Binocular and Spotting Scope Basics

A good pair of binoculars is a must for most for bird monitoring projects. Certainly, you can observe birds and other wildlife without the aid of binoculars, such as at a feeder, but with them you will see more detail. Binoculars don't have to cost you a lot of money, but should adequately magnify birds for identification. Many 7 x 35 or 8 x 42 power binoculars are affordable and good for bird watching. They should be easy and comfortable to use. You can buy binoculars through sporting goods stores, catalogs, and the Internet.

How to use binoculars

Binoculars are an extension of your eyes. First, use your naked eye to find the birds you are observing. Once you have detected movement and can see the wildlife, use binoculars to see details of a bird's "field marks." Everyone's eyes are different, so before you raise the binoculars, you must calibrate them for your eyes.

How to Calibrate Binoculars

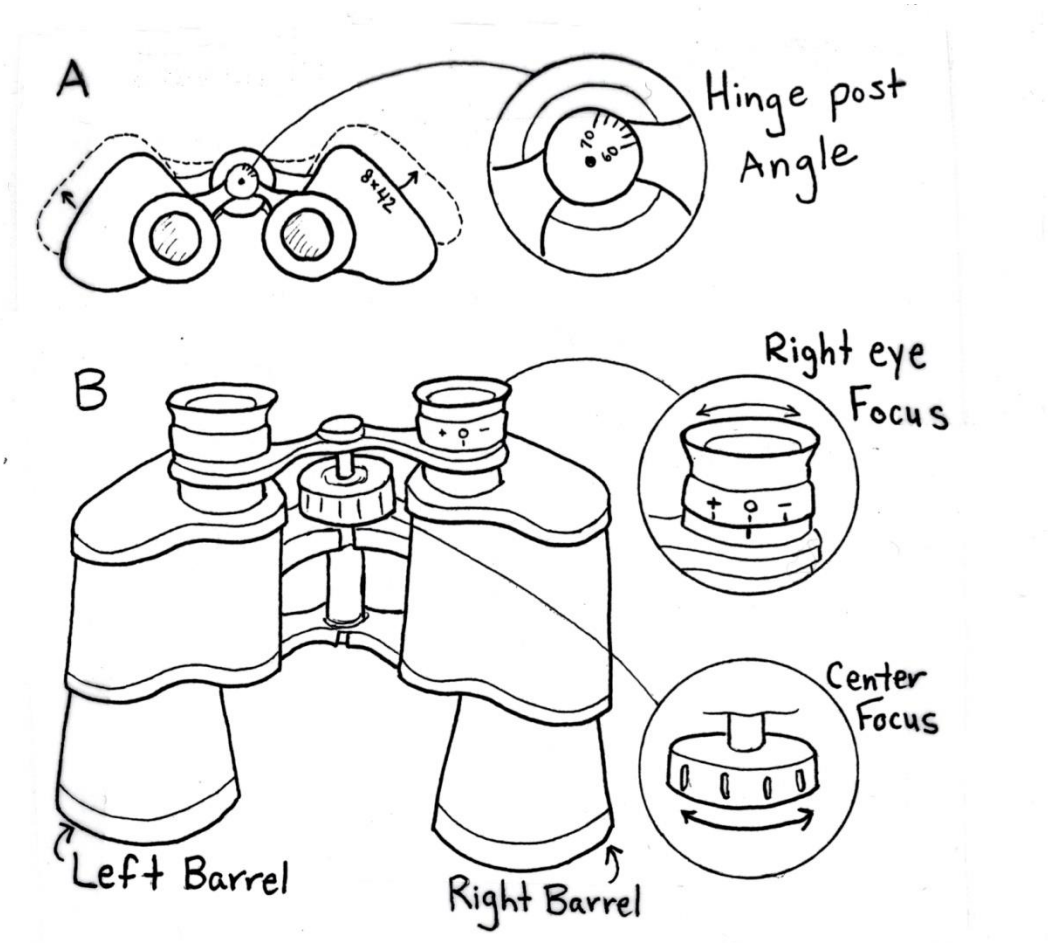
1. Binoculars hinge at the center between the two large "barrels," allowing the eyepieces to fit the width of your eyes (Illustration A). Pivot the hinged barrels so you see a single circle-shaped image, rather than a double-image when looking through them. If the barrels are as close together as they can move and you still see two images, you may need to find another pair. The distance between the eyepieces is called the "interpupillary distance." It is too large if you see two images. The number on the hinge post (angle) will always be the same for your eyes, no matter which binocular you use (A).

2. Each of your eyes has slightly different vision, so your binoculars must be calibrated to accommodate them (Illustration B). Calibrating binoculars brings both eyepieces into sharp focus. Most binoculars have a focusing wheel in the center. It adjusts the focus of both eyepieces (what you see with both eyes) at the same time. Most binoculars also have a separate "diopter" adjustment, which allows you to focus (turn) one eyepiece independently, to accommodate the differences in your eyes (B). Depending on the binoculars, this adjustment can be on the left or right eyepiece (usually the right). Marks similar to the following symbols (+ … O … -) are on the eyepiece. Note: the remainder of these instructions assumes you are using binoculars with a right-eye diopter adjustment. For binoculars with a left-eye adjustment, reverse the side of the binoculars indicated.

