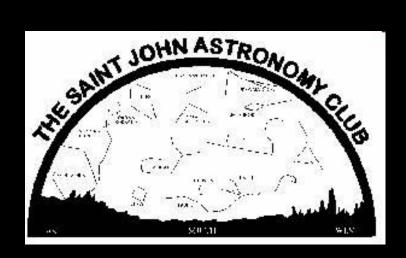
Welcome



To the SJAC Meeting





Astronomy Equipment Basics



What is astronomy



- Astronomy is the science of space beyond Earth's atmosphere. The name is derived from the Greek root "astron" for star, and "nomos" for arrangement or law.
- Astronomy is concerned with celestial objects and phenomena like stars, planets, comets and galaxies as well as the large-scale properties of the Universe, also known as "The Big Picture".

Basic Equipment for Astronomy







Binoculars

- Best tool for beginners
- Both eyes and right side up
- Wide field of view
- Low magnification
- Relatively inexpensive

Telescopes

- More stable views
- Adjustable magnification
- Narrow field of view
- Larger aperture
- Wide range of costs
- Ability to use for photography



Telescopes



- Main function of a telescope is to gather light to a single point, which can then be magnified
- Light gathering ability:
 Aperture affects the
 brightness of images, and the
 faintest objects you can see
- Light is gathered by the *objective* usually a lens or mirror
 - The length from the objective to the focus point is called the focal length

- Calculate magnification:
 Divide the objective's focal length by the focal length of the eyepiece in use
- Usable magnification is generally about 2 times the diameter of the objective as measured in mm or 50 times the measurement in inches
- Finder scope is a smaller scope mounted on the main tube to help you aim at objects in the sky

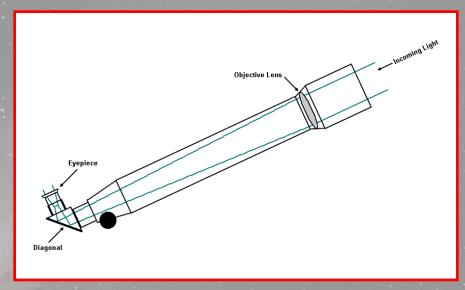


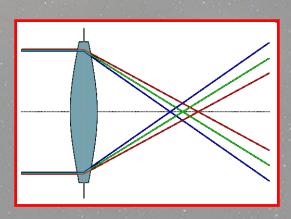


Basic Telescope Designs

Refractor

- Uses a lens to gather the light to a point
- Most rugged design easy to care for
- Gives the sharpest views especially of planets and the moon
- Most expensive for any given aperture
- Usually the tube is quite long, although short tube designs are now available
- Inexpensive models suffer from chromatic aberration



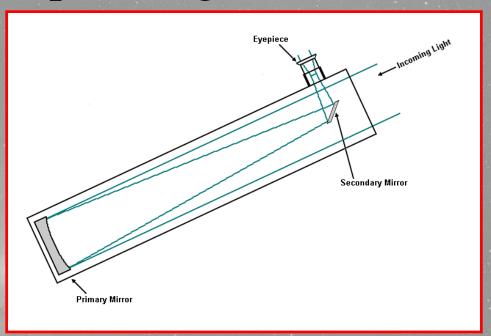




Basic Telescope Designs

Reflector

- Uses a mirror to gather the light to a point
- Open tube collects dust, mirror eventually tarnishes
- Requires periodic alignment (collimating) of the mirrors
- Least expensive for any given aperture
- Available in both long and short tube design
- Generally no chromatic aberration
- Most "bang for the buck"



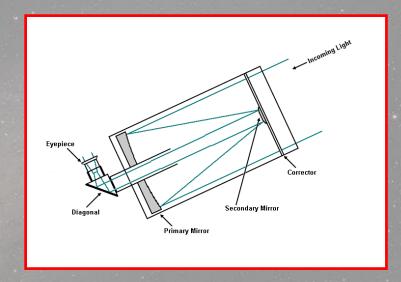


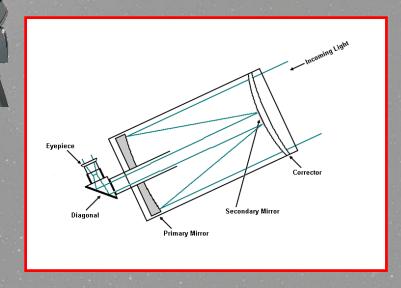
Basic Telescope Designs

Compound

Schmidt-Cassegrain, Maksutov

- Uses mirror and lens to gather the light to a point.
- Sharp views, Maksutov are almost as good as refractors.
- Closed tube protects optics.
- Moderate cost for any given aperture.
- Tube is shortest for any given aperture.
- Most portable for any given aperture.





Telescope Mounts

Altitude-Azimuth (Alt-Az)

- Simple, easy to use
- Inexpensive
- Most portable

Equatorial

- Easy to keep objects in the field of view
- More difficult to setup
- Usually heavy

Dobsonian (Dob)

- Very easy to use
- Least expensive
- Very stable

Most important: Stability!









