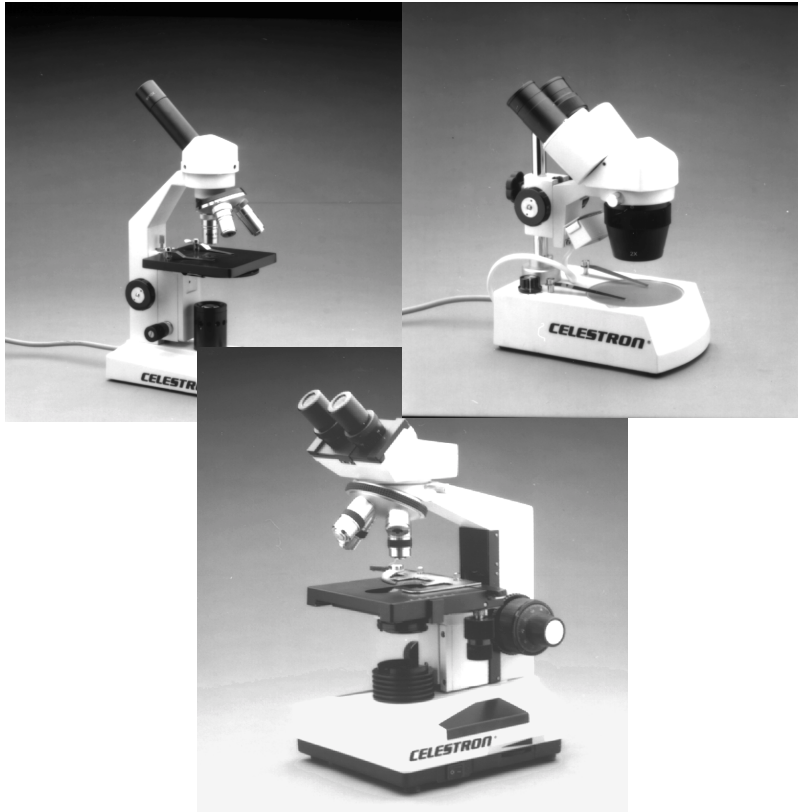


***CELESTRON***<sup>®</sup>



# Microscope

---

# Instruction Manual

Models # 4040, 4050 and 4060

## Table of Contents

---

<b>Introduction .....</b>	<b>1</b>
<b>Stereo Dissecting Microscope Model #4040 .....</b>	<b>2</b>
<b>Biological Microscope Model #4050 .....</b>	<b>5</b>
<b>Research Microscope Model #4060 .....</b>	<b>8</b>
<b>Care and Maintenance .....</b>	<b>12</b>

## Introduction

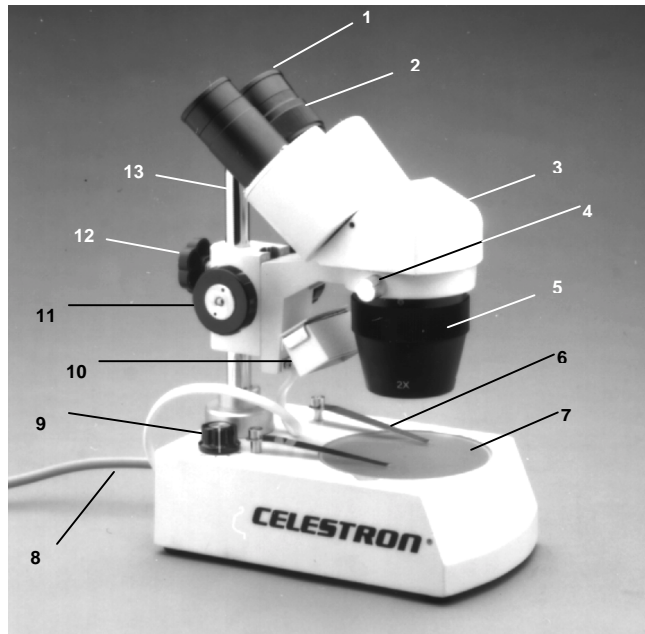
---

Congratulations on your purchase of a Celestron microscope. Celestron offers a complete line of quality microscopes ranging from beginner and educational microscopes to research level instruments. Your Celestron microscope is a precision optical instrument, made of the highest quality materials to ensure durability and long life. Your microscope is designed to give you a lifetime of pleasure with a minimal amount of maintenance.

