

MM8044C
Instruction Manual
900X Microscope



Your new 900X Microscope is a doorway to new and exciting adventures and is designed to bring hours of enjoyment, wonder and just plain fun. Discover the hidden microscopic world around you!

Before trying out your new equipment, please take the time to read the important Cautionary and Safety information below.

CAUTIONARY STATEMENTS

NOTE: Read all cautionary statements in this Manual. This contains instruments and other materials with sharp points and edges. This set is not to be used by children under 8 years of age, and always with adult supervision.

Use under adult supervision. For children 8 years and older.

ADVICE FOR SUPERVISING ADULTS

- a) Read and follow the instructions, the safety information and the first aid information carefully. Keep them on hand for reference.
- b) Use only the slides preparations listed in the instructions.
- c) This microscope is for children 8 years and older, and only with adult supervision.
- d) Because children's abilities vary, even within age groups, supervising adults should exercise discretion regarding which slide preparations are suitable and safe for children. The instructions should aid adults in assessing slide preparations to discern their suitability for each child.
- e) Supervising adults should discuss the warnings and safety information with the child before commencing the preparation of slides.
- f) Your preparation space should be kept clean, clear and away from any food storage areas. Prepare your slides in a well-lit area and close to a water supply. A solid table with a heat resistant top should also be used.
- g) A separate tin or bucket should be used for the disposal of solid waste materials. Any wasted solution should be poured directly down a drain, but never into a sink basin.
- h) To be used solely under the strict supervision of adults that have studied the precautions

provided.

Caution : Use care to install batteries in the orientation indicated by illustration in the battery slots of the battery holder. Follow battery manufacturer's precautions. Do not install batteries backwards or mix new and used batteries. Do not mix battery types. If these precautions are not followed, batteries may explode, catch fire or leak. Improperly installed batteries void your warranty.

Let's Begin!

Carefully lift the microscope from the box using two hands. Place one hand around the microscope arm and the other under the base. For best results, use the microscope on flat, sturdy surfaces. Always be mindful of your mirror and light source. The more light that is reflected or transmitted through the hole in the stage, the brighter and sharper the images will appear in the microscope eyepiece.

Microscope Features

Take a few moments to study Figure 1 and become familiar with the various parts and features of your microscope.

- A. Tweezers
- B. Scalpel
- C. Needle
- D. Stirring Rod
- E. Prepared slides x 5
- F. Blank slides x 7
- G. Slide covers and labels
- H. Petri Dish
- J. Vial x 6
- K. Graduated Cylinder
- L. Hatchery
- M. Micro-slicer

** Light bulb (not shown on photo)

N. The Eyepiece with fixed lens that has a 20X magnification. Remove the dust cover from the eyepiece and put it aside in a safe place

O. **The Body Tube.** Connected to the eyepiece and helps focus the lenses.

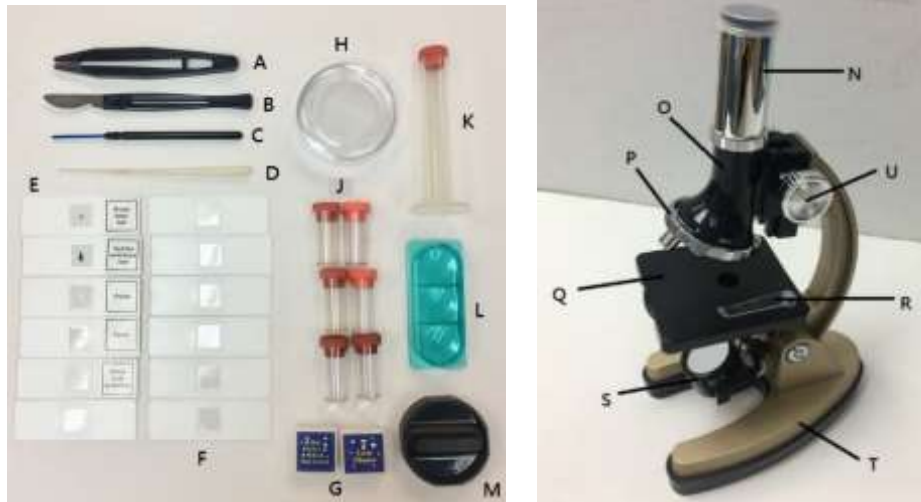


Fig. 1

P. Power Indicator / Objective Turret. The turret has 3 lenses or objectives: 7.5X, 30X and 45X (See Fig.2). The shorter the objective, the lower the power or magnification. The longest objective is the highest power. To calculate the magnification you are using, multiply the value of the objective by the power of the eyepiece (note that the power indicator on the turret makes this calculation for you). For example, turn the power indicator to the longest objective (45X), and multiply by the power of your fixed eyepiece (20X) – you will magnify the object by 900 Times larger than it appears to the naked Eye!

Gently turn the power indicator on the objective turret (**P, Fig. 1**). You will feel and hear the objective lens click into place. Practice turning the focus knob (**U, Fig. 1**) in both directions and notice how far you can turn it without letting the objective come into contact with stage (**Q, Fig 1**).



