

#5F626E2

M720X

FIELD MICROSCOPE

显微镜套装
顯微鏡套裝



警告！ 请不要把放大镜放在窗边
或者其它阳光可直接照射的地方
警告！ 请不要把放大鏡放在窗邊
或者其它陽光可直接照射的地方

⚠ WARNING:

KEEP MAGNIFYING GLASS AWAY FROM
DIRECT SUNLIGHT AND WINDOWS.

TOTAL NET WT. OF ACCESSORIES/POIDS NET TOTAL DU ACCESSOIRES/
PESO NETO TOTAL DEL ACCESORIOS: 4.13 OZ (117 g)

(需要2枚五号电池,
产品中不包含)

(需要2枚五號電池,
產品中不包含)



x2

Not Included
Non Inclues
No Includas



Contents:

- Microscope
- Slide case
- 1 Prepared slides
- 8 Blank slides
- 8 Slide covers
- 8 Labels
- 2 Collection vials
- Pipette
- Tweezers
- Graduated cylinder
- Shrimp hatchery
- Yeast

M720X Microscope Set

Supervision by Adults

Read and follow the instructions, safety rules and first aid information.

This microscope set is intended for children over the age of 8 years. Children should only use this device under adult supervision. Never leave a child unsupervised with this device.

Accessories in this experimental kit may have sharp edges and tips. Please store the device and all of its accessories and aids out of the reach of young children when not being used to avoid risk of INJURY.

This device contains electronic components that are powered by batteries. Batteries should be kept out of children's reach. When inserting batteries please ensure the polarity is correct. Insert the batteries according to the displayed +/- information.

Fire/Danger of Explosion

Do not expose the device to high temperatures. Use only battery types recommended.

Never mix old and new batteries (replace all batteries at the same time). Never mix alkaline standard carbon zinc or rechargeable batteries. Never short circuit the device or batteries or throw into a fire. Exposure to high temperatures or misuse of the device can lead to short circuits, fire or even explosion! Leaking or damaged batteries can cause injury if they come into contact with the skin. If you need to handle such batteries please wear suitable safety gloves.

Chemicals

Any chemicals or liquids used in preparing, using, or cleaning should be kept out of reach of children. Do not drink any chemicals! Hands should be washed thoroughly under running water after use. In case of accidental contact with the eyes or mouth rinse with water. Seek medical treatment for ailments arising from contact with the chemical substances and take the chemicals with you to the doctor for treatment.

Risk of Material Damage

Never take the device apart. Please contact our service center and send the device in for repair as needed.

Do not subject the device to temperatures exceeding 140°F.

Tips on Cleaning

Remove batteries from device before cleaning.

Microscope Care

Clean the exterior of device with a dry cloth. Do not use cleaning fluids so as to avoid causing damage to electronic components.

Clean the lens (objective and eyepiece) only with a soft lint-free cloth (e.g., microfiber). Do not use excessive pressure - this may scratch the lens. Protect the device from dust and moisture. Store the device in its original packaging. Batteries should be removed from the device if not used for a long period of time.

DISPOSAL

Keep packaging materials (plastic bags, rubber bands, etc.) away from children. There is a risk of SUFFOCATION.

Dispose of the packaging materials as legally required. Consult the local authority on the matter if necessary.

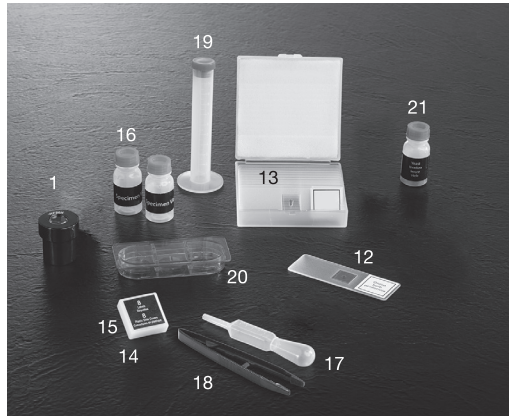
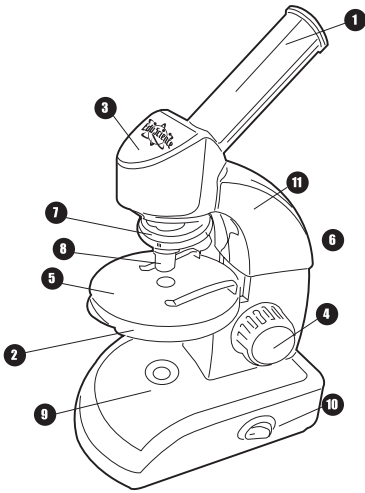


DISPOSAL

Dispose of the packaging materials properly, according to their type, such as paper or cardboard. Contact your local waste-disposal service or environmental authority for information on the proper disposal.