The first sections of this manual will help you become familiar with the various parts of your microscope and how they work together. Read carefully the sections on viewing specimens and focusing. Take special notice of all precautions regarding using the illuminator mirror (if applicable to your model) to focus sunlight and regulating the focuser travel so as not to damage specimen slides or the objective lens.

The final section provides simple care and maintenance tips for you to follow to ensure that your microscope provides you with years of quality performance and enjoyment.

## Stereo Dissecting Microscope – Model #4040



**Figure 1**

1	Eyepiece	8	Power Cord
2	Diopter Ring	9	Illuminator Switch
3	Binocular Head	10	Top Light Illuminator
4	Binocular Head Tension Screw	11	Focus Adjustment Knob
5	Objective Turret	12	Pillar Stand Locking Bolt
6	Slide Holder Clips	13	Pillar Stand
7	Glass Stage Plate		

### Standard Accessories:

Your Celestron microscope (#4040) comes complete with the following standard accessories:

- Two 10x Eyepieces
- One 2x Objective lens (20x)
- One 4x Objective lens (40x)
- Rubber Eyecups
- Black/White Stage Plate
- Plastic Dust Cover

Item #4040	Specifications:
Optical Head	45° inclined Binocular Head; 360° Rotatable
Interpupillary distance	Adjustable from 55-75mm
Illuminator	Top/Bottom built-in electric illuminator; Incandescent Bulb
Stage	94.5mm glass stage and black/white stage plate
Power Supply	110v
Nosepiece	Turret objective 2x/4x
Objectives	Achromatic objectives

## Assembling Your Microscope

---

Before you can view through your Celestron microscope, the binocular head assembly must be attached to the pillar stand (13) and the rubber eyecups must be placed over the eyepieces. To attach the binocular head assembly:

1. Remove the safety screw from the top of the pillar stand (13).
2. Partially unthread the pillar stand locking bolt (12) located behind the focuser assembly.
3. Place the binocular head assembly onto the pillar stand (13) and slide it half way down the stand. Be careful not to put too much tension on the cord that goes from the microscope base to the top light illuminator (10).
4. Rotate the binocular head assembly until the objective turret (5) is directly over the center of the stage (7).
5. Tighten the pillar stand locking bolt (12) to hold the binocular head assembly in place.
6. Thread the safety screw back onto the top of the pillar stand.

### To Attach the Rubber Eyecups:

1. Place the rubber eyecups over the eyepieces with the rubber lips facing up.
2. Push the eyecups down over the tops of the eyepieces.
3. Rotate the eyepieces so that the rubber lips are facing out to the sides.

Your microscope is now ready to view specimens.

## Microscope Operation

---

### Powering the illuminator:

Your Celestron microscope has a built-in, 3-setting illuminator powered by 110v AC power. To power the illuminator:

1. Plug the power cord (8) into a wall outlet.
2. Turn the illuminator switch (9) to the "I" setting to turn on the bottom illuminator bulb.
3. Turn the illuminator switch (9) to the "II" setting to turn on the top illuminator bulb.
4. Turn the illuminator switch (9) to the "III" setting to turn on both the top and bottom illuminator bulbs.

### Viewing a Specimen

To view a specimen:

1. Place the round glass stage plate (7) into the opening above the illuminator. When viewing a specimen using top lighting only, you may wish to replace the glass stage plate with the black/white stage plate.

**Tip:** Specimens of different size and thickness will require different levels of illumination. Experiment with different lighting for each specimen. When using top lighting, the white side of the stage plate may wash out fine detail where as the black side will increase contrast but may make the specimen less bright.

2. Place a specimen slide under the specimen holder clips (6) and center the specimen directly in the center of the stage.