Many New mounts are motorized, and computerized!

Telescope Accessories

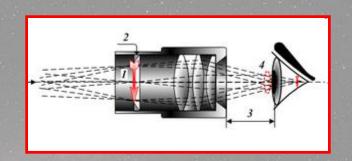
- Eyepieces many designs, some costing hundreds of dollars!
- **Barlow lens** increases magnification from 2x to 3x
- **Filters** for enhanced views of the planets and moon
- Cameras for photographing objects
- Red light flashlight preserves night vision
- Planisphere /Atlas or Computer Software - helps you to find your way around the sky





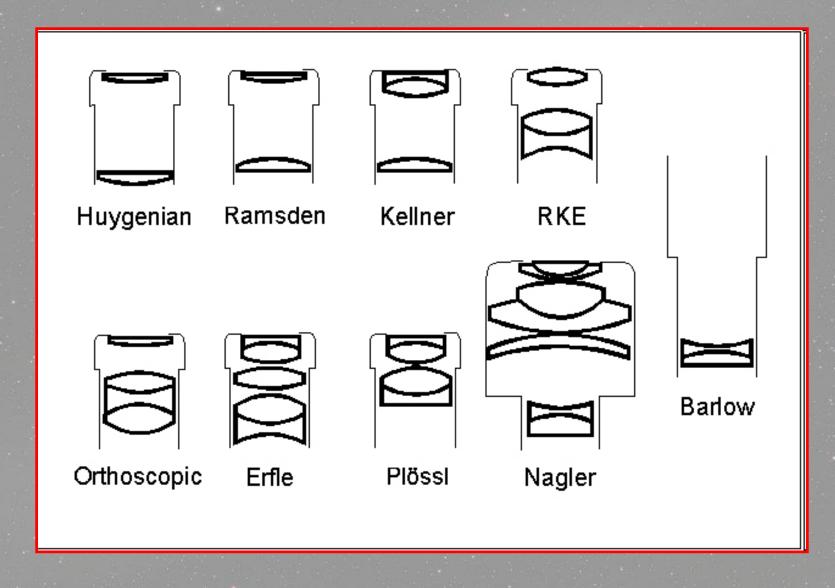


Eyepieces



- An eyepiece, or ocular lens, is a type of lens that is attached to a variety of optical devices such as telescopes and microscopes.
- It is so named because it is usually the lens that is closest to the eye when someone looks through the device.
- The objective lens or mirror collects light and brings it to focus creating an image. The eyepiece is placed at the focal point of the objective to magnify this image.
- The amount of magnification depends on the focal length of the eyepiece.

Some Eyepiece Designs



Filters



Color Filters are one of the most popular on every one's astronomy list. They serve both photographic and visual purposes and can often be combined "stacked" with other filters to produce higher results.

While all color filters serve specific purposes, you may find that certain colors, or stacking two or more filters improves the view for you. By purchasing Color Filter Sets, you can experiment and find the right combination for your needs.



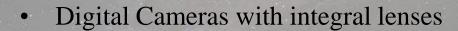
Camera setups

Web Cameras





• Web Cams (the type used to video conference on the internet) make a good entry point and are useful for Moon and Planetary use. These little cameras are normally used to capture several 'still' images and are then 'stacked' to produce a final image. A webcam adapter lets you attach the camera to the eyepiece holder on the telescope.







• Ordinary digital cameras can be used with your telescope. Nice thing is it they can be used for other photography too. The most simple form is 'A-focal' or pointing the camera into the eyepiece to take a photo. There are several types of mounting attachments available to physically attach the camera to the telescope.





• Digital SLR Cameras

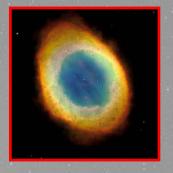
• Digital SLR Cameras are ideal for astrophotography. 'Prime Focus' is the method involved where the camera body is attached to the telescope with an adapter ring. These cameras are suitable for deep sky and longer exposure photography.



Dedicated Astro-cameras

• Dedicated Astro-cameras come in all shapes and sizes . . . and price bands! Advanced cameras coupled to the right telescope configuration can take images that rank as world class.

Resources



Magazines

- Sky and Telescope
- Astronomy

Introductory Books

- Exploring the Night Sky, Terence Dickinson (kids)
- Nightwatch, 3rd Ed., Terence Dickinson
- Turn Left at Orion, 3rd Ed., Consolmagno & Davis
- The Binocular Stargazer, Leslie Peltier
- Exploring the Night Sky with Binoculars, David Chandler

Computer Software

- TheSky
- Starry Night Backyard/Pro
- SkyMap Pro
- DeepSky2000 (Software I Use)
- HNSky (Free, I use as well)

Astronomy Clubs

- Meetings, Star Parties
- Large, club-owned scopes

Thank You and Clear Sky's!



