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DEPARTMENT OF EDUCATION

Science

Quarter 2 – Module 1:
The Microscope

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Science – Grade 7
Alternative Delivery Mode
Quarter 2 – Module 1: The "Magnifier"
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Introductory Message

This Self-Learning Module (SLM) is prepared so that you, our dear learners, can continue your studies and learn while at home. Activities, questions, directions, exercises, and discussions are carefully stated for you to understand each lesson.

Each SLM is composed of different parts. Each part shall guide you step-by-step as you discover and understand the lesson prepared for you.

Pre-tests are provided to measure your prior knowledge on lessons in each SLM. This will tell you if you need to proceed on completing this module or if you need to ask your facilitator or your teacher's assistance for better understanding of the lesson. At the end of each module, you need to answer the post-test to self-check your learning. Answer keys are provided for each activity and test. We trust that you will be honest in using these.

In addition to the material in the main text, Notes to the Teacher are also provided to our facilitators and parents for strategies and reminders on how they can best help you on your home-based learning.

Please use this module with care. Do not put unnecessary marks on any part of this SLM. Use a separate sheet of paper in answering the exercises and tests. And read the instructions carefully before performing each task.

If you have any questions in using this SLM or any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator.

Thank you.

What I Need to Know

Hi! Have a great day! Welcome to the nature of Biology, where you will learn the diversity of life. Do you know that living things of unique classes, big or small consist of cells? Yes, some organisms are single- celled while others are made up of billions of cells like our body or have trillions like the elephants.

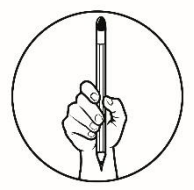
Most cells are so small that they cannot be seen by our naked eye. But, how can we examine these cells? We are grateful and lucky enough that our scientists and inventors in their times built the microscope, a special equipment or tool to make small objects like cells look bigger. In this module, you will learn the brief history and types of microscope. You will also study the parts of the microscope and how does each part function. Knowing this lesson is very essential in your future use especially in viewing different internal structures of living things under the microscope.

The module is divided into two lessons, specifically:

- Activity 1: Brief History of Microscope
- Activity 2: Parts and Functions of a Microscope

After going through this module, you are expected to:

- Define Microscope;
- state the function of a microscope;
- identify the various type of microscope;
- label the parts of the microscope; and
- describe the functions of each part of the microscope.



What I Know

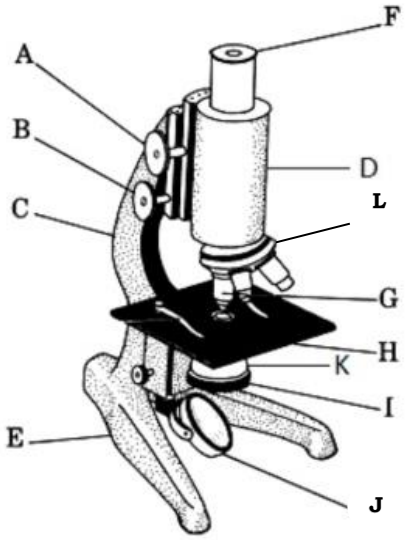
Directions: Read each item carefully. Write only the letter of the correct answer for each question. Write your answer on your activity notebook.

1. What tool is used to help you see tiny objects and living organisms?
   A. Goggles
   B. Microscope
   C. Stethoscope
   D. Telescope

2. Who invented the first compound microscope?
   A. Isaac Newton
   B. Robert Hooke
   C. Alexander Graham Bell
   D. Hans & Zacharias Janssen

3. Which two parts of the light microscope magnify the image of an object?
   A. Eyepiece & mirror
   B. Eyepiece & objective
   C. Objectives & mirror
   D. Objectives & diaphragm

For items 4 to 6, use the letters in the figure to answer the questions.



4. What part moves the body tube and objectives up and down?
   A. Part A
   B. Part B
   C. Part H
   D. Part I

5. Which part makes possible the changing of the objectives?
   A. Part I
   B. Part J
   C. Part L
   D. Part H

6. Which part will you adjust if the onion cell you are observing under HPO is not clear?
   A. Part B
   B. Part C
   C. Part G
   D. Part J

7. What makes a microscope determine how clearly a small object can be viewed?
   A. Mirror & eyepiece
   B. Mirror & magnification
   C. Magnification & resolution
   D. eyepiece & resolution

8. What is the science of investigating small objects and structures?
   A. autopsy
   B. colonoscopy
   C. endoscopy
   D. microscopy

9. What type of microscope uses visible light to form an image?
   A. Scanning Electron Microscope (SEM)
   B. Electron Microscope
   C. Optical Microscope
   D. Transmission Electron Microscope (TEM)

10. What is accomplished by turning the coarse adjustment upwards/downwards?

I. Facilitates the changing of objectives. II. Focuses or brings out the object to be observed. III. Facilitates the changing of eyepiece. IV. Connects the eyepieces to the revolving nosepiece with the objectives.