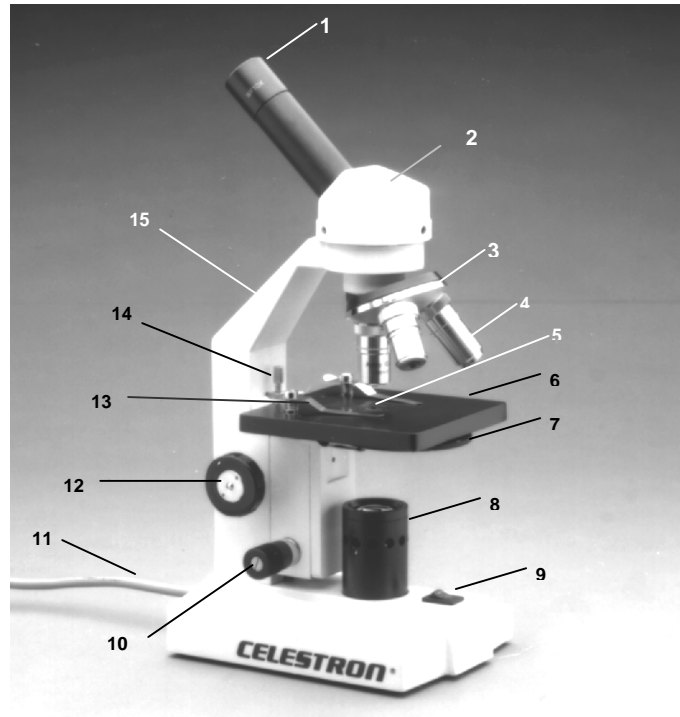
## **Focusing:**

To achieve the best focus with your microscope, not only can you make adjustments with the focus adjustment knobs, but you can also adjust the left diopter ring as well as the interpupillary distance between the eyepieces. To achieve sharpest focus:

1. Rotate the objective turret (5) to the 2x position . (Always begin by viewing a specimen at low power, then switch to high power when needed).
2. Turn the focus adjustment knob (11) until the specimen comes into focus. If there is not enough travel in the focuser mechanism to reach focus, it may be necessary to loosen the pillar stand locking bolt (12) and slightly raise or lower the entire binocular head assembly until the image becomes sharp.
3. Next, while looking through the eyepieces, adjust the interpupillary distance by sliding both eyepieces side to side until the whole field of view can be observed through both eyes at the same time.
4. Finally, close your right eye and turn the left eyepiece diopter ring until the image is in sharp focus through the eyepiece.

If higher power is desired, rotate the objective turret (5) to the 4x position and readjust the focus knobs (11) until the specimen comes into focus.

## Biological Microscope - Model #4050



1	Eyepiece	9	Power Switch
2	Monocular Head	10	Fine Focus Adjustment Knob
3	Objective Lens Rotator	11	Power Cord
4	Objective Lens	12	Course Focus Adjustment Knob
5	Condenser	13	Specimen Holder Clips
6	Specimen Stage	14	Focus Travel Safety Screw
7	Diaphragm Dial	15	Stand Column
8	Illuminator		

### Standard Accessories:

Your Celestron microscope (#4050) comes complete with the following standard accessories:

- 10x eyepiece with pointer
- Plastic Dust Cover
- 4x Objective lens (40x)
- 10x Objective lens (100x)
- 40x Objective lens (400x)

Item #4050	Specifications
Objective Lens	Achromatic Objective
Nosepiece	Triple nosepiece with click stop
Stage	120mm x 110mm, with paired clips
Illuminator	Built-in electric illuminator; 20W tungsten bulb
Diaphragm	Disc diaphragm with five aperture sizes
Head	Monocular head, 45° incline, 360° rotatable
Focuser	Course focus; Fine focus adjustments

# Assembling Your Microscope

---

Before you can view through your Celestron microscope, the objective lenses must first be attached.

## Installing the Objective Lenses:

1. Remove the three objective lenses from their individual containers. Unscrew the container lids from the threaded portion of the objective lens.
2. Thread the end of the 4x objective lens into one of the holes on the objective lens rotator (3). It may be necessary to lower the specimen stage (6) by turning the coarse focus knob (12).
3. Now turn the objective rotator to the next opening and thread each of the remaining objective lenses into the remaining holes.

Your microscope is now ready to view specimens.

# Microscope Operation

---

## Powering the illuminator:

Your Celestron microscope has a built-in illuminator powered by 110v AC power. To power the illuminator:

5. Plug the power cord (11) into a wall outlet.
6. Turn the power switch (9) to the "on" position.

To regulate the amount of light shining on the specimen, rotate the diaphragm dial (7). The diaphragm dial has five openings of different sizes which allow different amounts of light to pass from the illuminator.

