

User Manual of Product 1:

AmScope 120X-1200X 52-pcs Kids Beginner Microscope
STEM Kit with Metal Body Microscope, Plastic Slides, LED
Light and Carrying Box (M30-ABS-KT51),Black

52-Piece MICROSCOPE SET

EXPLORE... LEARN... GROW!



Comes In Black & White Colors

**M30-ABS-KT2
USER GUIDE**



SCIENCE • TECHNOLOGY • ENGINEERING • MATH

WARNING - CHOKING HAZARD
Small parts. Not for children under
three (3) years. Adult supervision
required.



amscope.com/iqcrew





Safety Information

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Small parts. Not for children under
three (3) years. Adult supervision
required.



This microscope kit has tools with sharp points or edges, including a microtome and a pick. Please use this product very carefully, children must be under adult supervision. This microscope set contains chemicals that may be harmful if misused. Please read all the warnings and cautions in the instruction manual and on individual containers carefully. Do not allow the chemicals to come into contact with any part of the body, especially the mouth and eyes. Keep small children and animals away from experiments. As the microscope kit also has instruments with sharp edges and points, eye protection is strongly recommended.

WARNING- BATTERY SAFETY INFORMATION

- ▶ Battery installation and removal should be performed by an adult.
- ▶ Use only batteries recommended in this instruction manual.
- ▶ Be careful to install the batteries with correct polarity as indicated.
- ▶ Do not mix old and new batteries.
- ▶ Remove all batteries when replacing.
- ▶ Do not mix alkaline, standard, rechargeable, or different types of batteries.
- ▶ Rechargeable batteries are to be removed from the microscope before being charged.

CAUTION:

The following chemicals in this package could be harmful if misused:

- Eosin Biological Dye
- Gum Media

Avoid eye and skin contact. Do not swallow. Do not inhale. May cause irritation. In case of accident, call a doctor. Keep away from young children.

SAFETY INFORMATION

- a) Glass slides and slide covers are very delicate. Please handle with care.
- b) The incorrect use of chemicals can cause injury and damage to one's health. Use only the slide preparations listed in the instructions.
- c) 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.
- d) Supervising adults should discuss the warnings and safety information with the child before commencing the preparation of slides. Pay particular attention to the safe handling of chemicals (if used).
- e) Your slide and brine shrimp preparation space should be kept clean, clear and away from any food storage areas. Place brine shrimp hatching station in a location where brine shrimp will not be consumed by humans or animals.

IQCrew M30 User Guide

1. Introduction

IQCrew's Science Discovery Series is designed to inspire kids to learn more about science. Microscopes are important tools which help children understand science and nature by allowing them to peek into the microscopic world, which is why they are a standard component of STEM curricula. Biology, chemistry, geology, and many more fields rely on microscopes to understand how things work.



SCIENCE | TECHNOLOGY | ENGINEERING | MATH

The IQCrew brand offers a range of microscopes and accessories to drive the curiosity of the budding scientist:

- **Compound Microscope:** view specimens under high magnification where light is transmitted through the specimen.
- **Stereo Microscope:** view specimens under low magnification where light is reflected from the surface of the specimen.
- **Inverted Microscope:** view specimens in petri dishes as light is directed from top of specimen while objective is at the bottom.
- **Digital Microscope:** connect via USB to see the specimen on computer or phone and capture live images.
- Experiments and accessories supplementing the microscopes to continue learning.



