Stereo Microscope

Instruction Manual for
MI-13STERX – Stereo Microscope 10/30x
MI-24STERX – Stereo Microscope 20/40x
Tungsten Illumination

HOME SCIENCE TOOLS
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Welcome to an exciting world of discovery with your new Stereo Microscope! This low-power microscope is designed for viewing whole objects, such as flowers, rocks, or insects. This manual will give you a familiarity with the different features of your microscope, how to use them, and how to preserve your investment by proper maintenance and care.

Table of Contents

General Microscope Care

Unpacking

Your stereo microscope is shipped in a two-part Styrofoam case. Keep this case for storage, transport, and shipping. It is perfect packing material should you ever need to send your microscope in for repairs covered by the warranty.

Fit the rubber eye shields onto each eyepiece. The widest portion should be on the outside of each eye.

Avoid touching the lens surfaces on the eyepiece or objective lens, as finger prints will decrease image quality.

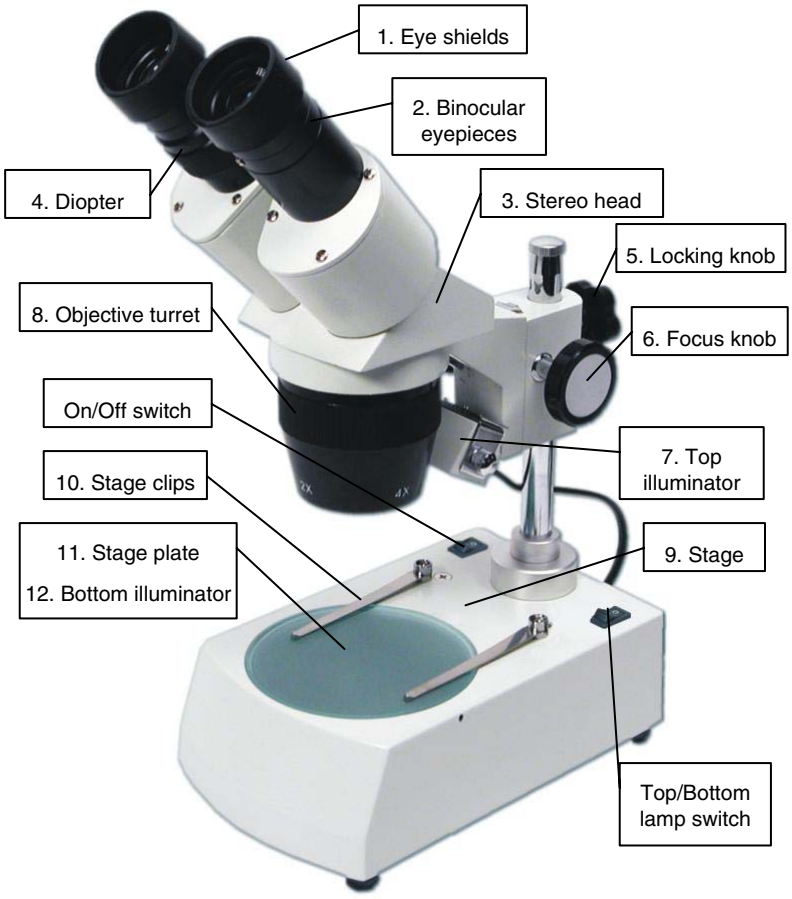
Cleaning

The best optical quality can be compromised by dirty lenses. Using a dustcover and cleaning the lenses regularly will greatly enhance your microscope use.

To clean lens surfaces, remove dust by using a soft brush or a can of compressed air. Then moisten a piece of lens paper (our item MI-PAPER) with some lens cleaning solution (MI-LENSCLN). Gently clean the eyepiece and objective lens exterior surface using a circular motion. Repeat with a second paper moistened with solution if necessary. Repeat once again with a piece of dry lens paper until the lens is clean and dry. **Do not spray lens cleaner directly on the lens.**

Features & Definitions

Microscope Diagram



Description of Components

1. **Eye shields:** These rubber shields fit over the eyepieces to block light and provide comfort.
2. **Binocular eyepieces:** This is the part of the microscope that you look through. The binocular eyepieces contain lenses that magnify 10x and provide an unreversed 3D stereo image. They are inclined at an angle for comfortable viewing.

