All About Telescopes

There are two basic types of telescopes: refractors and reflectors. Both have their advantages. Properly outfitted, either will show you distant galaxies, the rings of Saturn, or the craters of the Moon.

- **Refracting Telescopes** gather light with a lens, directing it to the eyepiece. Small starter scopes are often of this type, as they are simple to operate and maintain. Larger refractors, however, become very expensive and are typically bought by avid enthusiasts.
- **Reflecting Telescopes** gather light with a mirror, reflecting it before directing the light to the eyepiece. Reflectors typically give you a wider aperture for the dollar. They require more care and maintenance, however.

Cautions before buying:
Before you decide on a telescope, here's three things to do:
1. Don't rush. You'll have to do a little research before you can pick out a telescope that suits your needs. Consider buying a good pair of binoculars first. Go to a few Star Parties first.

2. Don't blow your money. A telescope is, and should be, a big investment. Saving money on a cheap setup will only disappoint you. Sure, you can spend under a hundred dollars on a starter scope for a nine-year-old (who's liable to break it anyway), but we strongly recommend that you don't waste a dime on one like that for yourself. Once again, "Don't blow your money."

3. Don't buy your telescope at a toy store or department store. The prices will sound good, but the quality of the optics, mounts and materials is inferior. Stick with a reputable brand. Typically, a telescope that says something like "575 X Power Magnification" on the side of the box is not worth your money because a telescope can only magnify 50 times it's aperture in inches. For example any 3" lens or mirror telescope can only magnify up to 150X on a clear steady night.


ANTELOPE VALLEY
ASTRONOMY CLUB, INC.

A 501 (c)(3) Non-Profit Organization

On the web at:
www.avastronomyclub.org

Tel: (661) 724-1623
Or (661) 822-4580

ANTELOPE VALLEY ASTRONOMY CLUB, INC.

Components of a telescope

That said, no one can tell you what telescope to buy. The choice depends on what you want to do with it. One setup will prove best for seeing the planets, another for exploring faraway galaxies. By setup we mean that a telescope is more than just a tube you look through. It's a system that includes the main scope, a finder scope, more than one eyepiece, a tripod, and perhaps a camera adapter.

Aperture
Get the biggest aperture you can. The aperture is the diameter of the lens or mirror that collects light. The magnification of your telescope is limited by the aperture. A larger aperture collects more light, allowing for greater resolution and higher magnification. Some cheap telescopes feature large magnification, but images are often fuzzy because the aperture is not large enough to support the magnification.

Focal length, eyepieces and magnification
The distance light travels inside the telescope is the focal length. The eyepiece, which will be a separate piece on a good telescope, has its own focal length. The power of a telescope, often called magnification, is determined by dividing the focal length of the telescope by the focal length of the eyepiece. Be sure and purchase a telescope that allows for changeable eyepieces, as this is how you easily change the power of your telescope. Why would you want to? Some objects, such as planets, are better viewed at lower magnification, whereas others require more. Every telescope's power has a limit, typically about 50 times its aperture in inches. A telescope that has a 3.5-inch aperture won't support clear images beyond about 175 power (3.5 x 50). How much power do you want? Almost any telescope will allow you to see Saturn's rings and Jupiter's larger moons. With 48 power, you'll see faint color bands on Jupiter. Beyond 100 power (still achievable with a 3.5" aperture), you can start tracking the changes in Jupiter's cloud structure. To see the structure of distant galaxies you may want to move up to a telescope with at least a 6-inch aperture.

Finderscope
A finder scope is crucial to a good setup; it helps you find and center objects that would be elusive in the higher-powered main telescope. The finder scope must be adjustable so that it can be aligned with the main scope. Smaller telescopes will often come with a 5 x 24 finder scope, ample for finding the planets and bright stars. Searching for distant objects is better accomplished with a 6 x 30 finder scope.

Focuser and controls
All of the knobs that control focusing and movement of the telescope must operate smoothly to insure a crisp image and accurate positioning. As the Earth rotates, your target moves quickly out of view, and nothing is more frustrating than clunky controls.

Mount, tripod and photography
A solid base, either a table-mount or a tripod similar to that used by a camera, is critical to steady viewing. The least expensive tripods (called alt-azimuth) move horizontally and vertically, requiring adjustment in both directions to keep an object in the scope. An alt-azimuth mount saves money and works fine for casual viewing. One helpful feature to look for is a "slow-motion" knob, which allows you to make smooth, minor adjustments to the position.
If you plan to get serious, consider an equatorial mount to automatically track the stars as they move across the sky. The equatorial mount provides one axis of motion that matches that of the Earth. Only one adjustment is required. For more money, you can buy a motor drive for the equatorial mount, and the object is tracked automatically. For photography, an equatorial mount with a motor drive is a must, as is a camera adapter. If you plan to eventually do astrophotography, make sure the telescope you purchase supports an adapter. For more on these options, see the Astronomy Buyer's Guide advice on buying a telescope.