## Viewing a Specimen

To view a specimen:

3. Press downward on the back portion of the spring-loaded specimen holder clips (13) to raise the front of the clips off of the specimen stage (6).
4. Place a specimen slide under the specimen holder clips (13) and center the specimen directly over the condenser lens .

You are now ready to focus and view the specimen, but first you must take some precautions so as not to damage the specimen slide or objective lens. Your microscope is equipped with a focus travel safety screw (14) which allows you to regulate the range of travel on the focuser. This assures that the objective lenses will not accidentally come in contact with specimen slide, breaking the slide or scratching the objective lens. To adjust the travel on the focuser mechanism:

1. Lower the specimen stage by rotating the course focus adjustment knobs (12).
2. Partially unscrew the focus travel safely screw (14) so that about 1 inch is sticking up.
3. Turn the objective lens rotator (3) until the 40x lens is directly over the light condenser (5).
4. Use the focus knobs (12) to raise the stage (6) until the tip of the lens is slightly above the specimen slide. (Be careful not to touch the slide to the objective lens).
5. Thread the focus travel safely screw (14) down until it stops against the focuser mechanism.
6. Rotate the knurled locking nut downward to lock the safety screw in place.

## **Focusing:**

Now that the specimen slide is placed directly under the objective lens, use the course focus knob (12) to focus on the specimen.

- Always start with the lowest power (4x objective lens) and switch to higher power by rotating the objective lens rotator (3). Be cautious not to let the objective lens touch the specimen slide when changing to higher power.
- Use the fine focus knob (10) to change the depth of field on the specimen you are observing.
- If you run out of upward travel before reaching sharp focus, you can unscrew the focus travel safety screw (14) to allow for more upward travel. Once again be careful not to let the objective lens touch the specimen slide.

## **Replacing the illuminator lamp:**

1. Raise the specimen stage (6) to its highest position by rotating the course focus adjustment knob (12).
2. Unscrew the black metal illuminator housing (8) and lift it straight up over the lightbulb.
3. Turn the lightbulb counterclockwise while gently pushing down.
4. Replace with a new 20W tungsten bulb.
5. Slide the illuminator housing back over the lightbulb and thread into place.

## Research Microscope – Model #4060

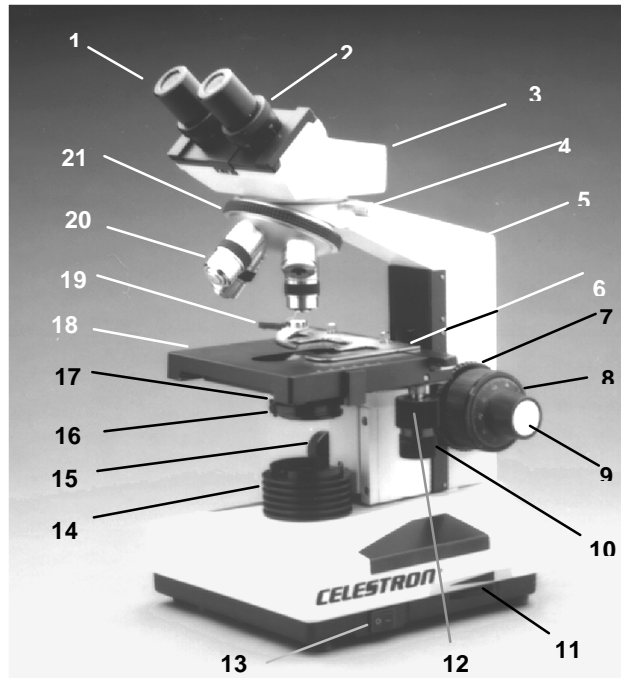


Figure 3

1	Eyepiece	12	Longitudinal Specimen Mover Handwheel
2	Eyepiece Diopter	13	Power Switch
3	Eyepiece Housing	14	Illuminator
4	Locking Screw	15	Condenser Adjustment Handwheel
5	Stand Column	16	Iris Diaphragm
6	Specimen Holder	17	Condenser
7	Focuser Lock	18	Specimen Stage
8	Coarse Focus Handwheel	19	Specimen Holder Clamp Lever
9	Fine Focus Handwheel	20	Objective
10	Transverse Specimen Mover Handwheel	21	Objective Changer
11	Brightness Control Wheel		

