

## Care and Use of HAA Optical Equipment - Tips for Success!

Welcome to the HAA Loaner Scope program! If you are new to observing, it can be a bit daunting, but the following tips and suggestions below will help you get the most and best use out of the telescope you have borrowed. Remember, your best resource is the group you have joined! If you have any question or are unsure about something, feel free to contact us at [loanerscope@amateurastronomy.org](mailto:loanerscope@amateurastronomy.org).

### **Tips for Careful Use of Equipment:**

Optical equipment is delicate and should be handled with care. Minding the following suggestions will help us prolong the life of the equipment you have borrowed and allow future members to continue to enjoy this benefit membership.

**WARNING: NEVER look directly at the sun through binoculars, telescopes or finder scopes - even for an instant as permanent eye damage can result.**

1. To deliver optimum performance, the telescope's optical components must be at ambient air temperature. This eliminates optical distortion and what are called tube currents that degrade the image in the eyepiece. A good storage area for the telescope is a lockable garage, covered porch or entrance area that is not heated. If such is not available, take the scope indoors when not in use. Just remember to set it up outdoors about half an hour prior to observing so that the mirrors can cool and the warm air currents in the tube have escaped. After your observing session, leave the eyepiece and scope out to allow for temperature adjustments and to let them dry out if needed, before packing them up.
2. Never leave the telescope outside where it will be exposed to the wind or rain. Even when covered with a tarp, it can be blown over and seriously damaged.
3. The mirror on reflector telescope is coated on the front side of the glass, not on the back like the mirror in your bathroom. Always place the supplied cover over the front opening of the telescope when it is stored and keep it in its blue bag. This will help prevent dust from building up on the mirror. A bit of dust is expected and should be of no concern. Never attempt to clean the mirror yourself. It requires special cleaning and rinsing solution as well as swabs for wiping the surface. The HAA Loaner Scope Program Manager is responsible for keeping the mirror tidy. If the mirror needs cleaning, please email the address above.
4. Eyepieces have optical coatings designed to eliminate reflections, thereby letting a maximum amount of light through the observer's eye. It's a good idea after an observing session to wipe the eyepiece lens area with a clean, soft damp warm cloth; you can use eyeglasses cleaner as well. Dry the eyepiece with a soft, non-abrasive cloth immediately thereafter.

5. When transporting the telescope, make certain that it is snugly cradled on the padded surface and not subject to sharp bangs or bumps. If not, the mirrors can be knocked out of collimation (alignment) and optical performance will be greatly compromised. Should this happen, contact the HAA Loaner Scope Manager who will arrange for repairs with special tools. You'll know your scope is out of collimation because you won't be able to get an image to come into focus in the eyepiece. Another indication of poor collimation is an image that is only in focus at the centre of the field of view.

### **Tips For a Good Night Under the Stars:**

Here are some tips that will help you enjoy the first clear night with your telescope. We assume that you already have a made-up list of targets for the night based on what is above the horizon during the time you'll be observing. Remember to take your red beam flashlight for reading the star charts you'll be using!

1. In the winter, be sure you over-dress for the weather. It's easier to take a coat off and stow it in the care than it is to drive back to your house to pick one up!
2. Don't forget the bug spray in the summer. Just be careful not to get it on the lenses or eyepieces. The DEET in most formulations is corrosive to plastics and optical coatings. Spray yourself about 15 feet away from the scope and wipe your hands on a paper towel after use.
3. Light pollution is your enemy, so avoid areas that are close to old cobra style streetlights, shopping malls and poorly design or aimed residential light. Ideally, a country or semi rural location should be chosen. Make certain that you have a good view with as a few trees as possible in the immediate area. Also let someone know where you're going for the night and when you expect to be home! It's also a good idea to take your cell phone in case of emergency.
4. Wait until your eyes are dark-adapt (usually about 15 to 20 minutes) before you begin observing. If your main target is the Moon or a bright planet, light pollution won't be much of a problem. In this case dark-adapted eyes aren't as critical.
5. The HAA Website (<https://www.amateurastronomy.org>) has Clear Sky Charts for Hamilton and Binbrook which will provide some indications of the seeing conditions for the night. If the top line shows all dark blue, you're in for a great night. If it is a lighter shade of blue, the sky conditions aren't as good. A white top band means you will be clouded out.