3. **Stereo head:** The head rotates 360º so that multiple users can look in the eyepieces comfortably without moving the microscope itself (to rotate, loosen the head set screw on the left side of the microscope).

4. **Diopter:** This knurled band on the left eyepiece is used to adjust the focus for differences between your eyes. Instructions for doing this are on page 4.
5. **Locking knob:** The binocular head is mounted on a post and can be raised, lowered, or rotated 90º for off-stage viewing by loosening the locking knob on the back of the post.
6. **Focus knob:** This knob is used to raise or lower the objective lens until the image is in focus.
7. **Top (incident) illuminator:** This bulb-holder holds the 10-watt, 12 volt tungsten bulb that shines down on the specimen. Use this light when your specimen is opaque or solid (when light cannot pass through it from below).
8. **Objective turret:** This rotating turret contains the lenses closest to the specimen. The two objective lenses have magnification of either 1x and 3x or 2x and 4x depending on the model. Multiplied with the 10x eyepieces, the total magnification is 10x/30x or 20x/40x.
9. **Stage:** The stage is the platform that supports the specimen below the objective lens.
10. **Stage clips:** These clips can be used to hold thin specimens in place.
11. **Stage plate:** This microscope comes with two stage plates. The frosted glass plate is used with bottom lighting, and the reversible black/white plate is used with top lighting to help you get the best contrast.
12. **Bottom (transmitted) illuminator:** Another 10-watt, 12 volt tungsten bulb is located beneath the stage plate. Use this light for translucent specimens.

Operating Procedure

Now that you have an overview of what each component on your microscope is for, you can follow this step-by-step procedure to help you get started using it.

Getting Started

1. Set your microscope on a tabletop or other flat sturdy surface where you will have plenty of room to work. Plug the microscope's power cord into an outlet, making sure that the excess cord is out of the way so no one can trip over it or pull it off of the table.
2. Flip the switch to turn on your microscope's light source. Use top lighting for opaque specimens and bottom lighting for translucent specimens. Some specimens have both opaque and translucent parts. You may have to switch between lighting options. **Warning:** The top light can get very hot. Use care touching the top light housing during use. **Do not touch the lamp directly.**
3. Center a specimen on the stage plate. If you are using top lighting, insert the reversible black/white stage plate (use the dark side if the specimen is light-colored). To change or reverse the plate, insert the small hex wrench (included with your microscope) into the hole on the right side of the stage and turn until you are able to pop the plate out. Turn the plate over and tighten it in place with the wrench.
4. If your specimen is thin and flat, or if its edges curl up easily, use the stage clips to hold it in place. To do this, pull up the pointed end of one stage clip and slide it over one end of the specimen, then do the same with the stage clip on the other side. If your specimen is larger than the stage plate, turn the stage clips out so that they hang off the stage; this will give you more room to work.
5. You may need to adjust the height of the head in order to find a good working distance between the specimen and the objective lens. Do this by loosening the locking knob, moving the head to the appropriate position, and tightening the locking knob. If you are viewing a very large specimen, you may want to turn the head 90º and place your specimen directly on the table.
6. Turn the objective turret until the lowest-power objective clicks into place. The 1x or 2x label will be facing you.
7. Slowly turn the focus knob until the specimen comes into view. Once you can see the outline of the specimen, turn the knob even more slowly until it is focused as sharply as possible. Once you have focused your specimen, you can move it around to see other parts of it. You may need to refocus slightly on each new area, especially when the specimen surface is uneven.

Note: with this microscope you will often be viewing three-dimensional specimens that have many different levels. You will not be able to focus on every feature clearly at the same time.