3. Turn the center focusing wheel to the right as far as it will go (if it is an external focus binocular, like illustration) (B). Turn the adjustable eyepiece (diopter adjustment) counterclockwise, moving it as far out from the body as possible (B). Both eyepieces should now be out of focus. Stand about 30 feet from a sign (street signs work well) with clear lettering. Cover the end of the right binocular barrel with your hand (B). With both eyes open, turn the center focusing wheel until the lettering comes into sharp focus. Turn the center focus wheel past sharpest focus and back again to ensure you have the sharpest image.

4. Next, cover the left barrel, keeping both eyes open, and turn the right eyepiece clockwise to bring the lettering into focus (B). Again, turn the eyepiece beyond the point of sharp focus and back to find the sharpest image. Remember to keep the center focus wheel in the exact position you left it in step 3. Uncover the left barrel. Your binoculars should be in perfect focus and calibrated to your eyes. Remember the position that the right eyepiece is set. This will not have to be changed unless your vision changes. You may want to place masking tape around the eyepiece so it can't be turned. From now on, you will only need to use the center focus wheel to adjust both eyepieces.

NOTE: This exercise will greatly enhance the experience of watching wildlife, and taking the time to teach students this method is passing on an important skill. However, it may be preferable to keep the right eyepiece in the center (not adjusted) for younger students. Most young people have little or no need to adjust the eyepieces independently. This will reduce confusion for younger students, but the decision is up to you.



Binocular Basics

Information taken from Classroom BirdWatch, Teacher's Guide, FeederWatch Module, Copyright, 2001, Cornell Lab of Ornithology; adapted from "*How to Calibrate Binoculars For Your Eyes*" by Steve W. Kress, National Audubon Society biologist. Binocular drawings by Jason O'Brien, 2002, Iowa NatureMapping.

Spotting Scopes for Birding and Bird Monitoring

While binoculars are usually the most useful tool for general bird observation, spotting scopes are invaluable for long distance viewing, such as identifying shorebirds or monitoring an eagle nest. Here are some basic tips on selecting a scope to fit your needs.

Size/power: Spotting scopes come in three sizes and a range of powers, with zoom lenses the most popular. Compact and mid-sized scopes fall in the 12-45 power range, while full-sized are in the 20-60 power range. For beginning or average birders, compact or mid-sized scopes are suggested, because they are lighter weight, easier to use and less costly. However, optical quality is *sometimes* not as good in the smaller scopes, to some degree reflected by price. If you can afford it, *any* scope you consider will be excellent if it has "ED" or "HD" lenses, which reduce blurriness or chromatic aberration (colors) around the edge of your viewing field. Most birders seldom use the 60x end of even their large, expensive scopes, because of the narrow range of vision at this high end of the magnification range and the effects of heat waves, viewing through precipitation, or the shaky picture resulting from even a slight wind. Scopes are also measured by the size of their *objective lens* (the lens at the opposite end from the eyepiece). This is a measurement of lens diameter in millimeters (50mm, 60mm, 80mm, etc.) and the larger this number the brighter your view through the scope. Thus, an 80mm objective lens is brighter than a 72mm (on the same power scope), a 60 mm is brighter than a 50mm, etc.

Eye Relief and Retractable Eyepieces: All scopes and binoculars are given an "eye relief" rating, and the higher this number, the easier it is to see through the optics. Anyone with glasses should consider a scope with the highest eye relief number (usually above 15 or 16) possible, to offer the widest field of view. Retractable eye cups are most often extended by people who do *not* wear glasses, to keep their eye at an optimal distance from the lens.

Lens Hood or Shade: A retractable lens hood on the objective (far end) lens of a scope helps reduce lens glare on sunny days. It should be retracted in low-light conditions.

Tripods and Window Mounts: Because scope viewing is always at higher magnification than binoculars, a solid base is essential. Purchase a strong, heavy tripod to reduce scope vibrations when viewing. A good tripod will cost $100+. A window mount is much less expensive ($25-$45) and is a great tool when viewing birds from your car (cars make *great* blinds for bird observation).

Examples of Scopes and Price Ranges: The following selections do not constitute endorsements of these brands. However, the models in this list often receive high ratings by optics reviewers and birding magazines. All prices are *approximate* "street" prices collected in 2010.

Compact:

- Minox MD 16x-30x (50mm), ~$350
- Bushnell Legend Ultra HD 12x-35x (50mm), ~$300
- Burris Compact 12x-24x (50mm), $150

Mid-sized:

- Bushnell Legend Ultra HD 15x-45x (60mm), ~$350
- Leupold Sequoia 15x-45x (60mm), ~$300
- Burris Landmark 15x-45x (60mm), ~$200

Full-sized:

- Swarovski ATM HD 20x-60x (80mm), ~$3,000
- Vortex Razor HD 20x-60x (80mm), ~$1,600
- Vortex Skyline ED 20x-60x (80mm), ~$800
- Nikon ProStaff 20x-60x (82mm), ~$700

Courtesy of Iowa Department of Natural Resources