TIP : Begin viewing at the lowest magnification or power and focus the object. Once the image is focused, increase magnification by turning the objective turret and refocus.

CAUTION: Be careful as you turn the focus knob so that the objective lens does not make contact with a slide or the stage. This may cause damage to the slide and also to the objective lens.

Q. The Stage is a flat platform with a hole in the centre to allow reflected light off the mirror or light source to enter the microscope.

R. The Stage Clips hold the plastic slide firmly onto the stage.

S. Mirror/Light Source. While holding the base down, pull on the arm to tip the microscope back. Examine the mirror and light source located below the stage to see how you can adjust them, and choose one or the other. The light source turns on automatically when tipped upwards toward the stage. The mirror gathers and reflects light into the

TIP : Always keep both eyes open when looking through the eyepiece. Doing so will relieve stress on your eyes.

T. Base/Battery Compartment. Place the microscope on its side. To remove the protective plastic cover, remove the screws with a Philips head screwdriver. Gently lift and the base will open. Insert two “AA” batteries (user supplied) in the base. Match the positive (+) and negative (-) poles of the batteries with the (+) and (-) markings on the base (**Fig 3.**) To replace lid, position it over the opening and replace the screws.

Fig. 3



CAUTION: To prevent the wires attached to the light from breaking, never rotate the light source a full 360° •

U. Focus Knob. Slowly turn the knob back and forth to focus an object in the eyepiece. Notice what happens to the power indicator (**P, Fig.1**) as you turn the knob.

Start Observing!

Now that you've studied the features of your Microscope, it's time to take it out for a test drive and try out a simple observing exercise.

1. Rotate the focus knob (**U. Fig.1**) and lower the stage (**Q, Fig.1**) as far as it will go. Place the 20X eyepiece into the microscope, if necessary. Turn the objective turret (**P, Fig.1**) to the shortest objective (**7.5X**)
2. Put one of the prepared plastic slides (**E, Fig-1**) under the stage clips (**R, Fig. 1**) and position the prepared specimen over the hole in the stage.
3. Look through the eyepiece (**N, Fig. 1**) and slowly turn the focus knob until the specimen can be seen in focus.
4. Observe what happens when you slowly move the light source (**S, Fig. 1**) or the mirror.

CAUTION: Be Careful not to touch the slide with the objective lens. You can break the slide and/or the lens by touching the slide with the lens.

NOTE : The view presented in the eyepiece is upside-down and reversed from left to right of the object. In other words, if you wish to examine more of the left side, move the slide to the right. Or if you wish to examine more of the top of the image, move the slide down and vice-versa.

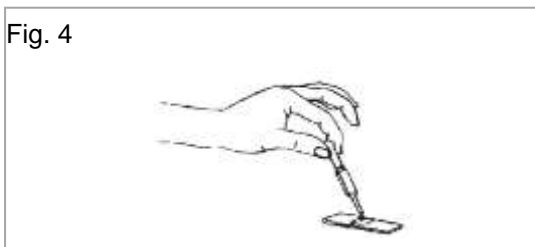
5. Look in the eyepiece and observe what happens to the image when you move the slide from side to side and up and down.
6. If you wish to increase magnification, rotate the objective turret to a higher power and refocus. Also, observe with the 20X eyepiece. Practice rotation the objective turret to Change magnification.

Try Out the Color Filter

Rotate the color filter located below the stage (**Q, Fig.1**). Below the stage, a fitting will line up with the opening in the centre of the filter. Rotate the filter wheel to change filter colors.

Turn on the light. Set it so it shines through the filter. Take a blank slide and place a few grains of salt or sugar on it. Rotate the filter and see how the filtered light enhances the image of the salt or sugar.

Fig. 4



Note : Use the color filter especially when looking at clear or dim specimens.

Make Your Own Slides

It's so easy to make slides that the variety of slides you can create will be limited only by your own imagination.

A section of almost any material can be placed on a slide and observed with a microscope. All you need is the proper equipment and a little patience, and you'll be making slides in no time.

Everything you need for the experiments in this booklet can be found in this kit or your home (make sure to ask a parent first before you borrow any of his or her items, such as the measuring cup). Locate the follow items:

- Scissors
- Petroleum jelly
- Natural, uncolored toothpicks
- Eyedropper
- Salt or Sugar
- 3 or 4 paper cups, or any small containers which can be discarded after use.
- Paper towels
- A measuring cup
- 2 or 3 small bottle caps
- Wide mouth jar and lid

Next, set up your work area....the kitchen table (make sure to ask a parent for his or her

permission), the desk in your room....any place where you can work undisturbed.

Label 3 of your cups: clean, flush and waste. Fill the flush cup with clean water. Next, you will obtain a specimen and make your first slide.

TIP: Don't always assume that increasing magnification will produce the best image for viewing. Each time you increase in magnification, the amount of light decreases, and the section of the image you are able to view also decreases. This is desirable for some specimens, but not for others.

Experiment observing with all three objectives for all specimens until you get a feel for magnification levels.

Want to See Crystals?

Use a measuring cup to measure one or two ounces of hot (but not boiling) water and pour it into a clean cup. Slowly add as much salt to the water as will dissolve. Stir the solution continuously while adding the salt.

