Important Concepts . . .

Preview Review

Science *Grade 8*

W2 - Lesson 2: The Microscope

V5-07

Important Concepts of Grade 8 Science

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Materials Required

Textbook:
Science in Action 8

Science Grade 8
Version 5
Preview/Review W2 - Lesson 2

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Preview/Review Concepts for Grade Eight Science

W2 - Lesson 2:
The Microscope

OBJECTIVES

By the end of this lesson, you should

- discuss, in general terms, the history of the microscope
- name and describe some of the main types of microscopes
- explain the use of microscopes
- explain how to use a microscope

GLOSSARY

compound microscope - has two lenses that line up through which to view objects

magnification - the enlargement of an image

microscope - an instrument that allows a person to see objects too small to see with only the human eye

resolution - how well two objects close together can be distinguished from each other

slide - the clear flat piece of glass/plastic that holds a specimen to be viewed through a microscope

wet mount - a simple preparation of a sample on a slide so it can be viewed under a microscope

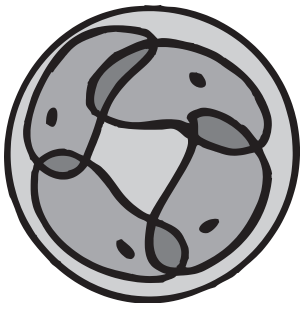
W2 - Lesson 2: The Microscope

Welcome to W2 - Lesson 2. This lesson is designed to teach you about the microscope, one of the most commonly used pieces of scientific equipment. It should take about 1.5 hours to complete.

What can we do if we need to see something very small? We can look at it through a microscope. This is something we take for granted. However, only about 400 years ago, that was not possible because the microscope had not yet been invented.

History

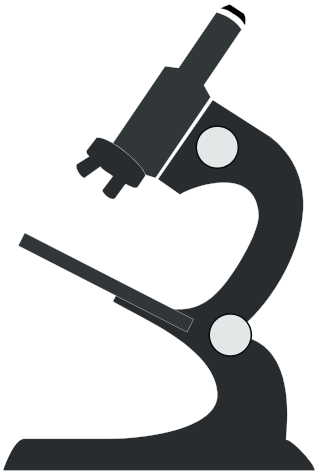
That lenses could increase the size of an image was known in Greek and Roman times several thousand years ago. But little practical use was made of this information. It was only in 1590 that two Dutch eyeglass makers named Janssen realized that lining up two lenses would further increase the magnification of the object being viewed. Soon after, Anton Van Leeuwenhoeck started experimenting with lenses. He used only one lens, but it was of superior quality so he could see objects more clearly than the Janssens did with two. He was the first person to see and describe very small objects such as yeast, paramecia, and blood cells. Another early user of microscopes was Robert Hooke, who used a compound microscope to discover and name cells.



Through time, improvements were made that led to higher magnification and resolution of the image. Lenses were ground more precisely and made of better glass. Someone discovered that a particular type of convex lens worked best.

Types of Microscopes

Various types of microscopes have been developed; the three types listed below are the most common.

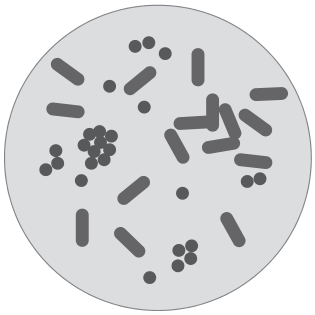


Compound Light Microscope

Light shines through the object being viewed. It can be used for prepared tissue or living organisms if they are thin enough to permit light to travel through them. This microscope has moderate magnification (generally up to 400 X) and resolution. Images viewed through a compound light microscope are flipped top to bottom and side-to-side compared to the object on the slide. More information on light microscopes is found on pages 100-102 and 439-440 of your text.

Dissection/Field Microscope

Because light reflects off the object being viewed, the dissection/field microscope can be used to view rocks, insects, plants, etc. in their original condition. No preparation is needed. Magnification and resolution are low (up to 40 X).



Electron Microscope

These microscopes were first developed in the 1930s. Rather than bouncing light off the object, they use electrons. They produce high magnification (more than 200 000 X), and high resolution. They can be used only with nonliving or dead objects. An electronic image is produced in black and white, but it can be computer-coloured. These microscopes are very expensive.

Activity 1

Be sure you understand the information on the previous pages, then answer the following questions.