Please take the current legal regulations into account when disposing of your device. You can get more information on the proper disposal from your local waste disposal service or environmental authority.

M720X Microscope Set



The Parts of Your Microscope:

- 1 Wide Field Eyepieces (WF20x)
- 2 Aperture Wheel
- 3 Eyepiece Head
- 4 Focus Knob
- 5 Stage
- 6 Metal Stage Clips
- 7 Objective Turret
- 8 4x,10x, 40x Objectives
- 9 Lower Illumination (LED)
- 10 Base with Battery Compartment
- 11 Microscope Arm

Additional Contents:

- 12 (1) Prepared slide
- 13 (8) Blank slides
- 14 (8) Slide covers
- 15 (8) Labels
- 16 (2) Collection vials
- 17 Pipette
- 18 Tweezers
- 19 Graduated cylinder
- 20 Shrimp hatchery
- 21 Yeast

Congratulations! You've chosen one of the highest quality microscopes available for young explorers. Read the following instructions carefully to get the greatest benefit from your precision instrument. Then try out the experiments to begin your investigation of the fascinating world around you.

How Do I Use My Microscope?

Before you use your microscope, make sure that the table, desk or whatever surface that you want to place it on is stable, and is not subject to vibration. If the microscope does need to be moved, use the arm and base for support while carefully transferring it.

Install two "AA" batteries (not included) in the battery compartment on the bottom of the microscope. Unscrew battery door on the bottom of the microscope and insert the batteries according to the displayed +/- information. Reattach the battery compartment door.

Once the microscope is in a suitable location and batteries installed, check the light sources to make sure that it illuminates by switching the light switch on. (Fig. 9) Use a cleaning cloth (e.g., microfiber) to gently wipe the lenses off. If the stage (Fig. 5) is dirty with dust or oil, carefully clean it off.

The stage is raised and lowered only by using the focus adjustment knob (Fig 4).

How Do I Operate the LED Illumination?

Locate the ON/OFF switch on the base of the microscope. Flip the switch to the on position and the light will illuminate. This microscope is equipped with modern LED lighting (a light-emitting diode) that illuminates the specimen from below. The aperture wheel (Fig. 2) is located in the middle of the microscope stage (Fig. 5). They help you when you are observing very bright or clear specimens. Using these filters, you can choose from various brightness levels. This helps you better recognize the components of colorless or transparent objects (e.g., grains of starch, protozoa).

M720X Microscope Set

How Do I Adjust My Microscope Correctly?

Place your microscope on a suitable location as described above and sit in a comfortable viewing position. Always start each observation with the lowest magnification. Adjust the microscope stage (Fig. 5) so that it is in the lowest position. Turn the objective turret (Fig. 8) until it clicks into place at the lowest magnification (Objective 4x). Note: Before you change the objective setting, always move the microscope stage (Fig. 5) to its lowest position by rotating the focus knob (Fig. 4). Lowering the stage by rotating the focus knob will prevent damage to the specimen slide or microscope. When starting an observation always start with the WF 20x eyepiece (Fig. 1) in the microscope head (Fig. 3).

Quick Fact - The highest magnification is not always the best for every specimen!

Magnification Guide		
Eyepiece	Objective	Power
20X	4x	80x
20X	10x	200x
20X	40x	800x

How Do I Observe the Specimen?

Sit in your location with adequate illumination chosen from the color filter wheel and follow these basic rules: Start with a simple observation at the lowest magnification. Position the object or specimen in the middle of the stage under the stage clips (Fig. 6), centered over the lower LED light (Fig. 10). Focus the image by rotating the focus knob (Fig. 4) until a clear image appears in the eyepiece.

NOTE: The higher the magnification, the more light you will require for a good image quality.

Quick Fact - The item you want to observe with the microscope is known as the object or specimen.