   A. I & II only
   B. II & III only
   C. I, II, & III only
   D. I, II, III & IV

11. Why do you have to watch from the side when changing objectives?

I. Objectives are of different lengths. II. The HPO is longer and can easily crash into the cover slip and slide. III. It allows one to tilt the microscope, so viewing is possible while seated. IV. This is done to prevent accidental crashing of the objectives into the slide and breakage of lens, slide, or cover slip.

   A. I & II only
   B. I & III only
   C. I, II and IV only
   D. II & III only

12. The magnification of a microscope is equal to _____.
   A. the magnification power of the objective lens divided by that of the ocular lens.
   B. the magnification power of the objective lens divided by the numerical aperture.
   C. the product of magnification produced individually by the ocular and objective lenses.
   D. the product of magnification produced individually by the ocular and numerical aperture.

13. A plant cell is viewed using a 10x eyepiece and 43x HPO. How much will the cell be magnified?

A. 10x
B. 43x
C. 143x
D. 430x

14. How does a mirror help in studying the specimen in a microscope?

A. It cleans the cover slip.
B. It cleans the glass slide.
C. It gives light directly to the eyes of the user.
D. It reflects light to illuminate the specimen.

15. Why is it necessary for the specimen to be observed under the microscope must be thin?

A. So that the image will be clearer.
B. So that the image would be larger.
C. So that light could pass through the specimen.
D. So that the high magnification objective can be used.

What's In

Hello students. In the previous grades, you learned that the basic unit of structure and function of all living things is the **cell.** Living things may have trillions of cells and are called **multicellular** organisms or may contain one cell and ARE called **unicellular** organisms.

We cannot see the cells using the naked eye because they are too tiny. Have you imagined how the structure of the cells appear when they were discovered? It's even more difficult to identify the smaller cell organelles inside. What other tools can we use to make things appear bigger? Can you name some of them? How are they used? Write your answer in a separate sheet of paper.

TOOL/S	**USE/S**

As we go along with our lesson, activities will be more exciting and thrilling. Are you ready? Let's get started.

What's New

It is fascinating to know the process by which many designers and inventors conceptualize an innovation. Through this activity, you will discover the different scientists who contributed to the invention of microscope.

ACTIVITY 1: MATCHY! MATCHY!

What to Do:

1. Read the paragraphs below.
2. Trace the history of the microscope by copying and filling in the boxes.
3. The first item is done for you.
4. Write your answer in your paper.

On the early 13th century, spectacle makers were producing lenses for glasses. The early simple "microscopes" were known as "flea glasses" because they were used to study small insects.

A father- son duo, Zacharias and Hans Janssen, created the first microscope in the 1590s.

In the year 1625, Galileo Galilei perfects the principle of microscope.

In 1665, an English physicist, Robert Hooke looked at a sliver of cork through a microscope lens and notice some "pores" or "cells" in it.

Anton van Leeuwenhoek built a simple microscope in 1674 with only one lens to examine blood, yeast, insects and many other tiny objects.

In year 1925, Richard Zsigmondy developed the ultra-microscope that could study objects below the wavelength of light and won a Nobel Prize in Chemistry in 1925.

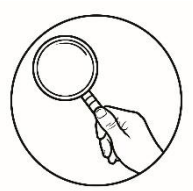
The phase- contrast microscope was invented by Frits Zernike in 1932, allows the study of colorless and transparent biological materials.

Little was done to improve the microscope until the middle of the 19th century when great strides were made and quality instruments like today's microscope emerged.

Here are your criteria to follow in answering this task in order for you to be guided and lead to an appropriate answer.

FEATURES	**4**	**3**	**2**	**1**
Explanation & Analysis	• Clear and concise explanation and analysis that thoroughly discusses the information presented	• Clear explanation & analysis that discusses most of the information presented	• Explanation and analysis attempt to discuss the information but is unclear	• Little to no explanation or analysis of the information presented
Grammar, Usage & Mechanics	• No incorrect spelling, punctuation or grammatical errors	• Few spelling and punctuations, errors, minor grammatical errors	• A number of spelling, punctuation or grammatical errors	• So many spelling, punctuation and grammatical errors that it interferes with the meaning

13th Century	Simple “microscopes” were known as “flea glasses” because they were used to study small insects.