Use the eye dropper to place one or two drops of the salt solution onto a clean slide (**Fig. 4**).

Allow the slide to dry. You are now finished with your tools for this experiment. Clean your tools: put the eyedropper in the flush cup, take up some water and release it into the waste cup. Do this two or three times. Stir the flush water.

The slide will dry covered with a white substance. Place the slide into the microscope stage. Rotate the light source of the microscope until it turns on. Before reading any further, look through the microscope eyepiece and write down what you observe.

If you carefully performed the experiment, you will see little crystal cubes. A grain of table salt is made up of many cubes. Place one or two grains of table salt on another blank slide and compare it with the slide containing the crystal cubes.

Begin to start thinking like a scientist as you experiment. Observe carefully, take notes (make sure you date them), and most importantly, keep your equipment and the working environment clean. Experiments work best with clean and uncontaminated equipment. And your parents will be appreciative of a clean work area, too.

Further Experiments: Try out the above procedure with other salts such as Epsom and Rochelle. Sugar will also crystallize, but you will need to let it dry overnight for the crystals to form.

Preparing a Mount

Dip your spatula in some clean water and make a smear across a clean slide. Use your tweezers (**A, Fig. 1**) to place a portion of an insect — a wing, a leg, insect — a wing, a leg, or an antenna — on the slide. Attach a cover slip (**G, Fig. 1**) over the specimen and place the slide on the microscope stage.

Obtain a piece of hair from your head or from your pet and place it on a wet slide. Try this again with more than one type of hair on a slide and compare how they differ. Also try a piece of fern (or other plant) and pollen and compare them as well.

Creating Smears

Using your scalpel (**B, Fig. 1**), gently scrape off small shavings from the surface of a freshly cut potato.

Smear the shavings onto a clean slide (**see Figs. 6 and 7**). Clean the scalpel by swishing it in the slush water. Draw up some water using your eyedropper from the cup labeled clean and put one drop onto the slide. Attach a cover slip to the slide and place to the microscope stage. Observe the slide and write down your observations. You will see hundreds of starch grains.

Take a few kernels from an uncooked ear of corn. Scrape off some shavings and make a smear as you did with the potato. Compare how the corn different from potato. Create smears of other foods such as apples, bananas, peaches, and pineapples. You will observe that these items have membranes rather than starch.

Fig. 6

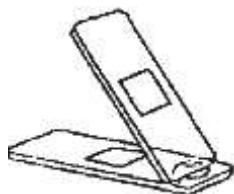


Fig. 7



A Simple Section Slide

Section slides are extremely thin slices of tissues of skin, leaves, flower stems, and other materials, generally, section slides are very difficult to make without special equipment and procedures. However, there is one common house-hold item which can be sectioned without special equipment: the common onion, made up of layers of tissue.

Peel off the very thinnest layer you can. One that is nearly transparent will make an ideal section. Slice into a piece about 1/4 x 1/4 inch.

CAUTION: The blade of the micro-slicer is very sharp.
Handle the micro-slicer with care.

Life Under Glass

Fill a wide mouth jar with fresh water. Let it stand for three or four days without the lid. Then drop a handful of dry grass and a pinch or two of dirt into the jar. Put the cap on the jar and

keep it in a place where it will receive light (but not direct sunlight).

In about five days, you may examine the water. First make a special slide: Using a toothpick, make a ring of petroleum jelly on a clean slide. The ring should be smaller than a cover slip and be about half as thick as a slide.

Put a drop of water from the jar onto the slide inside the ring. Use the lowest power of your microscope and write down your observations. Did you detect any movement in the water? The movement is caused by microscope animals. Try to focus on one of the animals – this may not be very easy as a drop of water is like an ocean to a microscope creature.

If the animals seem to be moving too fast to study or don't stay in focus for very long, soak up a little bit of water with a corner of a paper towel.

Care for Your Microscope

The 900X Microscope is a precision optical instrument and when treated with care, will provide you with years of use and discovery fun.

- Always carry the microscope with two hands one around its arm and one under the base.
- Always remove slides from the stage before putting the microscope away.
- Cover the microscope when not in use to clean the lenses.
- Never touch a slide with the objective lenses of the turret.
- Remove the batteries before storing the microscope for a month or longer.

Remember you can make a specimen slide out of almost any material. When you are on a playground, at school in a park, or just sitting around at home, train yourself to look at all the material around you. Keep an eye out for what might make a good specimen and discover the hidden microscopic world that surrounds us all.

Warnings

This unit uses two AA batteries.

Non-rechargeable batteries are not to be recharged.

Rechargeable batteries are only to be charged under adult supervision.

Rechargeable batteries are to be moved from the toy before being charged.

Different types of batteries or new and used batteries are not to be mixed.

Batteries are to be inserted with the correct polarity.

Exhausted batteries are to be removed from the toy.

The supply terminals are not to be short-circuited.

Specifications and colors may vary from item shown. Please retain packaging for future reference.



WARNING!

CHOKING HAZARD

Small parts. Not suitable for children under 3 years.