And one more thing...
Do more research. Check out online (and print) magazines, such as Sky & Telescope and Astronomy, or ask around at the Antelope Valley Astronomy Club meetings. Books can be a great resource, too!!

Antelope Valley Astronomy Club, Inc.
P.O. Box 8545
Lancaster, CA 93539
Phone: 661-724-1623 or (661) 822-4580
Email: info@avastronomyclub.org

We're on the web! http://www.avastronomyclub.org

You Are Invited to Join the Antelope Valley Astronomy Club!

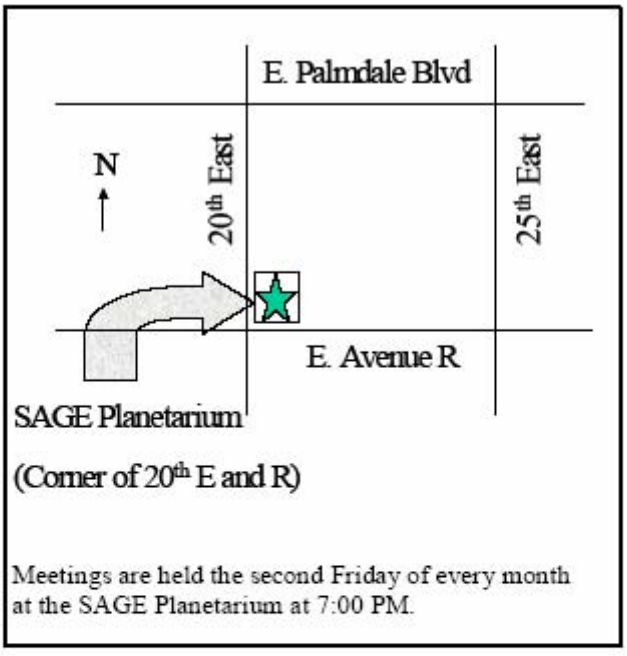
ANTELOPE VALLEY ASTRONOMY CLUB, INC.

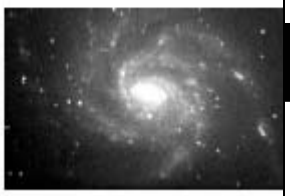
A 501 (c)(3) Non-Profit Organization

Monthly Meetings and Activities

The AVAC holds monthly meetings the second Friday of every month at the SAGE Planetarium, 38060 20th Street East,(located on the northeast corner of East Avenue R and 20thEast) at 7:00 PM. The meetings include guest speakers and monthly programs about the fascinating night sky, while giving members and guests a chance to get together to talk about the stars or other topics of interest. We hold monthly public star parties and frequent 'deep sky' observing sessions as weather permits. We offer our members resources to help you learn more about astronomy including classes, telescopes and books.

Directions to the Meeting





Galaxy M101, Viewed Through A 10" Telescope

AVAC Membership Application

AVAC Offers A Variety Of Membership Options:

☐ Family Membership — Cost (See Below)

☐ Individual Membership

☐ Junior Membership (13 and younger) — Total_____

Dues are prorated each month. See table below

Example: A Family Membership paid in June is $17.50

Membership Dues

Month	Family	Individual	Junior
JAN	$ 30.00	$ 25.00	$ 15.00
FEB	$ 27.50	$ 22.92	$ 13.75
MAR	$ 25.00	$ 20.83	$ 12.50
APR	$ 22.50	$ 18.75	$ 11.25
MAY	$ 20.00	$ 16.67	$ 10.00
JUN	$ 17.50	$ 14.58	$ 8.75
JUL	$ 15.00	$ 12.50	$ 7.50
AUG	$ 12.50	$ 10.42	$ 6.25
SEP	$ 10.00	$ 8.33	$ 5.00
OCT	$ 7.50	$ 6.25	$ 3.75
NOV	$ 5.00	$ 4.17	$ 2.50
DEC	$ 2.50	$ 2.08	$ 1.25

Checks should be made out to 'AVAC'
You may mail them to the Club PO Box or bring checks or cash to the meeting. **Do not mail cash**.
You may also pay via PayPal on our website.

Name(s)

Address

Phone

e-mail

ANTELOPE VALLEY ASTRONOMY CLUB, INC.

P.O. BOX 8545
Lancaster, CA 93539

Phone: 661-724-1623 or 661-822-4580
Email: info@avastronomyclub.org