What is It

Hans and Zacharias Janssen produced the first compound microscope in the 1590s. They were Dutch eyeglass makers. They began experimenting with ways to use different lenses. When they put a lens at the end of a small tube, they discovered that the objects near the end were magnified more than the lens by itself could achieve.

Galileo Galilei was credited with inventing one of the first compound microscope in the year 1625. It is called compound microscope because it has more than one lens. He added a focusing device to his microscope and of course went on to explore the heavens with his telescopes.

In 1665, Robert Hooke had access to many microscopes available in Royal Society of London. He examined everything he could get his hands on. When he examined a very thin slice of cork, he thought the close- up views resembled small, empty rooms. It reminded him of small rooms found in monastery; thus he named these rooms' *cells.* This gives way to the discovery of cell.

In 1674, Anton van Leeuwenhoek, Dutch scientist, worked to create stronger lenses that result to more powerful microscope. He was one of the first scientists able to observe bacteria movement in a single drop of pond water.

The prototype for the compound microscope was credited to Joseph Jackson Lister in 1830, which reduces spherical aberration or the "chromatic effect" by showing that several weak lenses used together at certain distances gave good magnification without blurring the image.

Ernst Abbe, research director of the Zeiss Optical Works, wrote a mathematical formula called the "Abbe Sine Condition". His formula provided calculations that allowed for the maximum resolution in microscopes possible in 1872.

In 1903, Richard Zsigmondy developed the ultra- microscope that could study objects below the wavelength of light and he won the Nobel Prize for Chemistry in 1925.

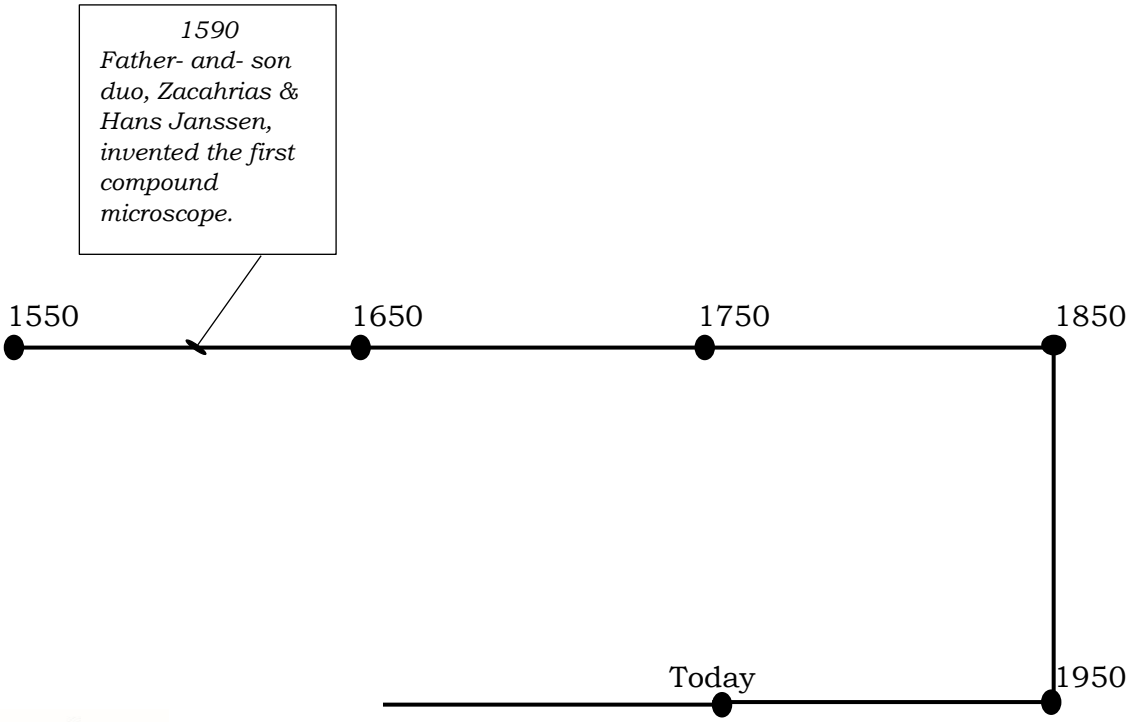
Frits Zernike invented the phase- contrast microscope in 1932 that allowed for the study of colorless and transparent biological materials for which he won the Nobel Prize in Physics in 1953.

In 19th century, companies in Germany like Zeiss and an American company founded by Charles Spencer began producing fine optical microscope.

What's More

Are you getting familiar with the inventors and their contribution to the development of the microscope? Let us have another activity focusing on the timeline of the development of the microscope.

Make a brief timeline about the development of the microscope. You will call it **"TIMEZONE TRAVEL FROM THE PAST TO THE PRESENT"**. The first one is done for you to serve as guide.