8. For higher magnification, turn the objective turret until the 3x or 4x objective clicks in place and refocus.

Using the Binocular Head

To use the binocular head to the best advantage, you must set the interpupillary distance to match the distance between the pupils of your eyes. You must also adjust the diopter to compensate for focusing differences between your two eyes. Each user of the microscope must make these adjustments for his or her own eyes. To do so, follow these steps:

1. Focus the microscope on a small specimen in the center of the stage plate.
2. Focus your eyes on the specimen.
3. Pull your eyes back from the eyepieces about 1". In your peripheral vision you will see two field view circles overlapping each other.
4. Open or close the distance between the eyepieces by twisting them apart or pushing them together until the two circles merge together and appear as one circle. The interpupillary distance is set correctly when you see just one field view circle.
5. Close your left eye and turn the focus knob until the specimen is in focus for your right eye.
6. Close your right eye and bring the specimen into sharp focus for your left eye by turning the knurled diopter band on the left eyepiece. Do not use the focus knob for this last step – use only the diopter adjustment.

Maintenance

Changing the Top Bulb

If your top microscope bulb burns out, follow these steps to replace it:

1. Obtain the correct 10-watt, 12 volt tungsten replacement bulb (our item MI-BULB5).
2. Unplug the microscope from the power supply and allow it to cool before replacing the bulb.
3. Lay the microscope carefully on its back or side.
4. Pull the old bulb straight out away from the socket. If necessary, unscrew the silver knob and remove the bulb shield.

5. Insert the prongs of a new bulb into the socket and press the bulb securely into the socket.

Changing the Bottom Bulb

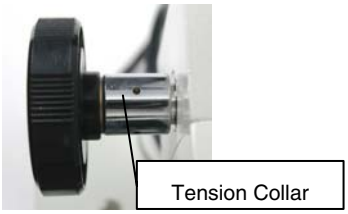
If your bottom microscope bulb burns out, follow these steps to replace it:

1. Obtain the correct 10-watt, 12 volt tungsten replacement bulb (our item MI-BULB5).
2. Unplug your microscope from the power supply and allow it to cool before replacing the bulb.
3. Remove the stage plate: insert the hex wrench into the small hole on the side of the stage and turn until the plate can be removed easily.

4. Pull the bulb straight out of its socket and replace with a new one.
5. Replace the stage plate and secure it in place with the wrench.

Adjusting Tension

The focus tension is pre-adjusted by the manufacturer, but if it falls out of adjustment, the microscope head will drift down under its own weight and the image will move out of focus. The tension adjustment collar is located between the microscope arm and the focus knob on the left side (when the stage is facing you).



To adjust the tension, follow these steps:

1. Insert the small C-wrench into one of the holes on the collar and turn the collar clockwise to tighten or counter-clockwise to loosen.
2. Tighten only enough to keep the stage from drifting downward.

Specifications

- Widefield 10x eyepieces, fully coated
- Inclined 45° head rotates 360° with 55-75mm interpupillary distance and one diopter (+/- 5 diopters)
- Fully coated objectives on rotating turret. MI-13STERX has 10x and 30x magnification with a 20mm field of view at 10x. MI-24STERX has 20x and 40x magnification with a 10mm field of view at 20X. Both have a 65mm working distance.
- All metal rack-and-pinion focusing, focus knob has tension adjustment
- Stage with stage clips, frosted glass stage plate, and reversible white/black stage plate
- Maximum specimen height of 55mm on-stage and 120mm off-stage
- Tungsten 10-watt, 12 volt top and bottom light illumination with grounded 110 volt cord

Warranty

Home Science Tools warrants this microscope to be free from defects in material and workmanship under normal use and service for the life of the instrument. This warranty does not cover light bulbs, batteries, or damage (including to lenses) due to misuse, abuse, alterations, lack of proper maintenance, or accident.

Any cameras and software supplied with this microscope are warranted for one year from the date of purchase.

You will need to return your microscope freight prepaid for warranty service to Home Science Tools, or the repair facility we designate. We will repair or replace your microscope at no charge and return it freight prepaid to you. Please call 1-800-860-6272 to arrange warranty service before returning this instrument.