Place the prepared slide directly under the objective on the microscope stage (Fig. 5) securing with the stage clips (Fig 6). The prepared slide should be located directly over the lower illumination (Fig. 10). Look through the eyepiece and carefully turn the focus knob (Fig. 4) until the image appears clear and sharp.

When the WF 20x lens is inserted in the barrel of the microscope head, the magnification is doubled. Higher levels of magnification can be achieved by turning the objective turret (Fig. 8) to a higher setting (10x or 40x).

For best results, return the WF 10x eyepiece to the lowest power of magnification before changing the power on the turret. Replacing the WF 20x eyepiece upon every rotation of the turret allows for easier transitions in magnification. Following this procedure creates a steady increase of magnification without overpowering the view of the object. The following magnifications should be considered: 80x, 200x, then 800x.

Each time the magnification changes (due to an eyepiece or objective change), the image sharpness must be readjusted with the focus knob (Fig. 4). When doing this, be careful because if you move the microscope stage too quickly, the objective and the slide could come into contact and cause damage to the slide or microscope.

For transparent objects (e.g., protozoa), light is projected by the lower LED light, traveling from below the stage, through the objective and eyepiece, and finally into your eye. This process of light transmission is known as microscopy. Many microorganisms found in water, plant components, and the smallest animal parts are transparent in nature. Opaque specimens, on the other hand, will need to be prepared for viewing. Opaque specimens can be made transparent by a process of treatment and penetration with the correct materials (media), or by slicing. You can read more about creating specimens in the following experiment sections.

Troubleshooting Table	
Problem	Solution
No recognizable image	Turn on light Readjust focus Start with the lowest power objective (4X) lowest power eyepiece (20X)
No Image	Center object on slide Start with the lowest power objective (4X) lowest power eyepiece (20X)
No Light	Replace batteries Check on/off position

Cleaning Tips

Ensure your microscope has a long service life. Clean the lens (objective and eyepiece) only with a soft lint-free cloth (e.g. microfiber). Do not press hard as this might scratch the lens. Ask your parents to help if your microscope is really dirty. The cleaning cloth should be moistened with cleaning fluid and the lens wiped clean using little pressure. Make sure your microscope is always protected against dust and dirt. After use, leave it in a warm room to dry.

This microscope can be the gateway to a fun, creative, learning process and will open the door to advanced knowledge of the world around you. It allows you to explore the various fields of science from Biology to Botany to Chemistry and beyond, so have fun exploring the exciting world of science.

M720X Microscope Set

Experiment Instructions

WARNING!

- Keep chemicals and corrosive liquids out of the reach of children.
- Do not ingest any chemicals.
- Wash your hands with soap thoroughly under running water after use.

Introduction

Here are a few tips about how to take a better look at the wonderful world of microorganisms and crystals. For example, you'll learn how to prepare your object / specimen so that you can look at it with the microscope. The numerous experiments described should make you curious and want to use your microscope more.

What Kind of Objects?

With a magnifying glass, you can look at non-transparent (i.e., opaque) objects (for example, small animals, parts of plants, tissues, etc.) Here, the light falls onto the object and is reflected back through the magnifying lens and into your eye. With your microscope, however, you can also observe transparent objects, in which the light from the lamp goes through the opening on the stage and the prepared specimen. Then it passes through the objective, the body of the microscope and through the eyepiece into the eye. Many microorganisms in water, parts of plants and the tiniest animal parts are naturally transparent. For other things, you must make them transparent through a treatment or penetration with the right materials (media), or by taking the thinnest slices from them using your hand or a specimen slicer (not included) to be able to examine them with your microscope. You'll now find out how this is done.

How to Produce Thin Specimen Slices

WARNING:

Only do this with an adult's supervision. Ask your parents to help you. As already mentioned, you need to get the thinnest slices possible from an object so that they are transparent and can be looked at under the microscope. First, you'll need a simple candle. Place the wax from the candle in an old pot and heat it on the stovepot until it becomes liquid. Now use tweezers (Fig. 24) to dip the object in the liquid wax a few times. Attention: The wax is very hot. Be careful. After each dip, allow the wax to harden and then dip the object into the wax again. When the wax around the object has hardened completely, you can use a specimen slicer to cut thin slices from it. These slices are to be laid on a slide and covered with a cover slip or slide cover (Fig. 18).