What I Have Learned

Now that you've learned about the history of the development of the microscope, let us find out how far you have understand by answering the activity below. Are you ready? Let's start.

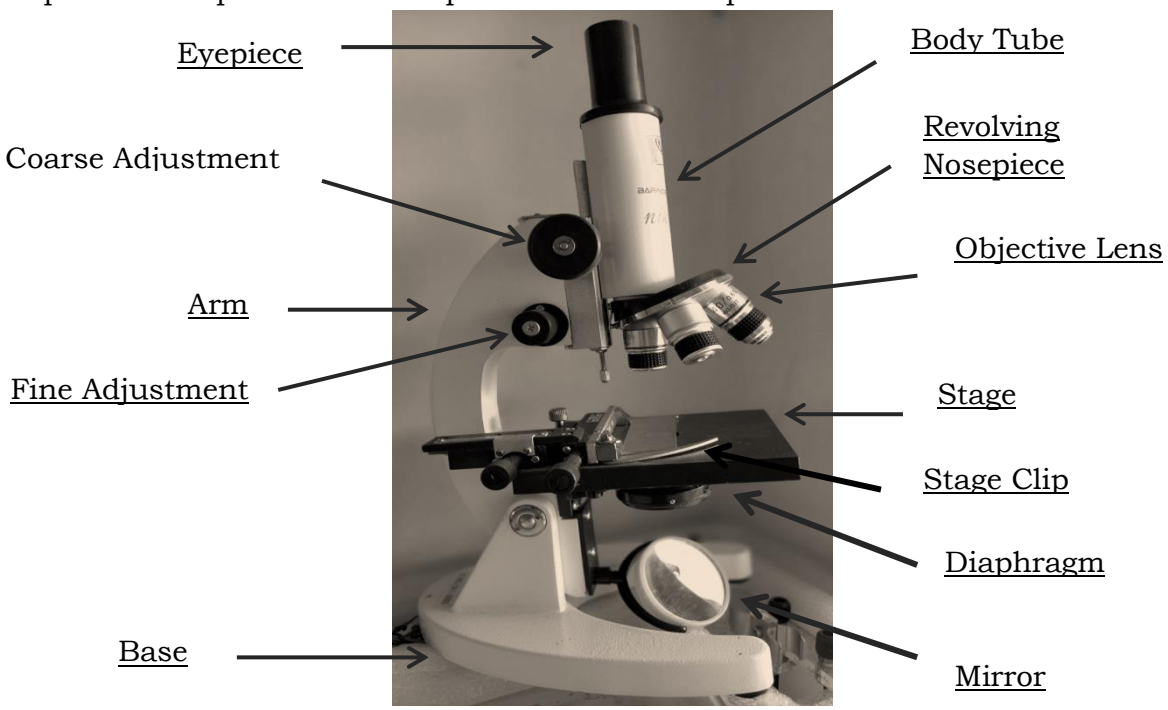
Directions: Describe the following scientists below and tell something about their contribution to the development of the microscope. Write your answer on your activity notebook.

SCIENTISTS	CONTRIBUTIONS
1. Robert Hooke	
2. Hans & Zacharias Janssen	
3. Anton van Leeuwenhoek	
4. Richard Zsigmondy	

What's New

Good job! You made it! In the previous activity, you were able to tell how was the microscope started and who are the scientists who made that device possible. I hope you can use the same skills about the activities we will discuss in this module. Are you excited? Let's start!

But before we're going to proceed with the next activity, I will show you an example of a compound microscope and its different parts.

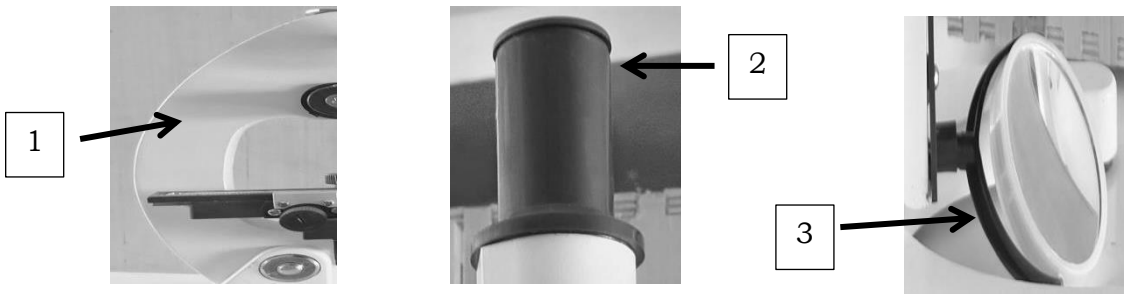


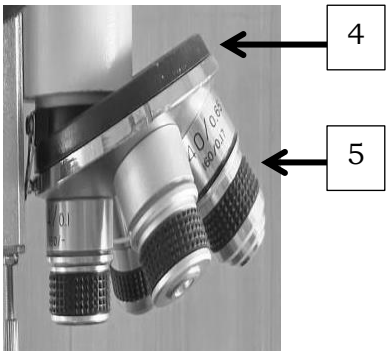
Do you now recognize the parts of the microscope? Let us try this activity just for you.

