BM-08019 Series Children's Popular Science Microscope

(Biological Experiment Box)

Operating Manual

This manual applies to children's popular science microscope. To ensure safety, please read this manual thoroughly and carefully before using the microscope.

Contents

The new microscope will bring you pleasure and fun. Go and discover the micro world hidden around you!

Please first read this manual before using the microscope!

I. Cautions

Remember:

The configuration may contain chemical solutions, which may harm you if used incorrectly. This series of microscopes includes some sharp-edged tools and other materials. Children under eight years old must use the microscope in the custody of adults.

The packaging may contain the following chemical solutions, which must be used properly.

1. Eosin

Note: Harmful, do not swallow. If used improperly, seek medical advice immediately. Please put this product out of reach of children.

2. Gum media

Note: Harmful, do not swallow. If used improperly, seek medical advice immediately. Please put this product out of reach of children.

II. Safety Information

General first-aid information

1. Accidental eye contact: Rinse the eye with sufficient water. Otherwise, seek medical advice immediately.
2. Swallow accidentally: Rinse your mouth with water to avoid vomiting, and seek medical advice immediately.
3. Inhale accidentally: Breathe fresh air rapidly.
4. Accidental skin contact: Rinse the skin with sufficient water for 15 minutes.
5. Accidental cut: Disinfect the wound with the disinfectant immediately, and it's best to carefully wrap the wound with a piece of gauze bandage. If seriously injured, seek medical advice immediately.

III. Configuration Table

Product name	Microscope
Accessories	Microscope body, tweezers, scalpel, dropper, stir bar, needle, sea salt, brine shrimp eggs, brine shrimp hatchery, plastic measuring cylinder, gum media, eosin, petri dish, specimen bottle, micro-slicer, 7 blank slides, 5 prepared slides, 7 cover glasses, 7 slide labels, Chinese and English manuals

Note:

Use and install the battery carefully, and install the battery in the specified position as shown in the figure. According to the instructions of the battery manufacturer, do not install the battery in the opposite direction or mix old batteries with new ones or mix different types of batteries. If not operated in accordance with the manual, the battery may cause explosion, ignition, or leakage.

IV. Start Operating

Carefully take out the microscope from the box with both hands. Use one hand to hold the curved arm of the microscope and the other hand to hold the bottom, and put the objective lens back to the operator. To achieve the best observation effects, please use the microscope on a flat and sturdy platform.

Ensure the source of light and always observe the slide. The more light passes through the hole, the brighter and clearer the image displayed in the eyepiece of the microscope.

V. Microscope Accessories

Now, let's take some time to know about various accessories of the microscope (Figure 1):