See our full line of products at www.amscope.com/iqcrew

M30-ABS-KT2 - Parts Names and Applications



NAME	USAGE
Body	The main body of a microscope, connecting parts of a microscope
Eye piece	The lens you look through. Further magnifies specimens
Stage	Where specimens are placed for viewing
Stage Clips	Used to prevent specimen from moving
Illuminator	A source of light which illuminates the specimen
Filter Holder	Holds optional filters used to change the color or quality of light
Lamp Housing	Contains the light-source, including the LED bulb
Arm	Connects the illuminator to the body
Objective turret (nose piece)	Holds the objective lenses, and rotates to switch between lenses
Brightness control knob	Switches the illuminator on and off, and adjusts the brightness
Focusing knob	Adjusts the height of the objective turret to focus on the specimen
Battery compartment lid	Covers the battery compartment, where AA batteries can be installed
Battery compartment screw	Secures the battery compartment lid

Microscope Features

- **Focus Knob:** moves the specimen up or down making the image clear and sharp. Use the focus knob to raise or lower the lens until the image you see is clear and sharp.
- **The Body Tube:** Connected to the eyepiece and helps focus the lenses.
- **Eyepieces:** The two eyepieces have 8X and 20X magnifications. Remove the dust cover from the eyepiece and put it aside in a safe place.
- **Power Indicator/ Objective turret:** The turret has 3 lenses or objectives: 15 X, 30 X, and 60 X (See Fig. 3.1). 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 (60 X and multiply it by the power of your fixed eyepiece (20X).
- **The Stage:** A flat platform with a hole in the center allows reflected light off the mirror or light source to enter the microscope.
- **Stage Clips:** The 2 stage clips hold the glass slide firmly on the stage.
- **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 microscope.
- **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.
- **Color Filter and Aperture Wheel:** The color filters are incorporated in the stage. Use these filters to add color to enhance the image of certain specimens.

Available Magnification Options

EYEPIECE OBJECTIVE LENS	8X	20X
15x	120x	300x
30x	240x	600x
60x	480x	1200x

1. Installing Batteries in the Microscope

Remove the battery cover on the back of the microscope and install 2AA batteries (included in the kit). Make sure to follow the diagram on the inside of the battery compartment to ensure that batteries are installed in the correct direction. Once installed replace the battery cover on the microscope.



2. Adjust the focus



1. Rotate the focus knob and raise the body tube as far as it will go. Turn the turret to the shortest objective (the power indicator will read 100x).
2. Put one of the prepared glass slides under the stage clips and position the prepared specimen over the hole in the stage.
3. Rotate the focus knob to lower the body tube as far as it will go.
4. Look through the eyepiece and slowly turn the focus knob until the specimen can be seen in focus.
5. Observe what happens when you slowly move

the light source or the mirror. Adjust the mirror or light source to provide the amount of light that gives you the best image.

6. Look in the eyepiece and observe what happens to the image when you move the slide to the left and then to the right.
7. If you wish to increase magnification, rotate the objective turret to a higher power and refocus. Practice rotating the turret to change magnification.



2.1 Using filters

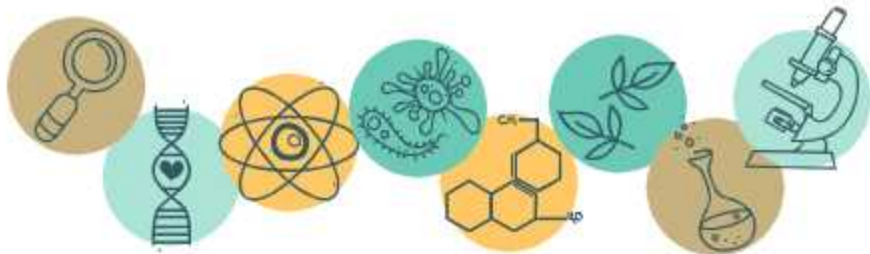
Locate the color filter located at the front of the stage. Rotate the filter to change filter colors. Observe how the color filter affects your view of the prepared slide. Next, take a blank slide and place a few grains of salt or sugar on it. Rotate the filter and see how the filtered light enhances the image of the salt or sugar.



Tip: The color filter will be most useful when looking at clear or dim specimens.



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



Your First Experiment!

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.

Prepare your own slides.