### Standard Accessories

Your Celestron microscope (#4060) comes complete with the following standard accessories:

- Two 10x Eyepieces
- Two 15x Eyepieces
- One 4x Objective lens
- One 10x Objective lens
- One 40x Objective lens
- One 100x Objective lens
- Three Color Filters (Red, Blue, Green)
- Plastic Dust Cover
- Cedar Wood Oil

Item #4060	Specifications:
Optical Head Interpupillary distance	45° inclined Binocular Head; 360° Rotatable Adjustable from 55-75mm
Illuminator	Built-in, electric illuminator; Halogen bulb 6v/20w
Stage Size Working Range	Built-in, Mechanical 123mm x 153mm 70mm x 40mm
Condenser	Abbe N.A. 1.25 condenser, and iris diaphragm
Power Supply	110v
Nosepiece	Quadruple nosepiece
Objectives	Achromatic objectives

## Magnification Table

---

Use the following table to determine the magnification of the different eyepiece/objective lens combination of your microscope.

		Objective Lens			
Eyepiece		4x	10x	40x	100x
	10x	40x	100x	400x	1000x
	15x	60x	150x	600x	1500x

## Assembling Your Microscope

---

Before you can view through your Celestron microscope, the eyepiece housing, eyepieces and objective lenses must first be attached. To attach the eyepiece housing:

1. Remove the microscope body from its packaging by lifting it by the stand column (5).
2. Unthread the locking screw (4) located on the side of the microscope body just above the objective lens changer (21).
3. Place the round angled end of the eyepiece housing (3) inside the circular opening at the top of the microscope body. The round eyepiece housing adapter is slightly angled and should slide under the two metal tabs on the inside of the microscope body opening.
4. Secure the eyepiece housing by tightening the locking screw (4).

## Installing the Binocular Eyepieces

---

1. Remove the two 10x eyepieces from their individual containers.
2. Slide the narrow end of the eyepiece barrel into each of the eyepiece holders on top of the eyepiece housing.

### Installing the Objective Lenses:

4. Remove the four objective lenses from their individual containers. Unscrew the container lids from the threaded portion of the objective lenses.
5. Thread the end of the 4x objective lens into one of the holes on the objective changer (21). It may be necessary to lower the specimen stage (18) by turning the coarse focus knob (8).
6. Now rotate the objective changer to the next opening and thread each of the remaining objective lenses in order of power (10x, 40x, 100x) into the remaining holes.

# Microscope Operation

---

## Powering the illuminator:

Your Celestron microscope has a built-in illuminator powered by 110v AC power. To power the illuminator:

7. Plug the power cord into a wall outlet.
8. Turn the power switch (13) to the "on" position.

Your microscope is now ready to view specimens.

## Viewing a Specimen:

Your instrument is provided with a specimen holder and a specimen mover. To view a specimen:

1. Use the clamp lever (19) to open the clamping arm of the specimen holder (6).
2. Place a specimen slide inside the holder and gently close the clamping arm against the slide.
3. Use the specimen mover handwheels (10 & 12) to position the specimen over the opening in the specimen stage (18).

**TIP:** To position the specimen directly under the objective lens, first rotate the illuminator brightness control wheel (11) to increase the brightness to its maximum setting. Then close the opening on the iris diaphragm (16) until it is almost completely closed. You should see a small beam of light projected onto the specimen slide. Now simply use the specimen mover handwheels (10 & 12) to move the specimen directly inside the beam of light.