A. Tweezers

B. Scalpel

C. Dropper

D. Needle

E. Brine Shrimp Hatchery: Used to hatch brine shrimp eggs.

F. Test Tube

G. Gum Media, Eosin

H. Sea Salt, Brine Shrimp Eggs

I. Small Test Tubes

J. Prepared & Blank Glass Slides

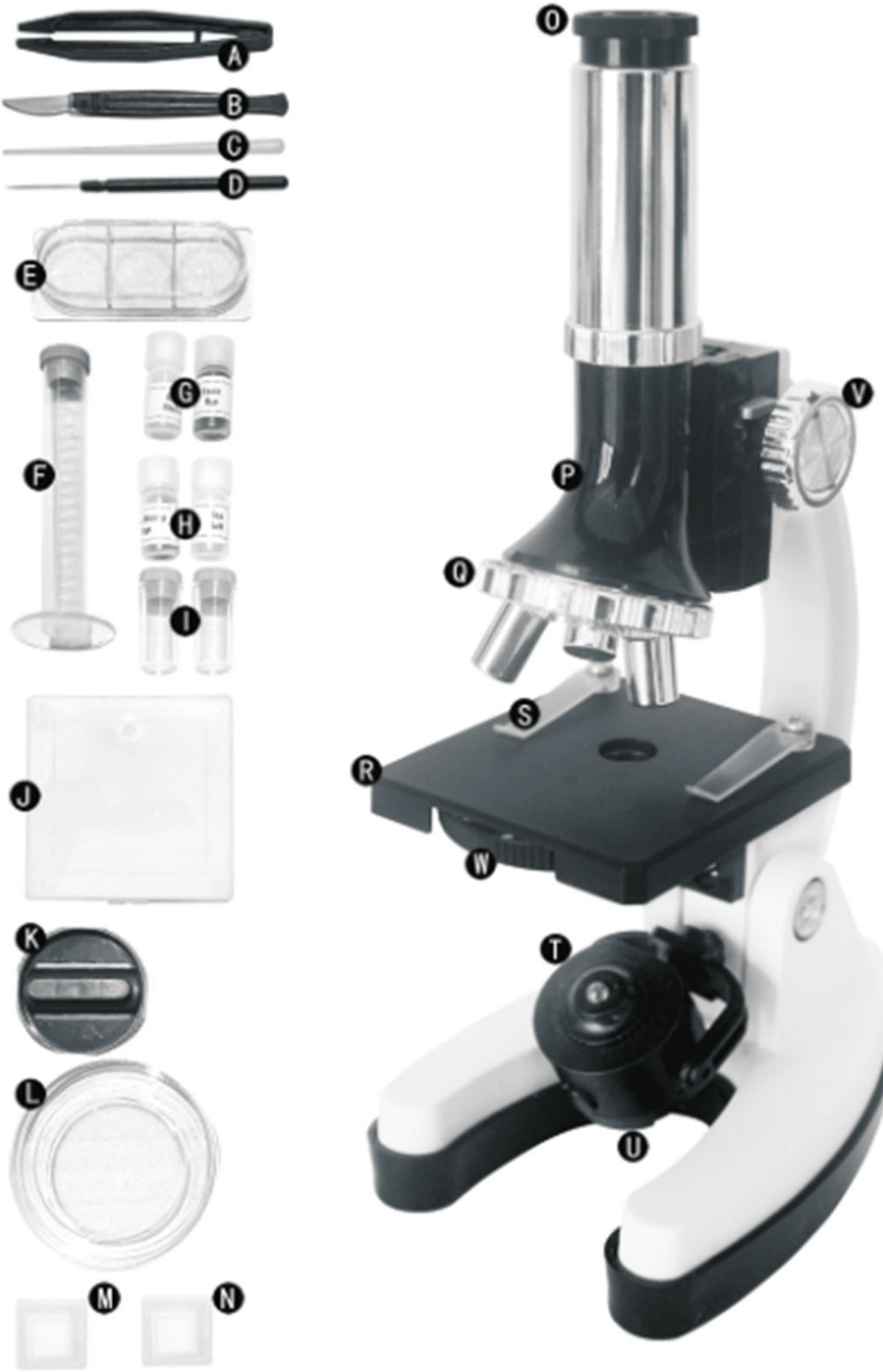
K. Micro-slicer

L. Petri Dish

M. Cover Glasses

N. Slide Labels & Statical Slide Covers

O. Eyepiece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Tip:

Start focusing on the object with the objective lens with minimum magnification. Once the image is concentrated on the focus, that is, you can see a clear image, turn the revolving nosepiece to re-focus and increase magnification.

Figure 2

Note:

When you turn the focusing handwheel, be careful that the objective lens is not in contact with the glass slide or the microscope stage. Otherwise, it may damage the glass slide or the objective lens.

O **Eyepiece (Figure 1):**

There is a transparent plastic cover on the microscope eyepiece, which is used to protect the eyepiece. Every time you use the microscope, please keep in mind that you have to cover the eyepiece. Otherwise, the eyepiece will be stained with dust, which will cause a lot of trouble or even affect observation.

P **Eyepiece Tube (Figure 1):** Connect the eyepiece, and you can move the focusing

Revolving Nosepiece (Figure 1):

Q The revolving nosepiece has three objective lenses: 10x, 20x, and 40x (see Figure 2). Generally, magnification is engraved on the objective lens and eyepiece of a microscope (generally speaking, the shorter the objective lens, the lower the magnification; the longest objective lens has the highest magnification). The last magnification of the object is the result of the magnification of the eyepiece multiplied by the magnification of the objective lens. For example, adjust the objective lens to its maximum magnification (10x) and multiply it by the fixed magnification of the eyepiece (30x), and you will find that the specimen is magnified 1,200 times (note the 1,200 shown on the magnification indicator), which means that the object is 1,200 times larger than what you can see with the naked eye!

