after Sir Isaac Newton (1643-1727), the originator of this particular design. The type of mount that is most popular with amateurs is the Dobsonian Alt-Azimuth Telescope Mount, named for amateur telescope maker John Dobson (1915-2014), due to its portability and low cost.



Newtonian Telescope Function: Above is a cross-sectional view of the Newtonian Telescope tube. The scope consists of a tube, in which is mounted a Curved Primary Objective Mirror at the bottom (the curve is a parabola.) Up at the top end of the tube is a smaller Flat Mirror set at 45º to the Optical Axis of the Primary Mirror, along with a mounting on the side of the tube designed for holding interchangeable eyepieces. (Different eyepieces provide differing magnifications.)

This is how it works:

- Light from a distant object (in our case somewhere out there in the Universe) passes into the top end of the telescope tube. Since the objects are so far away, all the light rays are parallel to the optical axis of the telescope mirror.
- The light is then focused by the curved mirror to a point called the Focus.
- However, the Secondary Mirror diverts the focus off to the side of the telescope where the eyepiece is mounted. (This is so your head does not block the incoming light.)
- The eyepiece then accepts the light and passes it to your eye, again parallel, but magnified.

The Dobsionian Alt-Azimuth Telescope Mount

The type of mounting used on many Newtonian telescopes is a compact, and very portable, type of Alt-Azimuth mounting. That is, the two axes on the telescope are (in reference to the observer) up-and-down from the Horizon (Altitude), and around the Horizon (Azimuth) hence, the name Alt-Azimuth. This type of mount does not track objects in the sky as the Earth turns. Their prime usefulness is that they are compact, portable, and versatile over a variety of types of observing (Solar, Lunar, Planetary, and Deep Sky) and, not to mention, are economically priced.