The Production of Specimens

There are two basic types of specimens: Permanent specimens and short-term specimens.

Short-term Specimens

Short-term specimens are produced from objects that you want to look at, but don't want to keep in your specimen collection. These specimens are only meant to be observed for a short period of time, after which they are discarded. For short-term specimens, place the object on the slide and place a cover slip on top of it. After looking at the object, clean the slide and the cover slip. One of the secrets of successful observation with your microscope is the use of clean slides and cover slips. Spots or stains would only distract you when looking at an object.

Permanent Prepared Specimens

Permanent specimens are those produced from objects that you would like to look at again and again. The preparation of dry objects (pollen, the wings of a fly, etc.) can only be done with special glue. You'll find such glue at a local hobby store, identified as "gum media."

How to Prepare a Dry Object

Objects that contain liquid must first have the liquid taken out of them. First, place the object in the middle of a clean slide and cover it with a drop of glue (gum media). Then place a cover slip on the object. Lightly press the cover slip, so that the glue spreads to the edges. Let the specimen harden for 2-3 days. When the specimen is firmly glued, you will be able to use it.

How to Prepare Smear Specimen

For a smear specimen, a drop of the liquid to be observed (e.g., water from a puddle in the forest) is placed on the end of the slide using a pipette. Then you can smear the liquid across the slide with the help of a second slide. Before observing, let the substance dry together for a few minutes.

Experiments

Experiment No. 1:

Black and White Print

Objects:

1. A small piece of paper from a newspaper with a black and white picture and some text
2. A similar piece of paper from a magazine

In order to observe the letters and the pictures, produce a short-term slide from each object. Now set your microscope to the lowest magnification and use the specimen from the newspaper. The letters on the newspaper look frayed and broken since they are printed on raw, low quality paper. The letters on the magazine look smoother and more complete. The pictures in the newspaper are made up of many tiny dots, which appear slightly smudgy. The halftone dots of the magazine picture are clearly defined.

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Experiment No. 2:

Color Print

Objects:

1. A small piece of color-printed newspaper
2. A similar piece of paper from a magazine

Make short-term specimens from the objects and observe them with the lowest magnification. The colored halftone dots of the newspaper often overlap. Sometimes, you'll even notice two colors in one dot. In the magazine, the dots appear clear and rich in contrast. Look at the different sizes of the dots.

Experiment No. 3:

Textile Fibers

Objects and Accessories:

1. Threads from various fabrics (e.g., cotton, linen, wool, silk, rayon, nylon, etc.)
2. Two needles

Each thread is placed on a slide and frayed with the help of the two needles. Next, wet the threads and cover them with a cover slip. Set the microscope to one of the lower magnifications. Cotton fibers come from a plant, and look like a flat, twisted ribbon under the microscope. The fibers are thicker and rounder at the edges than in the middle.

Cotton fibers are basically long, collapsed tubes.

Linen fibers also come from a plant, and they are round and run in one direction.

The fibers shine like silk and exhibit countless bulges on the thread.

Silk comes from an animal and is made up of solid fibers that are small in diameter, in contrast to the hollow plant-based fibers.

Each fiber is smooth and even and looks like a tiny glass tube.

The fibers of the wool also come from an animal.

The surface is made of overlapping sleeves that look broken and wavy. If possible, compare wool from different weaving mills. In doing so, take a look at the different appearance of the fibers.

Experts can determine which country the wool came from by doing this.

Rayon is a synthetic material that is produced by a long chemical process. All the fibers have solid, dark lines on the smooth, shiny surface. After drying, the fibers curl into the same position. Observe the differences and the similarities.

Experiment No. 4:

Table Salt

Object:

1. Common table salt

First, place a few grains of salt on a slide and observe the salt crystals with the lowest setting of your microscope. The crystals are tiny cubes and are all the same shape.

Experiment No. 5:

Production of Salt Crystals

Objects and Accessories:

1. Table salt
2. A graduated cylinder filled halfway with warm water to dissolve the salt

3. Cotton thread

4. Paper clips

5. A matchstick or pencil

Add salt to the water until it no longer dissolves. You now have a saturated salt solution. Wait until the water has cooled. Fix a paper clip to the end of the cotton thread. The paper clip serves as a weight. Tie the other end of the cotton thread into a knot around the match, and dip the end with the paper clip in the salt solution. Place the match horizontally on top of the test tube. It prevents the cotton thread from slipping all the way down into the test tube. Now place the tube in a warm place for 3-4 days. If you take a look at the glass after a few days under the microscope, you can see that a little colony of salt crystals has formed on the cotton thread.