Gently turn the revolving nosepiece (Q in Figure 1), and you will hear a clear "click", indicating accurate positioning.

Turn the focusing handwheel (V in Figure 1) to let the eyepiece tube drop slowly. Turn the revolving nosepiece from the forward and backward directions to check the scope of adjustment, and ensure that the objective lens is kept away from the microscope stage (R in Figure 1).

R **Microscope Stage (Figure 1):**

It is used to place the object to be observed. There is a light hole in the middle that allows the light reflected from the mirror or emitted by the light source to pass through and be reflected into the microscope so that the object to be observed will be seen clearly.

S **Slide Clip (Figure 1):**

It is used to fix the glass slide.

T **Mirror/Light Source (Figure 1):**

Two kinds of lighting methods are adopted for effective lighting and clear observation of the object: mirror and light source. Rotate the light source to remove the insulation, and turn on the side switch with the light source facing upwards to use the light source.

It is easy.

When you observe the object through the eyepiece, try to adjust the mirror and light source to see which one produces better effects.

U **Battery Case (Figure 1):**

Please turn over the electric light source to find the battery case. Unscrew the screw to open the case cover and replace the button battery (3V). Battery model: 2032 (see Figure 3). After installation, cover the case.

V **Focusing Handwheel (Figure 1):**

Put what you want to observe on the microscope stage, slowly rotate the focusing handwheel forward or backward, and adjust the focal length of the object with the eyepiece. Change the focal length, and you will find interesting things about the object under observation.

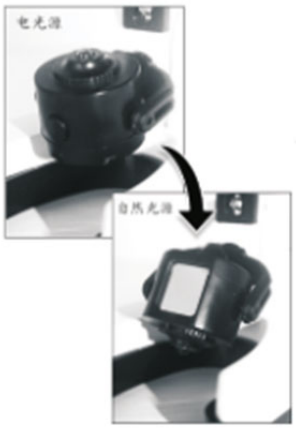
W **Color Filter (Figure 1):**

Find the microscope stage, and there is a projected part below. Press the middle part of the filter upward and pull the wheel, and you will observe the odd discoloration of the object by changing different colors.

☺ Tip:

Keep your eyes open when looking at the eyepiece to relieve eye fatigue.

Electric light source



Natural light source

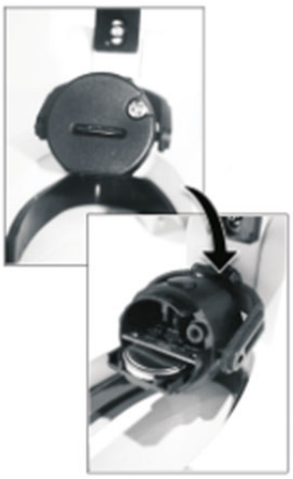


Figure 3

Note:

Be careful, and keep your objective lens away from the specimen slide. Otherwise, the glass slide or objective lens may be damaged.

Tip:

The image in the eyepiece is inverted, which is also opposite to the left and right of the object itself. In other words, if you want to observe the left side of the object more, move the specimen slide to the right, or if you want to observe the top of the object more, pull the specimen slide down.

Note:

When you finish observation, please remove the slide and turn off the power. If necessary, remove the battery and put the microscope and its related accessories into the box. When not used for more than a month, the battery must be removed from the microscope.

VI. Start Observing!

Now, you have a preliminary understanding of the microscope, and you may try to do a simple observation experiment!

1. Rotate the focusing handwheel (V in Figure 1) and lower the microscope stage (R in Figure 1), place a 10x eyepiece on the microscope, rotate the revolving nosepiece, and adjust it to the minimum objective lens magnification.

2. Take a specimen slide that needs to be observed (J in Figure 1), put it on the microscope stage (R in Figure 1), clamp it with the slide clip (S in Figure 1), and adjust the position of the slide so that the part that needs to be observed is accurately placed below the objective lens.

3. Turn the focusing handwheel to let the eyepiece tube (P in Figure 1) drop slowly until the objective lens approaches the specimen slide. Observe the eyepiece (O in Figure 1) with one eye, and slowly rotate the focusing handwheel clockwise (counterclockwise) until the image is clear.

4. When you see the image, adjust the mirror/light source (T in Figure 1) to let the light pass through the hole. When the light in the view field is the brightest and the most uniform, the best effect is achieved.

