

2. Most cells are microscopic: They are measured in units called _____.
3. Micrometers are equal to _____ of a millimeter.
4. The largest known cells are _____ cells.
5. Egg cells from animals other than mammals are large because they contain _____ for the developing embryo.
6. Organisms whose cells have no visible nucleus are called _____.
7. More complex cells, which have a nucleus, are called _____.
8. Most organisms on earth are _____.
9. Most multicellular organisms have groups of similar cells which work together called _____.
10. Because your heart is made of several different types of tissue which work together, it is called an _____.
11. The human body is composed of 11 groups of organs which work together to carry out all the different functions we carry on each day. These groups of organs are called _____.
12. Through a classroom microscope the cell appears to have only 3 parts: the cell membrane, the _____, and the _____.
13. The development of the _____ microscope allowed us to see many of the small parts [organelles] in the cytoplasm for the first time.
14. The outer covering of the cell, the _____, is said to be semi-permeable.
15. Your white cells can tell your cells from "foreign" cells due to _____ on the surface of the cell membrane.
16. The overall shape of cells is supported by a system of web-like tubes called the _____.
17. The organelles which burn glucose to provide energy for the cell are called _____.

- _____.
18. This "burning" of glucose to produce energy is known as the _____ reaction.
19. The cell's "transportation system" is the _____.
20. Ribosomes found on the endoplasmic reticulum produce _____ for the cell.
21. An important protein called _____ carries oxygen in our blood.
22. Special proteins, called _____, make all of our chemical reactions [such as digestion] possible.
23. _____ bodies package proteins to be shipped to other parts of the cell or even outside the cell.
24. One package of enzymes, called a _____, help digest dead cells when the body is injured.
25. The nuclear membrane is covered with nuclear _____ to allow materials to enter and leave the nucleus.
26. The nucleus in the human cell contains _____ pairs of chromosomes.
27. These chromosomes are made of a chemical called _____.
28. Plant cells contain 3 organelles not found in animal cells: the cell wall, the vacuoles, and green bodies called _____.
29. Cellulose makes up the _____ of plant cells.
30. If the vacuoles of a tomato plant are not full of _____, the plant wilts.
31. The important reaction done in the chloroplasts of plants is called _____.
32. Photosynthesis is the basis of all the world's food and _____.

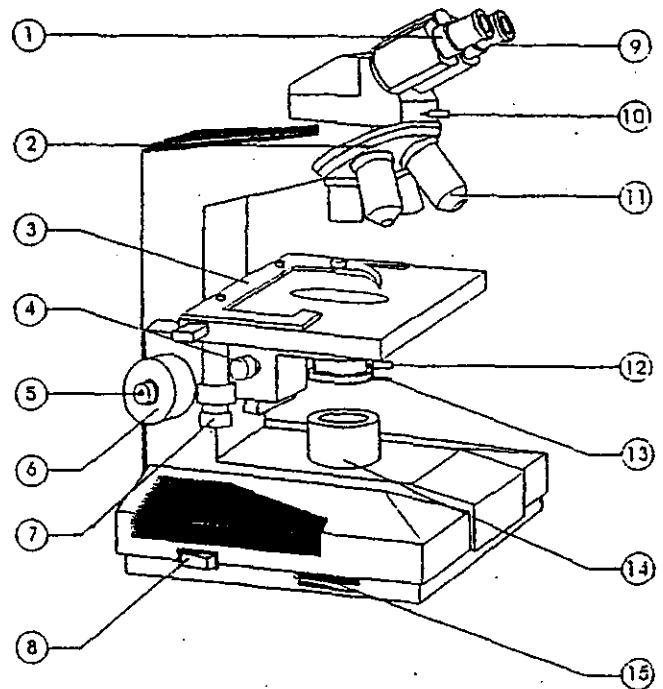
I. MICROSCOPES MAKE THINGS APPEAR LARGER (_____) AND MAKE THINGS APPEAR CLEARLY WITH LOTS OF DETAIL (_____).

II. MAGNIFICATION OF OUR _____ MICROSCOPES.

	EYEPIECE	OBJECTIVE LENS	TOTAL POWER OF MAGNIFICATION.
LOW	10	4	40
MEDIUM	—	10	—
HIGH	—	40	—

III. PARTS AND FUNCTIONS:

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____



IV. MAKING A _____ SLIDE

- A. GET A _____ SLIDE AND _____.
- B. ADD _____ DROP OF _____ TO CENTER OF SLIDE.
- C. ADD _____.
- D. PUT ON _____. BE CAREFUL NOT TO TRAP ANY _____!

V. USE AND CARE OF MICROSCOPES

A. _____ USE THE SCOPE THAT
HAS BEEN _____ TO YOU.

B. _____ CARRY THE MICROSCOPE
WITH _____!

C. CLEAN LENSES WITH _____
ONLY! EVEN KLEENEX WILL _____
THE SOFT LENSES.

D. _____ YOUR SLIDE
AFTER YOU ARE FINISHED.

E. _____ PUT THE SCOPE AWAY
WITH A _____ LEFT ON THE STAGE.

F. PUT THE SCOPE AWAY WITH _____
POWER OBJECTIVE LENS IN PLACE.

VI. _____ VERY CAREFULLY.

A. _____ WITH _____
_____ THE SPECIMEN AT THE
TIP OF THE _____. FOCUS WITH
_____ ADJUSTMENT KNOB.

B. SWITCH TO _____ POWER WITHOUT
TOUCHING THE SLIDE. _____ THE
SPECIMEN AT THE TIP OF THE _____.
FOCUS WITH _____ ADJUSTMENT
KNOB.