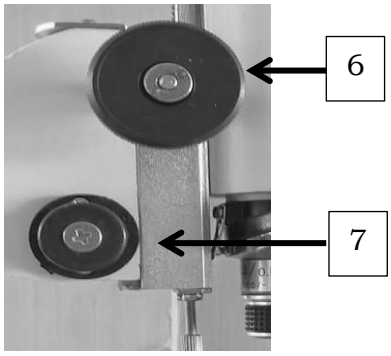
ACTIVITY 2.1: CHOP, CHOP AND AWAY!

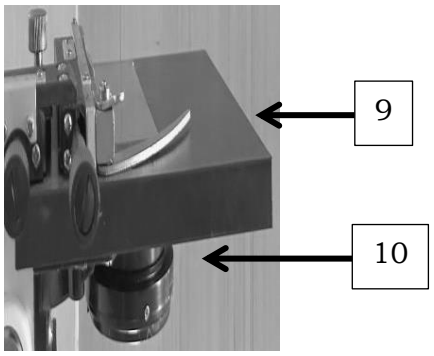
WHAT TO DO:

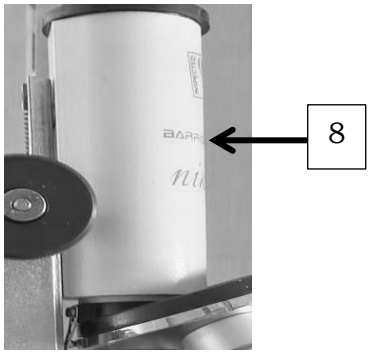
1. Look at the different parts of a microscope below.
2. Name each part.
3. Write your answer in your activity notebook.











What is It

What is a microscope? What are functions of the different parts of a microscope? What are the types of microscopes?

A **microscope** comes from the Ancient Greek *micros* meaning "small" and *skopein*, which means "to look", is a tool which can help you see tiny objects and living organism. It makes them look bigger. The science of investigating small objects and structures using such an instrument is called **microscopy**.

What makes a microscope determine how clearly a small object can be viewed?

1. *Magnification-* describes how much larger an object appears when viewed

The magnification is written on the side of the lens. The value could be 4x, 10x, 40x or 100x. To calculate the total magnification of the compound light microscope, multiply the magnification power of the ocular lens by the power of the objective lens. For example, a 10x ocular lens and a 40x objective would have a 400x total magnification.

2. Resolution or resolving power- the capacity of a microscope to distinguish finer details of an image.

There are different types of microscopes which differ in their magnification and their resolving power, namely,

1. Optical microscope- uses visible light to form an image. It uses glass lenses to magnify and resolve images. The image that was formed can be viewed from an eyepiece. It has two types:

A. Compound- uses two or more double convex lenses to magnify the object; it can magnify object up to 1200x

B. Stereomicroscope- also known as dissecting microscope; it magnifies the object 100x and gives three- dimensional image

2. Electron microscope- uses high energy electron beams to form an image. The image that was formed can only be viewed from a photographic plate or from a computer screen; the image magnified can reach up to 2 000 000x.

A. Transmission electron microscope (TEM)- electron beam passes through an ultra- thin sample; the image magnified and focused onto an imaging device such as fluorescent screen, to be examined in fine detail

B. Scanning electron microscope (SEM)- electron beam bounces off from the surface of the sample; thus, the image provided is three- dimensional

Parts and Function of a Microscope

1. **Eyepiece or Ocular lens**, this is the part used to look through the microscope.

2. **Body tube or Lens tube** is connected with the eyepiece and its main task is to hold it.

3. **Revolving nosepiece**, it holds the objective lenses. It is movable and it can revolve the objective lenses depending on the magnification power of the lens.

4. **Arm**, this is the part connecting the base and to the head and the eyepiece tube to the base of the microscope. It gives support to the head of the microscope and it is also used when carrying the microscope.