5. When you move the specimen slide left and right or up and down, what changes have taken place in the image observed through the eyepiece?

6. If you want to increase the magnification of the image, you can rotate the revolving nosepiece to adjust to a large magnification and focal length. Or you can use a 25x eyepiece for observation. Practice changing the size of the image by rotating the revolving nosepiece.

VII. Try Color Filters

Install the color filter (W in Figure 1) under the microscope stage (R in Figure 1) for adjustment, select the desired color, and align it with the light hole in the center of the microscope stage. If you rotate the color filter, you can observe the display of the object in several different colors. Take a clean glass slice, put a few grains of salt or sugar on it, rotate the filter of different colors, and you can see the reflections of salt or sugar particles in different colors.

VIII. Brine Shrimp Hatchery

Shrimp is a very small crustacean and an ideal sample to learn with a microscope. Crustaceans are sea creatures with hard shells and tentacles.

Shrimp is one of the main seafood.

Your microscope has the following experiment accessories: Sea Salt, Brine Shrimp Eggs (H in Figure 1) and Brine Shrimp Hatchery (E in Figure 1). Brine Shrimp Eggs put on the microscope are dry and can survive for five years if kept in a cold and dry place.

Figure 4

Brine Shrimp Eggs can be hatched according to the following steps:

Figure 5

1. First, pour part of the Sea Salt into a bottle of water as the hatching solution, and control its concentration between 1% and 3%; Put Brine Shrimp Eggs into a box with the hatching solution, and the hatching density is less than 2 g/l; In the process of hatching, put the hatching solution under room temperature (21°C-26°C) for 24 to 48 hours, and Brine Shrimp Eggs will hatch larvae. (This is the first stage of shell breaking)

2. Put some larvae into one Brine Shrimp Hatchery (E in Figure 1).

3. Pour some fresh salt solution into another Brine Shrimp Hatchery (E in Figure 1). Then, add a small amount of yeast powder in this new solution. After that, use a dropper (C in Figure 1), and transfer some larvae into this Brine Shrimp Hatchery (E in Figure 1). When these larvae are growing, the yeast powder is used to feed shrimps and provide them with oxygen. Without food or oxygen, larvae will not grow or even die.

4. With careful feeding, you can observe their different forms at different stages of growth: Dry spawn, spawn under hatching, growing larvae and finally, mature shrimps.

Note:

Do not take it for granted that the higher the imaging magnification, the clearer the image.

Every time you increase the imaging magnification, the light will weaken, and the imaging part will become unclear, which is for microorganisms rather than others.

As for experimental observation, use three objective lenses to observe all microorganisms until you get a satisfactory image.

5. Adult shrimps can feed fish in the fish tank. However, you need to first transfer shrimps from salt solution to fresh water, because every time you add a small amount of salt to the fish tank, it will increase the harm to fish.

IX. Make Slides by Yourself

It is very easy to make slides. You can make all kinds of slides based on your imagination.

A part of any material can be observed on a slide by using a microscope.

You can find everything necessary for the experiment mentioned in this manual from the accessories or in your home:

Tweezers, scissor, scalpel, dropper, capillary pipet, needle, tissue, gum media, measuring cup, vaseline, toothpick (natural and unstained), two to three bottles with caps, wide-mouth bottle with lid, three or four paper cups, or other small containers that can be disposed of after use.

A slide is a part or a thin cutting part of an organ, such as leaves, stems, skin, and other similar things.

You can start with an onion, the simplest object, as it has natural levels, and you do not need any equipment. Try to peel the onion as thin as possible, and if you are careful enough, you can easily get a transparent membrane, and you can cut it into square pieces of 6 mm.

Drop two different kinds of eosin in red and blue into different small caps, and respectively place in onion slices with tweezers.

Respectively take out onion slices from different coloring agents several minutes later, wash them with clean water, place them on separate glass slides, and then observe after covering them with cover glass or fully drying. Slices in different colors will bring you surprises.

X. Crystallization

Measure 30-60 ml of hot water (not boiling water) with a measuring cup, then pour it into a clean cup, slowly add a small amount of salt into it to dissolve slowly, stir the solution constantly while adding salt, and try to dissolve as much salt as possible.