Experiment No. 6:

How Do You Raise Brine Shrimp?

Accessories (from your microscope set):

1. Shrimp eggs (not included)
2. Sea salt
3. Hatchery
4. Yeast

Brine Shrimp, or "Artemia Salina" as they are called by scientists, have an unusual and interesting life cycle. The eggs produced by the female are hatched without ever being fertilized by a male shrimp. The shrimp that hatch from these eggs are all females. In unusual circumstances (e.g., when the marsh dries up), the male shrimp can hatch. These males fertilize the eggs of the females and from this mating, special eggs are produced. These eggs, called "winter eggs," have a thick shell, which protects them. The winter eggs are very resistant and capable of survival, even if the marsh or lake dries out, killing off the entire shrimp population. The winter eggs can exist for 5-10 years in a "sleep" status and will only hatch when the proper environmental conditions occur. These are the type of eggs you have in your microscope set.

The Incubation of the Brine Shrimp

In order to incubate the shrimp, you first need to create a salt solution that corresponds to the living conditions of the shrimp. For this, put a half-liter of rain or tap water in a container. Let the water sit for approximately 30 hours. Since the water evaporates over time, it is advisable to fill a second container with water and let it sit for 36 hours. After the water has sat stagnant for this period of time, add one quarter teaspoon (1/4 tsp.) of sea salt to the container and stir it until all of the salt is dissolved. Now put a few eggs in the container and cover it with a dish. Place the glass container in a bright location, but don't put it in direct sunlight. Since you have a hatchery, you can also add the salt solution along with a few eggs to each of the four compartments of the tank. The temperature should be around 77° F (25°C). At this temperature, the shrimp will hatch in about 2-3 days. If the water in the glass evaporates, add some water from the second container.

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The Brine Shrimp under the Microscope

The animal that hatches from the egg is known by the name "Nauplius Larva." With the help of a pipette, you can place a few of these larvae on a glass slide and observe them. The larvae will move around in the salt water by using their hair-like appendages. Take a few larvae from the container each day and observe them under the microscope. In case you've hatched the larvae in a hatchery, simply take off the cover of the tank and place the tank on the stage. Depending on the room temperature, the larvae will be mature in 6-10 weeks. Soon you will have raised a whole generation of brine shrimp, which will constantly grow in numbers.

Feeding Your Brine Shrimp

In order to keep the brine shrimp alive, you must feed them. This must be done carefully, since overfeeding can make the water become foul and poison your shrimp population. The feeding is done with dry yeast in powdered form. A little bit of this yeast every other day is enough. If the water in the compartments of the hatchery or your container turns dark, that is a sign that it has gone bad. Take the shrimp out of the water right away and place them in a fresh salt solution.

Warning! The shrimp eggs and the shrimp are not meant to be eaten!

Experiment No. 7:

How Does Bread Mold Develop?

Object:

1. An old piece of bread

Put the bread on a slide and lightly moisten it with water. Place the bread into a sealed container and keep it warm and out of harsh light. Within a few days time, the black bread mold forms. When the mold takes on a white, shining appearance, observe it with your microscope. It will look like a complicated mass of thread, forming the fungus body, which is called the mycelium. Each thread is known as a hypha. These threads, or hyphae, grow like long, slim stacks, ending in a small, white ball, called a sporocarp. Inside the sporocarp is a spore that will eventually be released to start new colonies of mold. With your microscope you can watch this amazing transformation unfold.

Experiment No. 8:

Observing Stem and Root Sections

Objects:

1. A celery stalk
2. A carrot

With an adult's supervision, cut several very thin slices from the middle of the celery (a stem) and from the middle of the carrot (a root). Make a "wet mount" by placing a drop of water on the slide. Then put the specimen on the water-covered slide, and top with a cover slip. The water will help support the sample. It also fills in the space between the cover slip and the slide. Start by viewing them at the lowest magnification and then increase the magnification for more detailed observation.



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