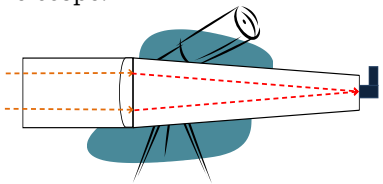
FORSYTH ASTRONOMICAL SOCIETY (FAS)

Refractor Telescope

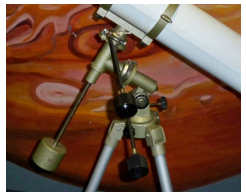
Uses lenses to bend light and send it through the telescope to the eyepiece at the back end of the scope.



Many smaller amateur telescopes are refractors.

Most have **Altitude-Azimuth mounts**, which move horizontally and vertically.

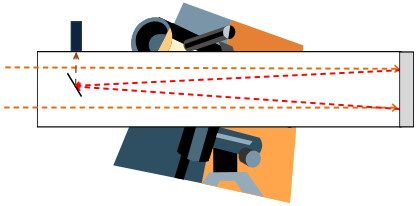
Some have **Equatorial mounts** that can be aligned to track the movement of the night sky. Equatorial mounts are typically harder for a beginner to use.



Reflector Telescope

Uses a primary mirror and secondary mirror to capture light.

Light is reflected from the curved primary mirror in the back of the telescope to the secondary mirror in the front of the scope. The secondary mirror reflects light into the eyepiece in the front side of the telescope.



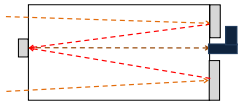
Many amateur telescopes are reflectors with either **Equatorial** or **Altitude-Azimuth** mounts.

Some reflector telescopes ("Dobs") have a **Dobsonian mount**, which sits on the ground and allows the telescope to move horizontally and vertically. These are often considered good telescopes for beginners.

Compound (Catadioptric) Telescope

Uses a corrector plate, primary mirror and secondary mirror to capture light.

Light passes through the corrector plate in the front of the telescope to the primary mirror in the back of the scope. It is then reflected by the primary mirror to the secondary mirror in the front of the scope. The secondary mirror reflects light to the eyepiece in the back of the scope.



These scopes are lighter and more compact than the equivalent reflectors, but usually are more expensive.

The most common types are the Schmidt-Cassegrain and Maksutov-Cassegrain.

Typically, these scopes come with a **"fork" mount**. Some also have a "wedge", which mimics an equatorial mount.

The **Aperture** is the diameter of the telescope's primary lens or mirror. With a larger aperture, the telescope gathers more light, and it is easier to see dim objects. However, the larger the aperture, the heavier and more expensive the telescope. **APERTURE vs. COST/SIZE**.

The **Focal Length** is the length light travels from the primary mirror or lens to the point where it converges to an image.

A **Telescope Eyepiece** is required to focus and magnify the light captured by the telescope so that you can view a large and sharp image. The **telescope's magnification** is the focal length of the telescope divided by the focal length of the eyepiece (e.g., a 500mm telescope / 25mm eyepiece will magnify 20 times). Eyepieces come in 1 ¼" and 2". The maximum magnification isn't always the best. Look for a "sweet spot" with a lower magnification than gives a clear image.

MAGNIFICATION = TELESCOPE FOCAL LENGTH / EYEPIECE FOCAL LENGTH

The **Focuser** attaches to the telescope, holds the eyepiece, and allows you to focus the telescope for a sharper image. Focusers come in two sizes 1¼" and 2". The larger has a greater field of view and holds both size eyepieces.

A **Finder** sits on the telescope tube and allows you to point the scope toward an object in the night sky. Finders come in three varieties:

- **Small auxiliary scopes** – These are "miniature" telescopes that provide a wide field of view and a small magnification allowing you to locate an object. Some have a right-angle shape, which makes it easier to look through.
- **Reflex ("Red Dot") finders** – These LED finders display a red dot or circle on a small transparent screen. To aim the telescope, simply line up the LED target with the object in the sky. A common reflex finder is the **Telrad finder**, which displays a target of concentric circles.
- **Laser mounts** – These allow one to mount a green laser pointer on the telescope and to aim the scope using the laser pointer.



Eyepiece filters block portions of the electromagnetic spectrum (specific wavelengths of light) and allow the glare from bright objects such as the Moon to be reduced and the contrast of other objects such as planets and nebulae to be enhanced. A **25% or 13% moon filter** is useful for viewing a bright Moon.

Telescopes and accessories can be purchased from several suppliers including the following:

- **Orion Telescopes (www.telescope.com)**
- **Meade Instruments (www.meade.com)**
- **Celestron (www.celestron.com)**

Of course, you can't use a telescope without some knowledge of the night sky. Information about the night sky can be found on-line at many places. This includes the FAS website (FAS37.org) and the Kaleideum Planetarium page (https://kaleideum.org/planetarium/). Use your phone's camera to scan the QR codes below.

Forsyth Astronomical Society (FAS37.org)
http://www.fas37.org/wp/

Kaleideum Planetarium
https://kaleideum.org/planetarium/

FAS Astronomy Resources
https://www.fas37.org/wp/resources/