C. SWITCH TO _____ POWER. _____
WITH _____ ADJUSTMENT KNOB ONLY



of a microscope?

► Identify and describe the functions of the parts of a compound microscope.

The Compound Microscope The first compound microscope was invented about 1590 by two Dutch lens makers, Hans and Zacharias Jansen. Many scientists made and used them. Much of what is known about living things would not be possible without the microscope.

All compound microscopes have the same basic parts. Using a microscope can be a lot of fun. It is easy to use if you know its parts and what they do.

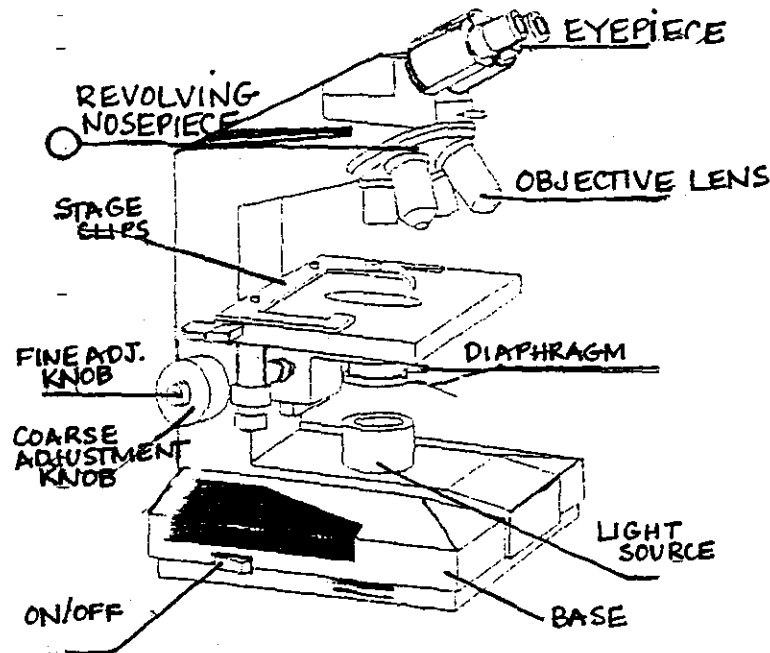
► **Identify:** Who invented the first compound microscope?

Parts of the Compound Microscope As you read about each part of the compound microscope, find the part on the drawing.

- **Eyepiece** The eyepiece is located at the top of the microscope. It holds the ocular lens.
- **Body tube** The body tube is a hollow tube through which light passes. It holds the lenses apart.
- **Nosepiece** The nosepiece holds the objective lenses.
- **Objective lens** There are several objective lenses. Each lens has a different magnification power.
- **Arm** The arm supports the body tube, and is used to carry the microscope.
- **Coarse-adjustment knob** This knob turns and is used to raise or lower the body tube to focus the microscope.
- **Fine-adjustment knob** The knob also raises or lowers the body tube. It is used to bring objects into sharp focus.
- **Stage** The stage is the place where the object you are looking at is put.

- **Stage clips** The stage clips hold down the slide on the stage.
- **Diaphragm** The diaphragm (DY-uh-fram) changes the amount of light entering the body tube.
- **Light source** The light source is located beneath the diaphragm. It sends light toward the hole in the stage. A light source can be an electric light built into the microscope or a mirror that reflects light into the microscope.
- **Base** The base is the bottom part of the microscope. It often is shaped like a horse-shoe. With the one hand holding the arm and one hand under the base, you carry a microscope properly.

► **Describe:** How do you carry a microscope properly?



- > The first compound microscope was invented by Hans and Zacharias Janssen.
- > All compound microscopes have the same basic parts.

CHECK Complete the following.

1. The lens at the top of the microscope is found in the _____.
2. When looking through a microscope the _____ lens is closest to your eye.
3. The nosepiece holds the _____ lenses.
4. The coarse- and fine- adjustment knobs help _____ the microscope.
5. The object to be viewed is placed on the _____ of the microscope.
6. The amount of light entering the microscope is controlled by the _____.

APPLY Answer the following.

7. **Explain:** Why is a compound microscope called a light microscope?

to get a clearer image than one that is fuzzy but greatly magnified?

- 9. **Infer:** How does changing the objective lenses affect what is seen through the microscope?

Use the microscope shown on page 28 to answer the following.

10. How many objective lenses are on the microscope?
11. What is the light source?

Skill Builder

Calculating To find the magnification of a microscope multiply the number found on the ocular lens by the number found on the objective lens. Find the magnification of the microscopes listed below.

	Ocular	Objective
a.	5X	10X
b.	5X	43X
c.	10X	10X
d.	10X	20X
e.	5X	20X

TECHNOLOGY AND SOCIETY

An ambulance races across town to a hospital. Inside there is an accident victim. The victim has had a finger severed in a machine. A team of microsurgons will work to reattach the finger. The surgeons will use microsurgery.

In microsurgery, special microscopes are used by the surgeons to look at the very small parts of the body as they operate. The parts would be too small to operate on with their unaided eyes. With these microscopes, the surgeons can even attach tiny nerve fibers and small blood vessels. They use tiny instruments developed by medical engineers. Some of these instruments are so small the surgeons can stick a needle into a blood cell that is only 0.008 millimeters across.

The special microscope used in microsurgery was developed in the mid-1950s. It was used for ear and eye operations. Today, microsurgery is used in many delicate operations. Some brain surgery is done using microsurgery techniques.