5. **Objectives/ objective lenses**, are the major lenses used for specimen visualization. Most schools have light microscope with three objectives and others have four. Usually, the shortest one marked 3x, 4x or 5x is called **scanner**. The **lower power objective (LPO)** is marked 10x or 12x, while the **high power objective (HPO)** is marked 40x, 43x or 60x. The objectives magnify the object to be observed to a certain size as indicated by the 3x, 10x or 40x, etc. marks.

6. **Stage** is the platform that holds the specimen or sample for viewing.

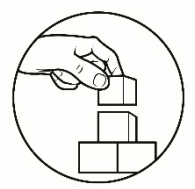
7. **Stage clips** hold the specimen slides in place.

8. **Diaphragm** controls the amount of light that passes through the specimen.
9. **Coarse adjustment** focuses images under the scanner and the low- power objectives.

10. **Fine adjustment** focuses images under the high- power and oil- immersion objectives.

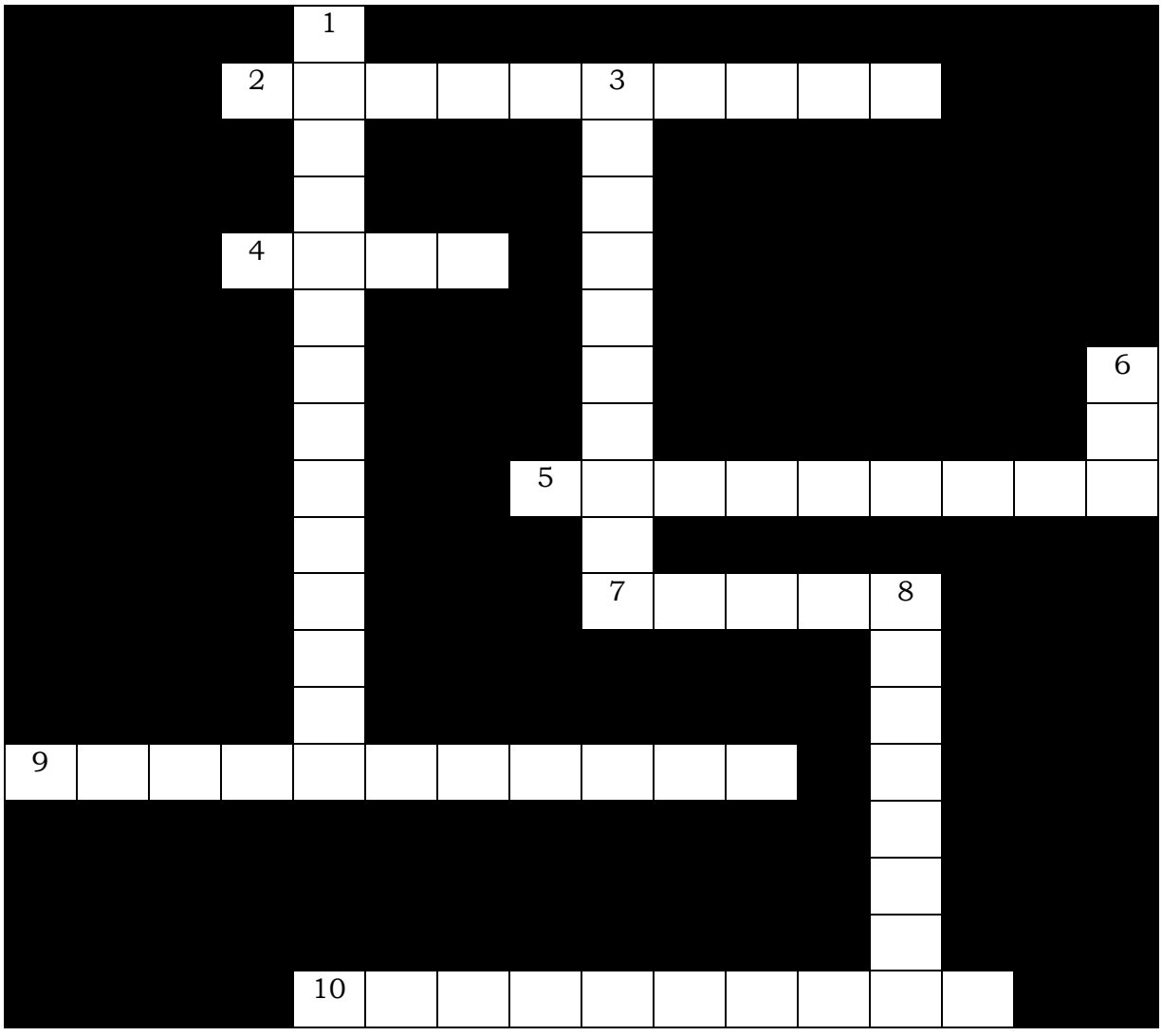
11. **Light source** provides light for the specimen (could be a lamp or a mirror).