4. Use the knurled ring to rotate the objective lens changer (21) until the 4x objective lens is directly over the specimen (Always start with the lowest power objective and work your way up to higher powers).
5. Look through the eyepieces while turning the coarse focus handwheel (8) until the specimen comes into view. You may need to adjust the specimen mover handwheels (10 & 12) slightly to center the specimen in the field of view. **Warning: When focusing, be careful not to raise the specimen stage so high that the specimen slide touches the objective lens. Not only can you break your slide but you may also scratch the objective lens.**
6. Finally, adjust the fine focus handwheel (9) until you reach the sharpest focus for your eye. **Never rotate both of the fine focus handwheels at the same time in opposite directions. Otherwise the focusing mechanism will be damaged.**

**Tip:** When viewing a specimen with the 100x objective lens, you can improve the resolving power by placing a small drop of the cedar wood oil between the specimen and objective lens. For specimen slides that you prepare yourself, always cover the specimen with a thin piece of glass and place the oil on the cover glass. Do not put oil directly on the specimen sample.

## Adjusting the Lighting:

Specimens of different size and thickness will require different levels of illumination. There are three ways to change the amount of illumination when viewing a specimen; adjusting the brightness control, adjusting the condenser and adjusting the iris diaphragm.

- When viewing a specimen that is not transparent or dark in color you may need to increase the amount of light to resolve certain features or details. This is best done by simply increasing the brightness of the illuminator by rotating the **Brightness Control Wheel (11)** all the way to its highest setting.
- When viewing with the lower power (4x and 10x) objective lenses you will need to lower the condenser lens (17) in order to spread the light over the larger field of view. To change the position of the condenser, simply rotate the **Condenser Adjustment Handwheel (15)** clockwise until the beam of light spreads wide enough to illuminate the

entire field of view when viewing.

- As you lower the condenser to spread out the light or change to a higher power objective, your image will appear dimmer. Instead of increasing the light intensity of the illuminator (which may "wash out" fine detail of the specimen you are viewing), open the aperture of the **Iris Diaphragm (16)** to let in more light. Opening and closing the diaphragm will give a relief view of the specimen and allow you to change the depth of field of the specimen being viewed.

### Filters:

To bring out different levels of detail, experiment with changing the color of the back lighting of the specimen. To change the lighting color, place one of the color filters in the light path by placing it on the top of the illuminator (14). You may need to refocus by adjusting the fine focus knob (9) slightly for best viewing.

### Focusing:

To achieve the best focus with your microscope, not only can you make adjustments with the coarse and fine focus handwheels, but you can also adjust the focus of each eyepiece individually as well as the interpupillary distance between the eyepieces. To achieve sharpest focus:

1. First rotate each eyepiece tube so that the scales read the same number (i.e. 60mm).
2. Change the distance between the eyepieces by sliding the eyepiece slide plate in or out horizontally until the interpupillary scale reads the same as the eyepiece scales. (To adjust the slide plate, grasp the knurled portion on each side of the plate. **Do not** hold the eyepieces to adjust the interpupillary distance).
3. With the 10x objective lens, focus with one eye using the coarse and fine focus handwheels.
4. Adjust the eyepiece slide plate until the whole field of view can be observed through both eyes at the same time without having to move your head side to side.
5. Now, read the number off of the eyepiece sliding plate scale. This is your interpupillary distance.
6. Finally, set the scale on each eyepiece tube to read the same as the eyepiece sliding plate. (Depending on your individual eyes, you may need to make slight adjustments to the right and left eyepiece tubes for the most comfortable viewing).

### Replacing the illuminator lamp:

1. Carefully lay the microscope back on its side so that the stand column (5) is flush against a flat surface.
2. On the bottom of the microscope, locate and unscrew the knurled bolt that holds the lightbulb compartment closed (see figure 4).
3. Open the light bulb compartment door.
4. Remove the old halogen bulb from its socket.
5. Use a tissue to hold the new bulb between your fingers and press the prongs into the socket.
6. Close the light bulb compartment and tighten the knurled screw.

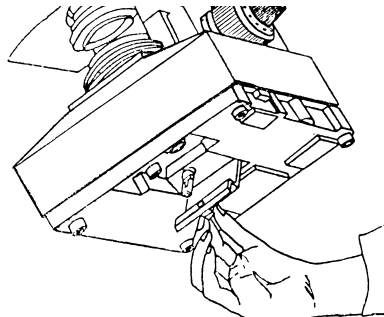


Figure 4

## Care and Maintenance

---

Your Celestron microscope is a precision optical instrument and should be treated with care at all times. Follow these maintenance suggestions and your microscope will need very little maintenance throughout its lifetime.

