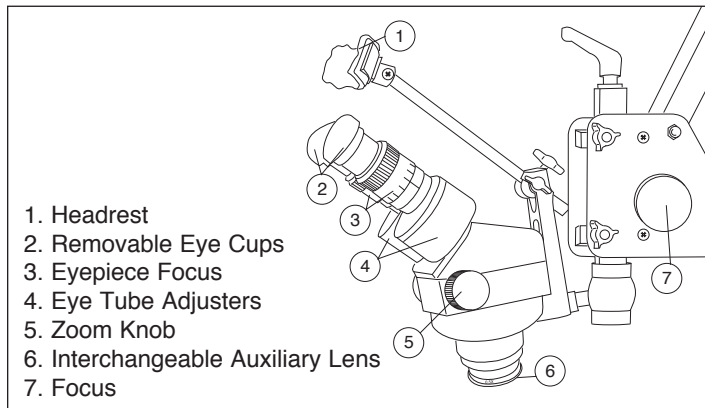


GRS[®]/Meiji Working Microscope

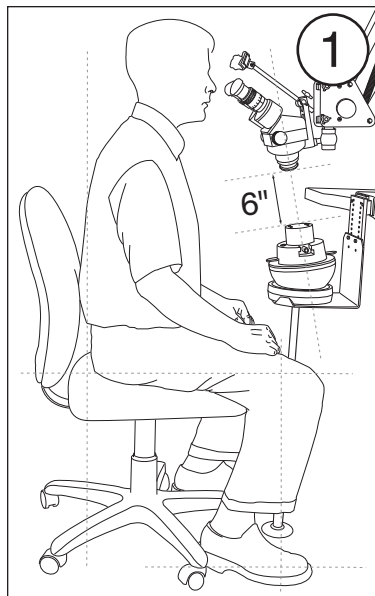
Parts of the Microscope



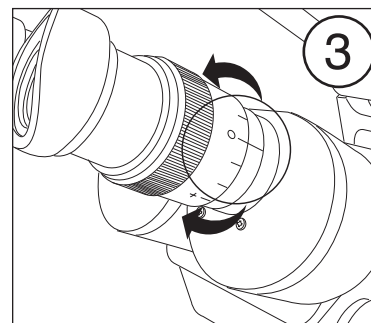
Focusing

The main point is to adjust your microscope so it stays sharply in focus for both eyes throughout the entire zoom range. There is a lot more to this than just turning the focus knob, so please read this carefully. Follow these steps accurately and in order. Additionally, you should also read the microscope Owner's Manual.

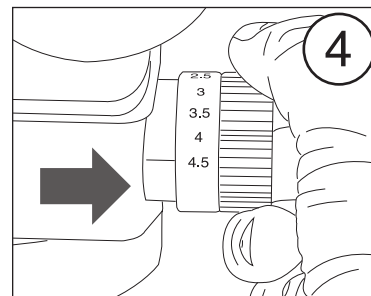
If you wear eyeglasses, you can work without them because your microscope has individual diopter adjustments for each eye. If you wish to wear glasses, we recommend purchasing the Eyeglass Rubber Pad Eyepieces (#003-648) to prevent scratching your lenses, especially plastic lenses.



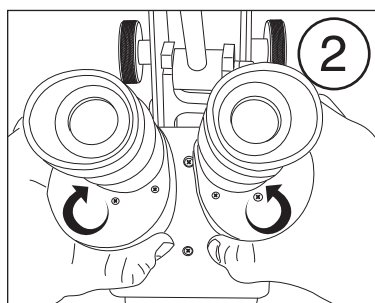
Before using your GRS/Meiji Microscope you must first position yourself and equipment properly. Start by sitting in a comfortable chair with both feet planted on the floor, and back straight. Next, adjust the ball vise and microscope with the bottom of the microscope parallel to the top surface of the ball vise, leaving about 6 inches of working space (see illustration at left). Adjusting the equipment correctly will help you maintain good posture. Now you are ready to make the necessary focusing adjustments to the microscope for use.



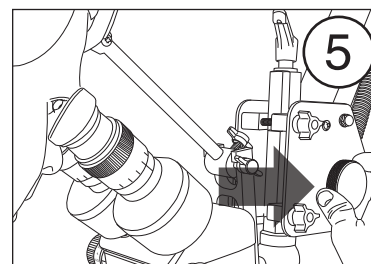
Rotate each eyepiece tube until the '0' mark aligns with the scribed mark below it. This sets both eyepieces to a neutral (0) diopter.



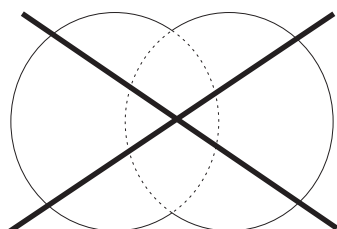
Turn zoom knob clockwise to 4.5, the highest power setting.



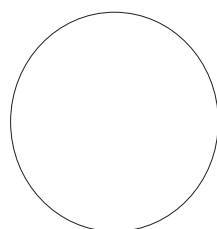
While looking through the eyepiece lenses, move the eyepiece tubes further apart or closer together until they match the distance between your eyes. When you see one central image, the distance is correct.