1. If you were wanting to view cells in plant tissue, which microscope would you use and why?

   _____

   _____

   _____

2. When might you use a dissection/field microscope?

   _____

   _____

   _____

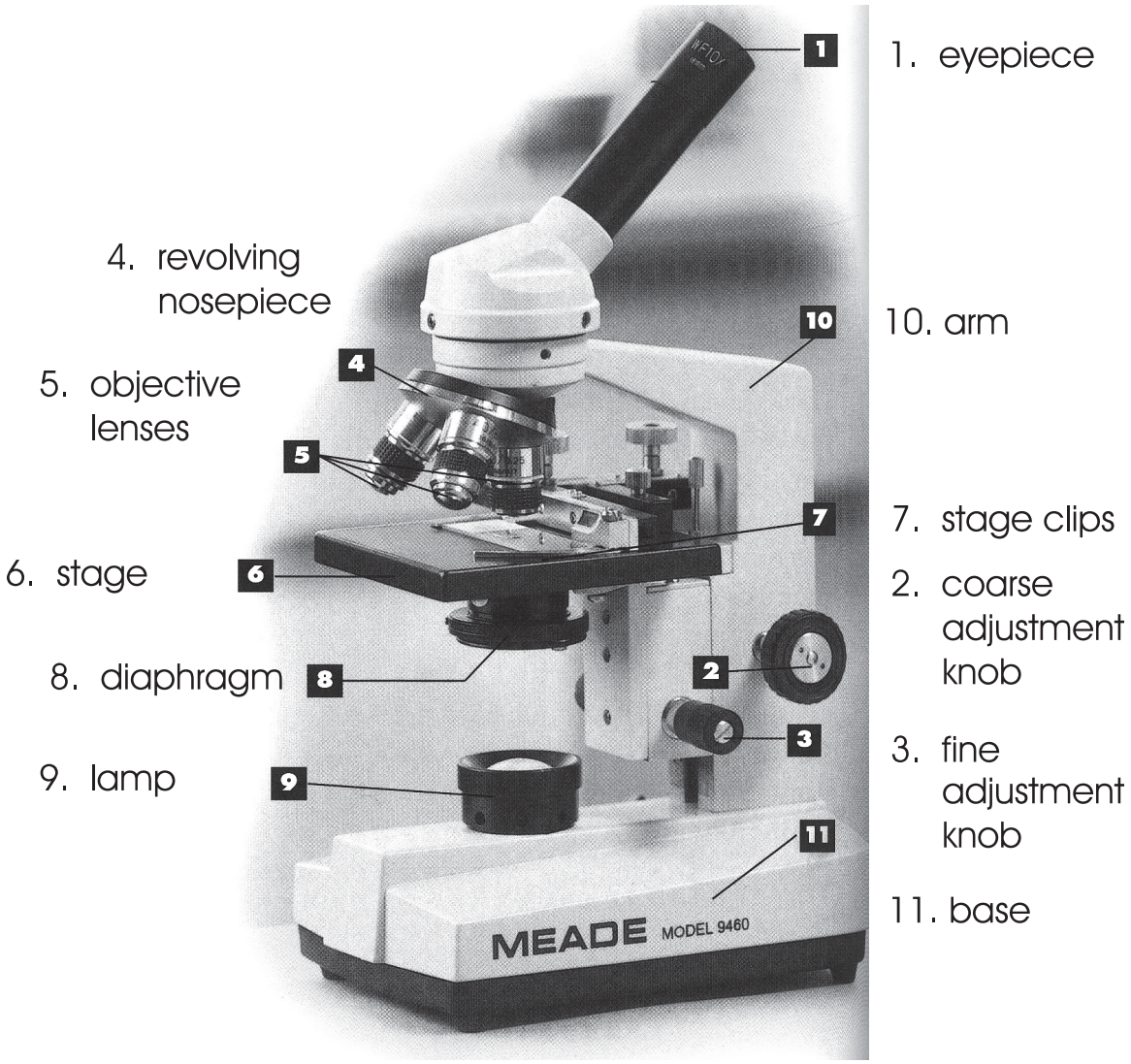
3. If you were viewing the letter "R" through a light microscope, how would it appear to your eye? Draw it.

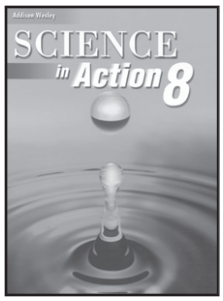
Magnification

The magnification produced by a microscope is the product of the magnifying power of the lenses used to view the object. If two lenses are lined up, one with 10 X magnification and the other with 40 X, the image will be magnified 10 x 40 = 400 X.

Microscope Parts

Microscopes have many parts, each of which has a function. Read pages 100-101 of your textbook for details of the compound light microscope. You must be able to identify the various parts on a diagram such as the one that follows. You must also state the function of the parts.





Activity 2

Read and understand page 101 in *Science in Action 8*. Then, answer the following questions.

1. Write the names of the parts of the microscope (on the diagram on the previous page). Get the names of the numbered parts from your text.

2. Which part of the microscope controls the amount of light that shines through your specimen?

   _____

3. What would you use to focus the image when using medium or high-power objective lenses?

   _____

4. You are using a microscope with the ocular lens 4X and the objective lens 20X. What is the magnification of the object you are looking at?

   _____

Making a Wet Mount

When preparing material to view under a light microscope, ensuring the specimen is very thin is important. That is because light must shine through the specimen before it reaches your eye. Temporary slides are called wet mounts. They are made by putting a thin sample, along with some liquid, on a slide. They are then covered carefully with a coverslip. Air bubbles should be avoided. Read pages 106 and 107 in *Science in Action 8*.

Using a Compound Light Microscope

Light microscopes are not difficult to use, but they do require that you follow a few rules to prevent damage to the equipment and slide. The steps are listed in pages 104 and 105 of the text. Some of the main points are these:

- After the slide is on the stage, **while watching from the side**, and with the **lowest power lens** pointing at the object on the slide, use the **coarse focus** knob to **lower** the lens as close to the slide as possible.

- While watching through the lens, slowly move the coarse focus so the object comes into focus (lens moves away from slide).

- When using higher power lenses, move to and focus the next strongest lens before moving to a stronger one. Use the fine focus (should require only minor adjustments) for the stronger lenses. **Turn to a higher power lens while watching from the side to make sure it does not hit the slide**.

Activity 3

Complete the following questions.

1. Why do you look from the side when changing lenses?

   _____

   _____

   _____

   _____

2. What could happen if you used the coarse focus with high power lenses?

_____

_____

_____

_____

You should now be able to use a microscope if you have the use of one. There is no homework assignment with this lesson.

You should now be able to meet all the objectives listed at the beginning of the lesson. Go through the list to see if there is anything you need to spend more time on.