Take one to two drops of salt water with the dropper (C in Figure 1) and place them on a clean blank slide (see Figure 4), and dry up the slide with natural sunshine, lamp light, or wind.

Wash the cup and pipette in clean water.

The dried slide will show white substances. Place the slide on the microscope stage, turn on the light source of the microscope and wait for it to get stable, observe the slide through the eyepiece, and then record the observation.

If you do this experiment carefully, you will see many small cubic crystals, and every grain of salt is composed of many cubic crystals. Place one or two grains of salt on another blank glass slide and compare them with a slide containing cubic crystals, and you will see the difference between the two.

If you want to store the crystal slides, use a toothpick to stick one to two drops of gum media onto a blank glass slide, then cover it with the cover glass (see Figure 5), and gently tap with the toothpick to evenly spread the gum media under the slide.

Write the object name on the slide label, stick it to the slide, and store it after drying for future observation and identification. If you do not want to store the slides, wash them with clean water and cleaning solution, then air dry them.

While experimenting, it's better to imagine yourself as a scientist, carefully observe and make records (you can record data). Most of all, you need to keep your experiment instruments and environment clean. The best experiment should be clean and free of pollution.

Further experiments:

Try to experiment with other salts according to the above steps, such as Epsom salt. Sugar is also of cubic crystal structure. However, you have to dry it up for one night and dry up the slide to form crystals.

Figure 6

XI. Prepare Glass Slides

Immerse your scalpel in clean water (B in Figure 1), cut off a slice and put it on a clean blank glass slide, and take off one part of an inset with your tweezers (A in Figure 1) - a wing, a leg, or a feeler - and place it on the glass slide. Take a cover glass and put it on the specimen, and then place the glass slide on the microscope stage to observe; You can also take a hair from your head or your pet and place it on a wet glass slide to observe. Try to place more different hairs on the same glass slide to see the differences between them. By doing so, you can observe the nutrition and development conditions of different hairs; Or you can experiment with a piece of fern plant (or other plants) and pollen to see the differences between them.

To store your glass slide, spread gum media on a clean and dry glass slide, place a cover glass on the medium in the specimen storage position and stick labels on it.

Figure 7

XII. Make Slides

Scrape a little potato chip from a fresh-cut potato with tweezers (B in Figure 1).

Make a potato slide (see Figures 6 and 7), rinse the tweezers with flowing water, and use a dropper to take a drop of water from the cup labeled clean and drop it on a blank glass slide. Take a cover glass and cover it on the glass slide, then place the slide on the microscope stage, observe the slices, and record what you observe. You will see many starch particles.

XIII. Dyeing

Dyeing is critical under some circumstances, for not all specimens can be easily observed under the microscope. Dyeing makes it easier to observe specimens. Easy as it is, dyeing requires patience and carefulness. Dyeing can easily make a mess, so it is better to put some tissues aside to correspond to disorders when dyeing. In addition, before preparing dyestuff, you need to first prepare some eosin.

Firstly, as mentioned above, when preparing fresh dyestuff (you may use chips from apples or other fruits), there shall be no water or anti-lubricant on the specimen. If necessary, dry up the blank glass slide first.

Drop a drop of bright red eosin (G in Figure 1) with dropper onto the dried glass slide, place the specimen on the slide, and then dip the dropper in a clean cup to wash it up.

Warp one end of the glass slide towards the other end to let the dyestuff diffuse and contaminate the specimen, pour redundant dyestuff into an abandoned cup, put down the slide, and wait for several minutes.

To prevent excessive dyeing and movement of the specimen, it is recommended to place the specimen sideways into an abandoned cup.

After the glass slide is completely dry, you can cover it with the cover glass and stick the label (the same as making a crystal specimen).

Note:

To dye the specimen, you need to prepare eosin;

Carefully reading bottles marked with "Eosin (G in Figure 1)" without opening the bottle, you will notice several particles of "dust" at the bottom. These are particles of bright red eosin. Remove the bottle cap, fill the bottle with water using the dropper (C in Figure 1), gently shake the mixture, and you have prepared the bright red eosin...

If possible, touch the edge of the specimen on the blank glass slide with a capillary pipet, and then slowly pour water inside into the cup.

Carefully and slightly wipe the back side of the glass slide with a piece of tissue, do not touch the specimen, and air dry the specimen for several minutes.