Please note that warranties apply only to the original purchaser and are not transferable.

Troubleshooting

If you are experiencing difficulty with your microscope, try these troubleshooting techniques:

Problem	Possible Reason and Solution
Light fails to operate	1. The AC power cord is not connected. *Connect the cord to an outlet.* 2. The bulb is burned out. *Replace the bulb. (See "Changing the Bulb," p.4.)* 3. The power source outlet is inoperative. *Have a qualified electrician repair the outlet.* 4. The incorrect bulb is installed. *Replace with the correct bulb.*
Light flickers	1. The bulb is not properly inserted into the socket. *Properly insert the bulb.* 2. The bulb is about to burn out. *Replace the bulb.* 3. The connection at the AC outlet is loose. *Have a qualified electrician repair the outlet.*
No image	The objective lens is not in place. *Move revolving objective turret until the objective lens clicks into position.*
Unable to focus	The head drops under its own weight. *Adjust tension of focus knob. (See "Adjusting Tension," p. 4.)*
Poor resolution, image not sharp, spots in field	The objective or eyepiece lenses are dirty. *Clean the lenses. (See "Cleaning," p. 2.)*
Glare in the field, poor lighting	Improper lighting is being used for your specimen. *Adjust lighting. Use top lighting for opaque specimens and bottom lighting for translucent specimens. Use both when necessary.*

Ideas for Using Your Microscope

Your stereo microscope is a versatile instrument than can be used to view a variety of specimens. This section contains various suggestions for what to study.

Clear plastic or glass petri dishes are great for viewing live or messy objects with a stereo microscope because they fit well on the stage and keep everything adequately contained. The suggestions below are just a few things you can view with petri dishes. Place the item or items to be viewed in the bottom of a petri dish and position it on the stage plate of your microscope. Use top or bottom lighting.

Observe the habits of live insects.

Collect insects in the bottom of a petri dish and cover with its lid to keep insects from escaping. Be careful not to leave the light source shining on the insects for too long as the heat could eventually kill them.

Study a shallow dish of pond water, daphnia, or brine shrimp.

Watch them closely as these tiny creatures swim, dive, and eat.

Examine a soil sample to see the different materials that comprise it.

Soils with a lot of sand or clay are particularly interesting to look at. You might even want to collect soil samples from several different spots and compare and contrast what you see in each sample.

Dissect a flower to learn about the beauty and intricacies of all its parts.

Carefully pull the flower petals and inside parts off of the stem, trying not to damage or tear them. See if you can identify the parts using a flower identification book. Stick one or two of the parts on your microscope to get a closer look. If there was a lot of pollen on the flower, try putting the pollinated parts, or loose pollen, into a petri dish and check it out with your microscope. *(Note: This is not a good experiment to do if you have bad allergies!)*

Compare the types of minerals and crystals in different rock specimens.

You can break off small pieces of larger rocks by knocking them together or using a rock pick. Put any small shards or pieces of the broken rocks into a petri dish for easy viewing.

Make a simple prepared slide.

To make a slide, tear a 2½-3" long piece of Scotch tape and set it sticky side up on the kitchen table or other work area. Fold over about ½" of the tape on each end to form finger holds on the sides of the slide. Next, sprinkle a few grains of salt, sugar, ground coffee, or sand in the middle of the sticky part of the slide. Carefully observe the differences between different grains.

Hair and thread also work well on homemade tape slides. Collect samples of hair from family members or pets and stick one hair from each sample on a tape slide. Label each slide and view them one at a time with your microscope. Write down your observations about each to see how hairs from humans and animals differ. You can also look at threads or fibers from furniture, rugs or clothing from around your house.

Record your observations.

In the field of science, recording observations while performing an experiment is one of the most useful tools available. Early scientists often kept very detailed journals of the experiments they performed, making entries for each individual experiment and writing down virtually everything they saw. These entries often included drawings and detailed descriptions as well as the procedures they used, data they collected, and conclusions drawn from their experimentation.