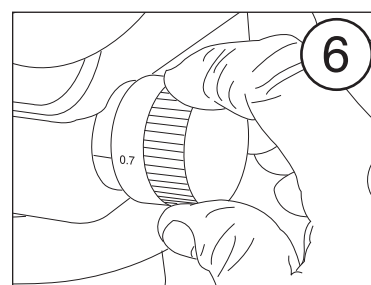
Look through the microscope, and focus on a simple object placed on the ball vise.



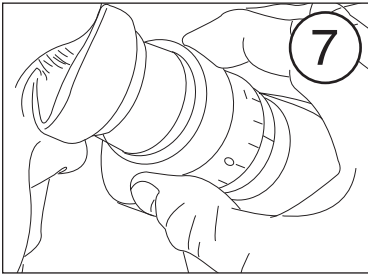
**Double Image
INCORRECT**



**Single Image
CORRECT**



Zoom to the lowest power 0.7. **DO NOT** refocus! If it lacks clarity at the lowest power, you will need to adjust the diopter for each eye.



After focusing and the image is still blurry, look with only your right eye, rotate **ONLY** the right eyepiece tube to adjust the diopter until the image is perfectly clear **DO NOT** change any other settings while doing this. Repeat your left eye and left eyepiece tube.

After completing these seven steps, the image should now be uniformly sharp with both eyes. If you've done these steps accurately, it will stay in focus throughout the entire zoom range **WITHOUT** refocusing. Remember that focusing at high magnification is more accurate, but has less depth of focus than low magnification. Although, you bought a microscope to see "up close," you may tend to use excessive magnification at first. Working at higher magnification than necessary can sometimes make your work slower and more awkward. At lower magnification, the area you see is greater and the focus is more forgiving.

Working Distance

The working distance is the distance from the bottom of the microscope to the viewing surface when properly focused. The **ONLY** thing that changes the working distance of your microscope is the auxiliary lens that screws onto the bottom of the microscope. The chart below shows the optical specifications for the GRS/Meiji Microscope for a variety of auxiliary lenses. (Note: Sometimes the auxiliary lens is also called a supplementary lens.)

| Auxiliary (Supplementary) Lens | Magnification (Zoom) Range* | Field of View Diameter* in. (mm) | Working Distance in. (mm) |
|--------------------------------|-----------------------------|----------------------------------|---------------------------|
| 0.30X #003-591 | 2.10 to 13.50X | 4.29" - 0.67" (109 - 17 mm) | 9.25" (235 mm) |
| 0.44X | 3.08 to 19.80X | 2.93" - 0.45" (74.5 - 11.5 mm) | 7.13" (181 mm) |
| 0.50X #003-567 | 3.50 to 22.50X | 2.58" - 0.40" (65.6 - 10.2 mm) | 5.91" (150 mm) |
| 0.75X | 5.25 to 33.75X | 1.72" - 0.27" (43.7 - 6.8 mm) | 3.82" (97 mm) |
| Without Lens (1.00X) | 7.00 to 45.00X | 1.29" - 0.20" (32.8 - 5.1 mm) | 3.66" (93 mm) |
| 1.50X | 10.5 to 67.50X | 0.86" - 0.13" (21.8 - 3.4 mm) | 1.93" (49 mm) |
| 2.00X | 14.0 to 90.00X | 0.65" - 0.10" (16.4 - 2.6 mm) | 1.34" (34 mm) |

* This Magnification Range and Field of View is for 10X eyepieces only. For other eyepieces, it will change accordingly. Eyepieces available from 10X to 30X.

Magnification

The total magnification is the multiplication of all lenses. There are three numbers involved: eyepiece power, zoom power of the body, and auxiliary lens power. Example: For a microscope with 10X eyepieces and a 0.5 auxiliary (supplemental) lens, if you zoom to a value of 2.5 (as seen on the zoom knob scale, the overall magnification is $10 \times 0.5 \times 2.5 = 12.5$ power.

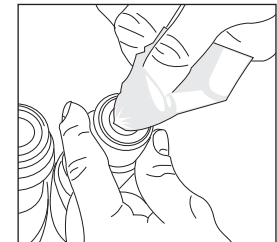
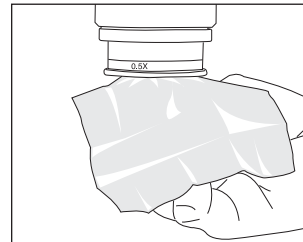
Other magnifications can be calculated the same way. Remember, to change the overall magnification without changing the working distance, change the zoom knob setting or the eyepieces. Changing the auxiliary lens will **ALWAYS** change the working distance! Eyepieces for the GRS/Meiji Scope are available in 10X, 15X, and 20X.

Field of View

This is the working diameter you can see through the microscope. This viewing diameter is dependent on magnification: the higher the magnification, the smaller the diameter of view. The chart above shows a range of values. The biggest field diameter is for the lowest zoom setting; the smallest field for the highest zoom.

Tips

- Keep a dust cover over the microscope when not in use. If dust appears, clean with a soft cloth or eyeglass wipes.



- Spend time to master the correct adjustment of focus and eyepiece settings previously described. Less eye strain and faster focusing will occur.
- Remember any optical device that "enlarges" what is seen also reduces the amount of light, so a good light source is necessary.

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