## Getting Started with your Telescope:

1. You should adjust the finder scope or Red Dot Finder (RDF) at each session. To do so, centre a distant object in the telescope using a low power eyepiece (ie 25mm). A light on a radio tower is a good target. Now look through the finder or the RDF and adjust it so that the object is centered there. It is easiest to do so when there is still some daylight available. To make finding things easier, the finder scope delivered a correctly oriented image so that what you see in the sky is what you see through to finder eyepiece. They also feature two-screw adjustment.
2. To focus the finder scopes, rotate the front lens. This should be done while looking through the finder. There is also a lock ring which may be loosened prior to adjusting the focus. Once you reach focus, snug up the lock ring. If you are focusing on the star, it should appear as a pinpoint sharp dot when properly in focus.
3. To find an object, put a low power piece into focuser. In most cases, this will be a 20 or 25mm eyepiece. Next, use the finder scope or RDF to locate the object. Try to align the object in the centre of the finder scope using the crosshairs. If you have properly aligned the finder or RDF prior to your observing session, your target should be in the low power eyepiece field of view. Now, if you wish to get up close and personal, you can put one of the high-power eyepieces into the focuser. These will be 12 or 10mm eyepiece.
4. To calculate the power a given eyepiece delivers, simply divide the focal length engraved on the eyepiece (10mm/20mm/25mm) into the focal length of the telescope. For example, you might have a DOB with a focal length of 1200mm. Thus, a 10mm eyepiece will deliver 120 powers (120x). That means an object will appear 120 times closer.
5. If included, the Barlow lens is like a turbocharger for your telescope. It doubles the power of an eyepiece. Thus, a 25mm eyepiece will perform like a 12.5mm one. Ditto at 10mm eyepiece turns into a 5mm powerhouse. Just remember, the higher you boost the power, the more adjustments you'll have to make when tracking your target. That's because when the power goes up, the field of view narrows. But the earth keeps rotating at the same speed!
6. Some scopes can deliver up to 240 times or more, especially when using a Barlow lens. But many times, the atmosphere is too unstable to make this a usable power. Images can appear to wobble and boil at this power. Subtle details will blur, and the view will not be useful or appealing. In this case, reduce the power until the details become crisp. You will also find that some objects are too large to view at high power. The Pleiades is an excellent example of this. It's best viewed through the 32mm eyepiece. If your scope doesn't have one, trying viewing it through the finder or the 25mm eyepiece. A little experimenting will help you establish which eyepiece is best for what object, and on what nights depending on atmospheric conditions.

7. The rules that apply to focusing the finder scope also apply to focusing the image on the main optical tube - you are looking to acquire a crisp sharp image. The difference is that you are now using the focuser knobs instead of the front lens cell. If your target is a star, focus down to the point that the star is as small as you can make it, and it still remains a pinpoint of light. If it is a planet, (Venus is the exception) focus down until you acquire crisp planetary surface detail in the eyepiece. This can be achieved on Mars, Jupiter and Saturn. Venus is shrouded with clouds, so you'll have to settle for a white disc. Also, because Venus and Mercury are inside Earth's orbit, we only see them in phases like the Moon. Mercury is a tough target because it hugs the horizon in the evening or morning. Planetary detail is difficult to see through the haze when viewing ground-hugging Mercury. Neptune and Uranus will only appear as blue-green spheres in the HAA scopes.

Those are basics. Hot coffee or chocolate is a warm friend as is a radio to keep you company. While a red flashlight will preserve your dark-adapted eyesight, it is also a good idea to have a white light flashlight available to help find those things that always get dropped! It's also handy for checking out our site for left-behinds when packing to leave, not to mention the emergency that you probably won't have – maybe.

If you're lucky to have an HAA organized viewing at Binbrook Conservation Area while you are borrowing a scope, be sure to come out for lots more tips, advice and experience with other types of telescopes!

Here's the clear skies and successful observing!