NOTE: When preparing slides you want to use the thinnest possible sample. Have an adult use a razor blade or sharp knife to cut slices for you to try. **DO NOT CUT SPECIMENS WITHOUT ADULT SUPERVISION.**

Wet Mount Slides

The most common way to prepare a specimen is with a "wet mount", and here's how you do it:



1. Place a specimen on the slide. Using a pipette, place a drop of water on the specimen.
2. Then place one edge of the cover slip over the specimen and carefully lower the cover slip into place using a toothpick or equivalent. This method will help prevent air bubbles from being trapped under the cover slip.
3. Your objective is to have sufficient water to fill space between cover slip and slide. If there is too much water, the cover slip will slide around. Take a piece of paper towel and hold it close to one edge of the cover slip. This will draw out some water. If too dry, add a drop of water beside the cover slip. Practice this until you get used to it.

Recommended Specimens to look at with wet mount slides

- Plant material, like leaves, onion skin, flower petals
- Mold spores from bread, cheese or fruit
- Fibers like thread or yarn

Dry Mount Slides

The procedure for making dry mount slides is much the same as for wet mounts.



1. Select a clean slide. Make sure it is free of dirt & smudges
2. Inspect the specimen to determine if it needs to be sliced. (Try to use a translucent to transparent specimen for light to pass through it)
3. Place the sample specimen on the slide using tweezers or toothpick - just enough to fit under a cover slip.
4. Carefully place a cover slip over your specimen to flatten it out. There is no need to worry about air bubbles, so you can just drop the cover slip onto the specimen.

Recommended Specimens to look at with dry mount slides

- Hair, fur or feathers
- Small insects or insect body parts
- Butterfly or moth wings
- Cloth
- Printed Material



TIP:



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

It is recommended that you 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.



Brine Shrimp Hatchery

Brine shrimp are tiny crustaceans that are ideal for study with a microscope. Crustaceans are sea creatures with hard shells and antennae. Crabs and lobsters are perhaps the most well-known crustaceans. Brine shrimp are the major part of the diet of many sea creatures. The word brine means water containing noticeable amounts of salt. Brine shrimp are salt water creatures.

Your microscope kit comes with a vial of sea salt, brine shrimp eggs and a hatchery. Here's how to grow and observe your own shrimp.

Growing Brine Shrimp:



1. To hatch the eggs, first prepare a brine solution. Pour the entire contents of the vial containing the sea salt into a quart (946 cc) of water.



2. Add the brine shrimp eggs into the solution. Allow the solution to stand at room temperature for 24 to 48 hours and the eggs will hatch into nauplius larvae (this is the first stage of development after leaving the eggs).



3. Place some of the larvae into one of the compartments of the shrimp hatchery.



4. Place some fresh brine solution in another compartment. Add a small amount of yeast to this new solution.



5. Then, using an eyedropper, transfer some of the larvae into this compartment as well. The yeast will serve as food and produce oxygen for the larvae as they develop into maturity. Without food and oxygen, the shrimp cannot develop and will die.



6. Observe the life cycle of the shrimp as they grow: the dried eggs, the hatching larvae, and finally, the mature shrimp.

Observing Brine Shrimp:

Once your shrimp have hatched, cover the hatching station with the lid and observe the shrimp through the magnifying lens.

For even higher magnification, suck up some shrimp into the pipette and place a few drops of that water onto a blank microscope slide. Cover the droplets gently with another slide, and then remove the covering slide. This will flatten out the water without crushing the shrimp.

Place the slide on your microscope stage and examine the shrimp with both the 10x and 25x lenses. The shrimp will be swimming rapidly. Move the slide around to keep them in view.

Your brine shrimp will live for 1-3 days. If you want to observe them for a longer period, feed them by adding a few grains of yeast to the hatching compartments. Also, skim off unhatched eggs from the water surface so the growing shrimp can get more oxygen.

Exciting Things to Look For

- When brine Shrimp first hatch, they only have one eye, called a naupliar eye, and an extra set of antennae with fine hairs to help them swim. Do you see the eye?
- After about 12 hours, the shrimp molt - shed their exoskeletons - and move into a new stage of development. They will continue to molt until they reach the adult stage, about 8 days after hatching. If you are lucky, you might see one as it molts!
- The adult brine shrimp have two eyes in addition to the naupliar eye. They also have 11 pairs of what look like legs. These appendages are called phyllopods and they are not all the same. Some are adapted for swimming, while others are used to scrape and filter algae, which is what shrimp mostly eat. Can you see any differences in the phyllopods?