Some specimen will dry quickly, but there is still enough time to observe before it dries. To save your glass slides, carefully follow the following steps.

XIV. Micro-slicer

Place the specimen you want to observe in a micro-slicer (K in Figure 1) and rotate the knob to cut it into small and thin slices. You can try it with a piece of onion and feel how it makes a beautiful professional specimen easily!

The micro-slicer is an ideal tool to make specimen slices.

> Note:
>
> The blade of the micro-slicer is very sharp. Use it with great caution.

XV. Simple Plant Tissue Slides

Plant tissue slicing refers to a part or very thin cutting part of an organ in a plant, such as: very thin leaf, stems, or other similar small slices.

It is difficult to make tissue slices without special equipment and rigorous procedures. However, there is a type of tissue slice that you can make at home without special equipment, such as alliums and multi-layer covering plants.

Peel off the thin layer of onion skin that you can peel, which is almost transparent and can be used as an ideal tissue slice, and cut a thin slice of approximately 1/4x1/4 ft.

Drop two drops of eosin into the bottle cap (G in Figure 1), and use your tweezers (A in Figure 1) to pick a piece of onion and place it on the bottle cap.

Take out the onion piece from eosin several minutes later, put it in an abandoned cup, and wash it with clean water, then place it on a clean glass slide and cover it with transparent cover glass for observation.

XVI. Observation of Aquatic Lives

Fill up a wide-mouth bottle with clean water, leave it uncovered, and place it in the air for three to four days. Then, put a little grass and soil (free of pollution) in water, cover the bottle with the cap, and place it in a place with no sunshine. You can observe your aquatic lives five days later.

Five days later, take a clean blank glass slide, pick a little vaseline with a toothpick, and paint a circle on the glass slide. The circle shall be smaller than the glass slide, being about half the thickness of the glass slide.

Use the dropper to take a drop of water from the wide-mouth bottle and place it in the circle on the glass slide. Then, use the lowest magnification of your microscope to observe and focus on these organisms, and record your observations. Can you notice any object movement in the water? You will find them swim upward and downward, and in and out; The movement is caused by microorganisms. It is difficult to focus on a particular microorganism, as this drop of water is like an ocean to them.

If the microorganisms move too fast and cannot be observed, or cannot stay on the focus point for a long time, it is recommended to absorb some water with tissue, and you will see more clearly after being proficient in these steps.

Remember, you can make microscope slides at your will. Train yourself to observe all things around you in a park, at school, in the playground or at home. Pay attention to things that can be made into good specimens and find out the tiny subtle world around us.

★Microscope Maintenance

A microscope is a precise optical instrument. Correct and careful use will extend its service life and enable you to discover more fun.

- λ Please be sure to take and put a microscope with both of your hands - one on its arm and the other on its bottom.
- λ Be sure to take off glass slides every time you use the microscope.
- λ After finishing observation, place the microscope into a box or cover it with an anti-dust bag.
- λ Wipe the lens only with the lens paper.
- λ Please avoid direct contact between the objective lens and microscope stage.
- λ Please remove the battery if the microscope will not be used for more than one month.
- λ The microscope cannot be placed under high temperature or direct sunshine, or in a place with moisture or poor ventilation.
- λ Accessories and others shall be stored after cleaning and drying.

★Warranty:

I. The product will be provided with a one-year free warranty service from the date of purchase. Our company will offer free maintenance for any quality issues arising during the warranty period.

II. The following circumstances are not covered by warranty:

1. Fail to show the receipt and warranty card stamped with the official seal of the dealer.
2. Product damage caused by installation or use not in accordance with the manual.
3. Product damage due to unexpected factors or human behavior, such as mechanical damage, break, moldy lens or rusty product due to improper maintenance.
4. The product is repaired or disassembled by personnel not authorized by our company.
5. Product damage due to irresistible natural forces, such as earthquakes and fire.

III. After the expiration of the warranty, our company will continue to provide lifelong maintenance for users, which requires a fee for spare parts.

IV. When your product needs to be transported for maintenance, please package it properly to prevent damage on the way. The transportation fee is borne by the user. To facilitate replacement, please keep the packaging intact and clean.

Special statement:

The above services only apply to products sold by our company in Mainland China. As for the after-sales service terms separately agreed on the sales of products, the contract shall prevail.