Our Microscope Observation worksheet (on the next page) will help you to keep track of the things that you study with your microscope and remember what you have learned. Blanks are provided for recording general information about each specimen, such as its type and the date it was collected. In addition, there is space to write down your observations and make sketches of what you see. Reproduce this sheet as necessary.

Microscope Observation Worksheet

Name of specimen: _____

Date specimen was collected: _____

Collected from: _____

Observations

_____

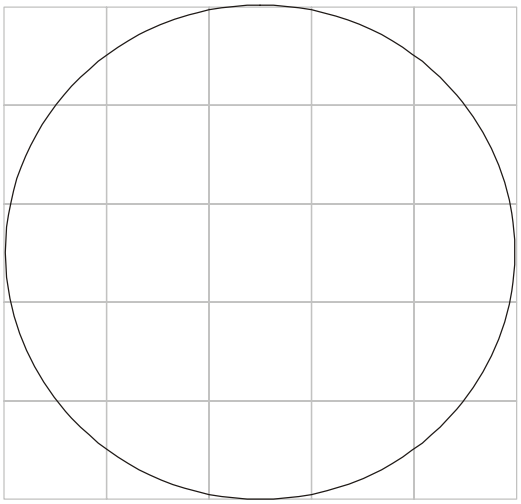
_____

_____

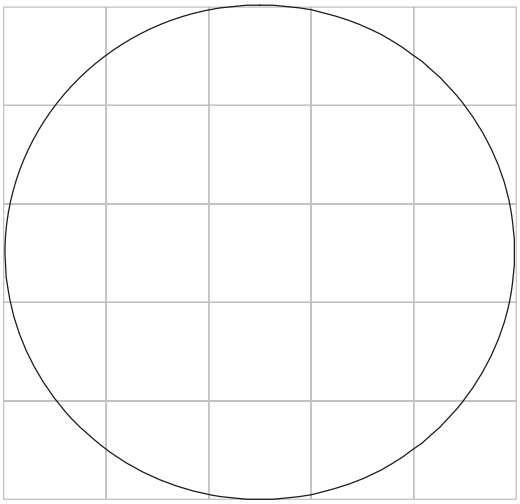
_____

_____

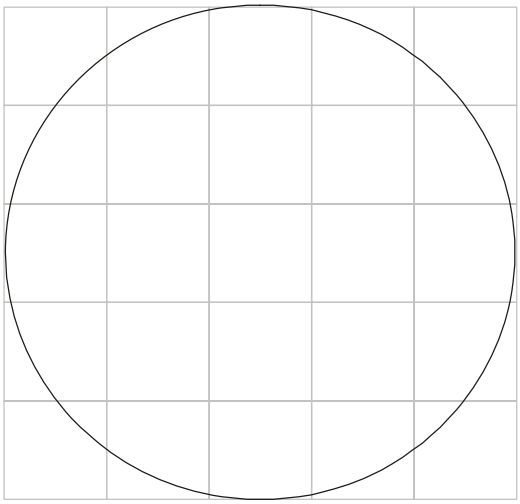
Sketches



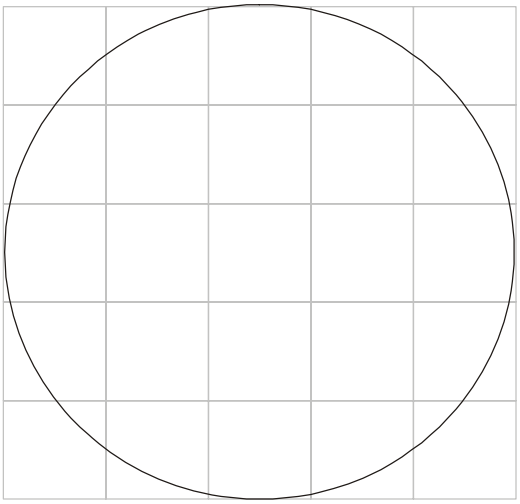
Lowest power



Highest power



Other:_____



Other: _____