Experiments to Try

See what kind of water your shrimp like best. Place unsalted water into one compartment, and fill the other three compartments with water that has salt at the ratio of $\frac{1}{2}$ teaspoon, 1 teaspoon and 2 teaspoons of salt per cup of water. Which solution did they hatch best in? Were there any differences between the results after 24 hours, 48 hours, and 72 hours?

See how pollutants in the water affect the shrimp. Once you have grown some shrimp, use the pipette to transfer an equal amount to each half of your petri dish. Then add a different pollutant to each sample. What happens when you add vinegar, dish soap, sugar, soy sauce, or anything else to the water?

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 following experiments can be found in this kit or around your home (make sure to ask a parent first before you borrow any items, such as the measuring cup).

NOTE:

In order to stain a slide, you will need to prepare the Eosin Dye. Without opening the container, look closely at the container marked "Eosin Dye". You'll notice a few grains of 'dust' at the bottom of the container. These are the grains of Eosin. Remove the container's lid and fill the container with water. Gently stir the mixture, you have now prepared Eosin Dye for use.

Onion Skin Cell Experiment:

Tissue from an onion is a good first exercise in using the microscope and viewing plant cells. The cells are easily visible under a microscope and the preparation of a thin section is straight forward. An onion is made of layers, each separated by a thin skin or membrane.



1. First, place a small drop of water on a microscope slide. This is to hold the onion skin and to keep it from drying out.



2. With adult supervision, take a small piece of onion and using tweezers, peel off the membrane from the underside (the rough side).



3. Using tweezers, place the onion skin membrane flat onto the drop of water on the slide.



4. Using your dropper, add a drop of Eosin dye provided with this kit on top of the onion on the slide. This will help you see the cell structure better.



5. Place one edge of the cover slip over the onion and dye. Carefully lower it into place using a toothpick or tweezers. This helps prevent air bubbles from getting trapped under the cover slip.



6. Observe the slide under your microscope. What do you see? Can you spot the four parts?

Troubleshooting

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

S/N	PROBLEM	CAUSE	SOLUTIONS
1	Light source of microscope is dim	No battery installed or batteries are dead.	Install two AA batteries in the battery compartment
2	Light source is bright but the image is not, or the light is not uniform	The objective lens is not properly aligned	Rotate objective turret (9) until it clicks in place.
3	The image is blurry	The focus is not correctly set.	Follow the instructions to properly focus. (Refer Pg 5)
4	The specimen cannot be focused and the entire focus range has been used	The specimen is too thick, or liquid is too high.	Try a thinner specimen sample or less liquid.

Microscope Best Practices

The microscope should be used in a dry environment. Do not use the microscope outside in wet conditions as water can damage the light-source or contaminate the optical system. Always turn off the illuminator when the microscope is not being used.



When storing the microscope, remove the batteries to prevent corrosion. Always remove slides from the stage before putting the microscope away. Do not use anything except lens cleaning tissue to clean the lenses. Always carry the microscope with two hands - one around its arm and one under the base. Keep the microscope in a cool, dry, dust-free place. Use a dust-cover to prevent dust and humidity from entering the microscope.



Make a Record of Your Experiments

Begin to start thinking like a scientist as you perform your experiments. Observe carefully and make records of your experiments (make sure you date them). Record the types of specimens you observe; their colors, shapes and patterns; how they look through each objective; how you prepare your slides; what tools you use; how different specimens compare with each other; and so forth.