- Always place the plastic cover over the microscope when not in use or when being stored.
- When moving your microscope, carry it by the stand column. Never pick it up by the eyepiece housing or focuser knobs.
- Clean the outside of the microscope with a slightly damp cloth.
- Always unplug the microscope (models with electric illuminators) before cleaning.
- Never wipe optical surfaces with cloth or paper towels.
- Clean dust off optical surfaces with an air blower or camels hair brush.
- Clean dirt off optical surfaces by wiping with a piece of clean cotton.
- Never disassemble or clean internal optical surfaces.

## CELESTRON ONE YEAR WARRANTY

- A. Celestron International (CI) warrants this microscope to be free from defects in materials and workmanship for one year. CI will repair or replace such product or part thereof which, upon inspection by CI, is found to be defective in materials or workmanship. As a condition to the obligation of CI to repair or replace such product, the product must be returned to CI together with proof-of-purchase satisfactory to CI.
- B. The Proper Return Authorization Number must be obtained from CI in advance of return. Call Celestron at (310) 328-9560 to receive the number to be displayed on the outside of your shipping container.

All returns must be accompanied by a written statement setting forth the name, address, and daytime telephone number of the owner, together with a brief description of any claimed defects. Parts or product for which replacement is made shall become the property of CI.

**The customer shall be responsible for all costs of transportation and insurance, both to and from the factory of CI, and shall be required to prepay such costs.**

CI shall use reasonable efforts to repair or replace any microscope covered by this warranty within thirty days of receipt. In the event repair or replacement shall require more than thirty days, CI shall notify the customer accordingly. CI reserves the right to replace any product which has been discontinued from its product line with a new product of comparable value and function.

**This warranty shall be void and of no force of effect in the event a covered product has been modified in design or function, or subjected to abuse, misuse, mishandling or unauthorized repair. Further, product malfunction or deterioration due to normal wear is not covered by this warranty.**

CI DISCLAIMS ANY WARRANTIES, EXPRESS OR IMPLIED, WHETHER OF MERCHANTABILITY OF FITNESS FOR A PARTICULAR USE, EXCEPT AS EXPRESSLY SET FORTH HEREIN.

THE SOLE OBLIGATION OF CI UNDER THIS LIMITED WARRANTY SHALL BE TO REPAIR OR REPLACE THE COVERED PRODUCT, IN ACCORDANCE WITH THE TERMS SET FORTH HEREIN. CI EXPRESSLY DISCLAIMS ANY LOST PROFITS, GENERAL, SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES WHICH MAY RESULT FROM BREACH OF ANY WARRANTY, OR ARISING OUT OF THE USE OR INABILITY TO USE ANY CI PRODUCT. ANY WARRANTIES WHICH ARE IMPLIED AND WHICH CANNOT BE DISCLAIMED SHALL BE LIMITED IN DURATION TO A TERM OF ONE YEAR FROM THE DATE OF ORIGINAL RETAIL PURCHASE.

Some states do not allow the exclusion or limitation of incidental or consequential damages or limitation on how long an implied warranty lasts, so the above limitations and exclusions may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

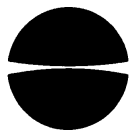
CI reserves the right to modify or discontinue, without prior notice to you, any model or style microscope.

If warranty problems arise, or if you need assistance in using your microscope contact:

Celestron International  
Customer Service Department  
2835 Columbia Street  
Torrance, CA 90503  
Tel. (310) 328-9560  
Fax. (310) 212-5835  
Monday-Friday 8AM-4PM PST

This warranty supersedes all other product warranties.

**NOTE: This warranty is valid to U.S.A. and Canadian customers who have purchased this product from an Authorized CI Dealer in the U.S.A. or Canada. Warranty outside the U.S.A. and Canada is valid only to customers who purchased from a CI International Distributor or Authorized CI Dealer in the specific country and please contact them for any warranty service.**



***CELESTRON***<sup>®</sup>

Celestron International  
2835 Columbia Street  
Torrance, CA 90503  
Tel: 310-328-9560  
Fax: 310-212-5835  
Web site: <http://www.celestron.com>

Copyright 1998 Celestron International  
All right reserved  
(Products or instructions may change  
without notice or obligation).

05-98

Printed in China