12. **Base** supports the microscope.



What's More

I'm so happy that you did a great job in every challenge in this module. Now, let us test how far you've gone with our lesson. Write your answer on your activity notebook.



ACROSS

2- a tool which can help you see tiny objects and living organism
4- it supports the microscope
5- controls the amount of light that passes through the specimen
7- provides a space where the slide can be examined
9- provides light for the specimen
10- magnify the specimens

DOWN

1- focuses images under the high- power and oil- immersion objectives
3- holds the slide in place
6- used to carry the microscope
8- part where the viewer views the sample

What I Have Learned

Good job! It truly shows how much you enjoyed and learned our lesson. Are you ready to have some more? Let's start the ball rolling.

Directions: Match the function of the microscope in Column A with its part in Column B. Write the letter of your answer in your activity notebook.

COLUMN A	COLUMN B
1. It holds the slide in place.	A. fine adjustment
2. It holds the objectives.	B. stage clips
3. Provides light for the specimen.	C. revolving nosepiece
4. This focuses the images under the HPO and oil immersion objectives.	D. light source
5. This part allows you to carry the microscope.	E. arm
6. This supports the microscope.	F. coarse adjustment
7. Focuses the images under the scanner and the LPO.	G. base
8. It provides a space where the slide can be examined.	H. diaphragm
9. It is connected with the eyepiece.	I. ocular lens
10.This is the part used to look through the microscope.	J. body tube
	K. stage
	L. rack stop

What I Can Do

Congratulations! You're fantastic and really enjoyed your exploration in the world of microscopy. Here is your final challenge to prove what you got. Write your answer in your activity notebook.

In this time of CoVID19 Pandemic, how useful is the microscope in detecting the viruses? What kind of microscope is being used in studying this kind of virus?

Here are your criteria to follow in answering this task in order for you to be guided and lead to an appropriate answer.

FEATURES	**4**	**3**	**2**	**1**
Quality of Writing	• Piece was written in an extraordinary style • Very informative and well organized	• Piece was written in an interesting style • Somewhat informative and organized	• Piece had little style • Gives some new information but poorly organized	• Piece had no style • Gives no new information and very poorly organized
Grammar, Usage & Mechanics	• No incorrect spelling, punctuation or grammatical errors	• Few spelling and punctuations, errors, minor grammatical errors	• A number of spelling, punctuation or grammatical errors	• So many spelling, punctuation and grammatical errors that it interferes with the meaning

Assessment

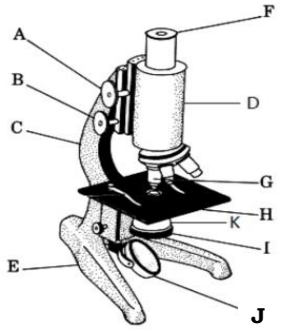
Directions: Read each item carefully. Write only the letter of the correct answer for each question. Write your answer on your activity notebook.

1. In what year did the father-and-son duo spectacles- makers create the first microscope?
   A. 1565
   B. 1590
   C. 1675
   D. 1830

2. Who uses the microscope with only one lens to observe insects and other specimens?
   A. Robert Hooke
   B. Richard Zsigmondy
   C. Hans & Zacharias Janssen
   D. Anton van Leeuwenhoek

3. Who invented the ultra- microscope which allows the observation of specimens beyond the wavelength of light?
   A. Robert Hooke
   B. Richard Zsigmondy
   C. Anton van Leeuwenhoek
   D. Hans & Zacharias Janssen

For items 4 to 6, use the letters in the figure to answer the questions.



4. Which part supports the entire weight of the microscope?
   A. Part B
   B. Part C
   C. Part D
   D. Part E

5. Edgar needs to raise the stage to focus the specimen he is studying using the low power objective. Which part should he manipulate?
   A. Part A
   B. Part B
   C. Part C
   D. Part E

6. You are to transfer the microscope to the next room. What parts should you hold to carry the microscope properly?
   A. Part C & E
   B. Part B & C
   C. Part A & F
   D. Part E & J

7. Which part will you adjust if the object you are observing under the HPO is **NOT** clear?
   A. Coarse adjustment
   B. Inclination joint
   C. fine adjustment
   D. Diaphragm

8. Which of the following describes the function of the mirror?
   A. It facilitates the changing of the objectives.
   B. It reflects light up to the diaphragm and to the specimen to be observed.
   C. It allows one to tilt the microscope, so viewing is possible while seated.
   D. Regulates the amount of light reflected to the object to be viewed.

