Skill Building: How to Use Binoculars

Binoculars are a basic tool of the nature observer-- one of the handiest and most widespread of all optical instruments used by field biologists and naturalists. The team at the Paul F-Brandwein Institute have prepared these tips for those who want to improve their ability to observe and appreciate nature. This short article is intended to help the person who needs some basic information about binoculars.

Virtually anyone who spends much time outdoors should own a pair of binoculars. We encourage you to take the time to obtain a quality binocular--one that is sharp and clear and that will serve you well for years to come. There are literally hundreds of different types of binoculars on the market, so the following guide is to help you make an informed purchase.

What Do the Numbers Mean?

On each pair of binoculars is a pair of numbers, such as 7x35 or 8x40.
The first number is the magnification or power. The higher the number, the greater the magnification. Higher magnification enables you to see greater detail but makes it harder to hold the binoculars steady and reduces the light-gathering capacity of the tool. We recommend 7x or 8x binoculars for beginning and intermediate users. If you can afford high quality optics, 9x or 10x binoculars are fine. Higher magnifications are very difficult to use in the field. It is usually best to avoid zoom or autofocus binoculars.

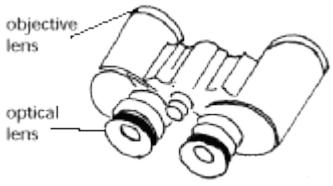

Image source: Missouri Department of Conservation

The second number is the *diameter of the objective lenses* (the lenses farthest from the eye). Larger lenses are heavier but they provide a larger field of view, making it easier to scan for objects. Larger lenses also gather more light, producing a brighter image (see below). We recommend lens diameters within the range of 30-40 mm, but any within the range of 28 to 50 mm should be fine.

Light-gathering or *image brightness* (almost as important as image sharpness, discussed below) is determined primarily by the ratio of lens diameter: magnification power. For example,

7x50 binoculars, this ratio is 50:7 = 7.1, bright but heavy
8x40 binoculars, this ratio is 40:8 = 5.0, intermediate
9x27 binoculars, this ratio is 27:9 = 3.0, dark but lightweight

Image **sharpness** is determined by the optical quality of the lenses and their coatings. Generally speaking, higher priced binoculars have better optics and sharper (and brighter) images.

Field of View

The field of view is the area seen through your binoculars. It is properly measured in degrees. The larger the field of view, the more area you can see. Field of view is particularly important when observing moving subjects, like animals or birds, or at sporting events.

How to Focus Binoculars

Focusing binoculars is something most people have to practice. There are two common focusing systems used in binoculars.

The first is individual eyepiece focus. This system is simple to understand and easy to manufacture. It also lends itself well to sealed optical tubes, and thus is usually the focusing system used for waterproof binoculars. Individual eyepiece focus means that to focus the binoculars to your eyes, you simply focus the left eyepiece to your left eye and the right eyepiece to your right eye. There is no centrally located focusing mechanism. It is done like this. Look at something in the distance. Close the right eye (or cover the front of the right binocular), and focus the left eyepiece to your left eye. Close the left eye (or cover the front of the left binocular), and focus the right eyepiece to your right eye. You are finished, until you need to look at something at a different distance, in which case you need to repeat the process.

Because individual eyepiece focus is time-consuming, center focus is more common. Unfortunately, very few people understand how to correctly use center focus binoculars. Here is how it is done. Aim your binoculars at something in the distance. Close the right eye (or cover the front of the right tube), and focus the left side of the binocular to your left eye using the center focus control, which is concentric with the pivot shaft between the binoculars. (Note: the left eyepiece itself does not focus on center focus binoculars.) Next, close your left eye (or cover the front of the left tube), and focus the right eyepiece to your right eye. DO NOT touch the center focus control while you are focusing the right eyepiece to your right eye. Now you are finished. What you have just done is adjust the binoculars for your individual eyes. (Practically everybody's left and right eyes are different.) From now on, you only need to adjust the center focus control when you look at things at different distances. Center focus is faster and easier to use than individual eyepiece focus once you have initially set the binoculars for your eyes.

How Much Should You Spend?

As is true of all optical equipment, better quality costs more money. With binoculars, more expensive pairs have better lenses and coatings and so are sharper, brighter, more durable, and sometimes waterproof. Many come with a full lifetime guarantee. Specifically, with regard to price, here is what to expect:

< $50	poor optics, usually not worth it
$50-200	good optics, budget choices available, but choose wisely generally: less durable, not waterproof, no guarantee
$200-500	very good optics, many quality choices, usually durable, waterproof, lifetime guarantee
>$500	professional quality optics, lifetime guarantee

Which Brands Are Best?

No one brand is categorically the best. but companies that specialize in optical products are usually more reliable and better value. Nikon, Pentax, Swift, Bushnell, Swarovski, Leica. and many others offer good products. Most companies make a number of different models covering a wide range of quality and price.

Where Should I Buy Binoculars?

The answer is wherever you can find the best price on the model you want, which is probably on the web. But you might start at local camera or sporting goods stores (even Costco) where you can handle, look through, and compare different models in your price range. Beware, however, these places often have a limited selection, and the clerks don't usually know their products. On the web, Eagle Optics (www.Eagleoptics.com) offers a good range of products, but there are many other good sites as well.