NOTES

Date of slide: _____

Name of sample: _____

Collected from: _____

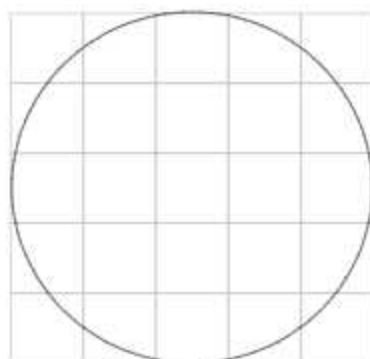
Stain: _____

Mount: _____

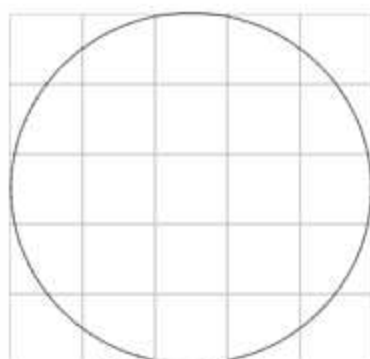
Lighting: _____

Observations

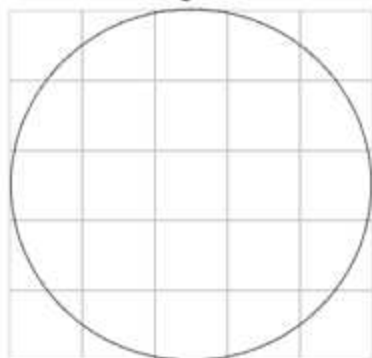
Sketches



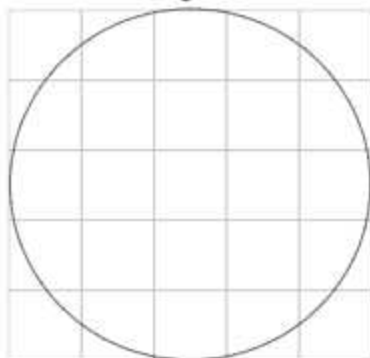
40x magnification



100x magnification



200x magnification



Other: _____

NOTES

Date of slide: _____

Name of sample: _____

Collected from: _____

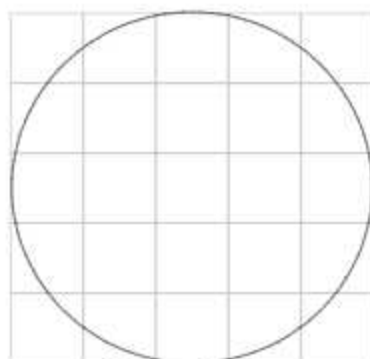
Stain: _____

Mount: _____

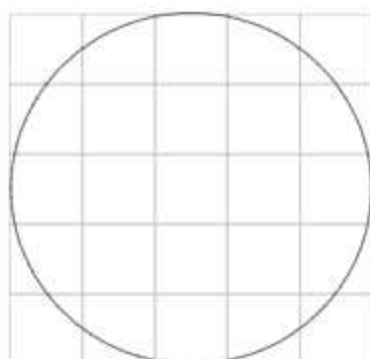
Lighting: _____

Observations

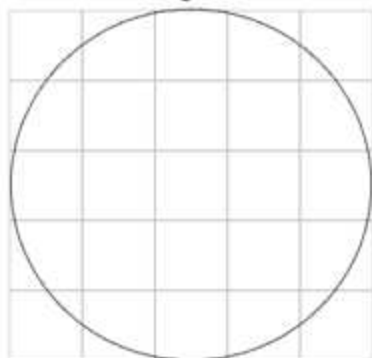
Sketches



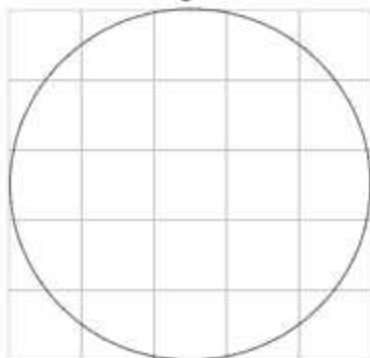
40x magnification



100x magnification



200x magnification



Other: _____



52-Piece MICROSCOPE SET

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Additional Products (can be purchased separately)



► Explore the world of microscopes with our best selling book.

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