9. Which of the following describes the function of diaphragm?
   A. It facilitates the changing of the objectives.
   B. It reflects light up to the diaphragm and the specimen to be observed.
   C. Regulates the amount of light reflected to the object to be viewed.
   D. It allows one to tilt the microscope, so viewing is possible while seated.

10. What is the correct way of carrying a microscope?
   A. Hold the arm by grasping with one hand.
   B. Hold the base by grasping with two hands.
   C. Hold the arm by grasping with one hand and the stage with the other hand.
   D. Hold the arm by grasping with one hand and the base with the other hand.

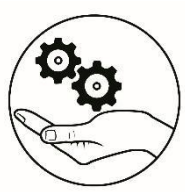
11. Total magnification is obtained by _____.
   A. magnifying power of eyepiece.
   B. magnifying power of condenser lens.
   C. magnifying power of the objective lens.
   D. magnifying power of both the objective lens and eyepiece.

12. Which should be used to observe bacteria?
    A. 20x obj. and 10x eyepiece
    B. 30x obj. and 10x eyepiece
    C. 100x oil immersion objective and 10x eyepiece
    D. 100x oil immersion objective and 5x eyepiece

13. Why does a microscope stage have a hole in it?
    A. To hold the specimen in place.
    B. To make the specimen visible.
    C. To secure the slide to the stage.
    D. To allow the light to pass through.

14. A student wants to see the parts of a plant cell in detail using high power objective. What part of the microscope will be manipulated?
    A. Eyepiece
    B. Objective lenses
    C. Fine adjustment knob
    D. Coarse adjustment knob

15. It is the ability of a microscope to distinguish the finer details in an image.
    A. microscopy
    B. scanning ability
    C. magnification
    D. Resolving power



Additional Activities

Directions: Encircle the parts of the microscope inside the Word Search Box in vertical, horizontal or slanting spot and write its function below. Write your answer on your activity notebook.

X	V	L	M	M	V	B	A	S	E	T	R	D	F	G	L	O	Q	X	Z	T	Y	O	P	F
R	V	B	H	Y	T	U	I	N	X	M	V	A	W	U	T	C	C	C	C	T	T	Y	K	I
E	S	R	T	U	V	B	O	L	T	E	Z	A	Z	H	G	U	V	X	A	Y	G	H	L	N
V	E	C	Y	Y	B	R	G	H	L	P	O	R	A	B	V	L	B	F	R	B	B	B	N	E
O	R	Z	B	B	T	E	A	P	I	L	O	M	P	C	B	A	N	N	T	Z	B	Z	F	A
L	Y	A	N	O	X	S	B	R	Y	Q	I	S	O	X	H	R	Z	K	G	X	J	X	X	D
V	G	E	M	L	W	O	O	B	M	D	L	T	U	V	N	D	A	U	B	C	O	D	Z	J
I	B	F	E	P	W	R	A	H	U	X	J	V	U	B	H	T	S	U	N	T	P	R	Y	U
N	B	T	C	M	Z	T	T	B	R	V	H	C	J	N	N	G	D	J	H	Y	G	Y	T	S
G	N	Y	X	I	Q	T	D	C	E	G	G	Z	D	I	A	P	H	R	A	G	M	I	O	T
N	G	P	T	R	Y	B	A	X	W	G	V	V	C	F	T	E	N	U	N	U	U	I	P	M
O	Z	I	G	R	P	N	P	Z	T	O	R	G	F	E	C	D	H	J	V	S	T	A	G	E
S	S	Y	B	O	O	M	O	R	Y	A	Y	H	H	R	B	R	Y	B	B	N	H	R	I	N
E	T	H	V	R	I	O	U	T	R	T	J	J	T	Y	B	T	W	L	G	O	M	S	K	T
P	Y	T	G	U	O	T	H	Z	E	B	R	S	R	U	O	Y	W	P	T	B	A	A	Q	X
I	U	B	O	R	T	E	W	Z	V	T	B	Y	T	O	D	G	Q	X	A	J	T	T	W	Z
E	H	Y	G	Z	W	Q	T	Y	H	B	O	Y	V	O	Y	B	E	C	A	E	W	Y	R	Y
C	O	A	R	S	E	A	D	J	U	S	T	M	E	N	T	B	R	Z	S	C	W	R	T	T
E	Q	M	T	Y	I	O	O	P	X	Z	C	V	S	Q	U	N	T	X	S	T	L	G	G	S
T	W	M	W	E	R	J	K	G	X	T	T	Q	Y	T	B	M	X	X	Q	I	I	G	H	D
R	R	N	S	F	F	V	M	Y	O	E	T	S	R	G	E	R	Y	T	O	V	P	B	N	E
F	Y	V	X	C	H	Y	O	T	G	N	T	Z	T	V	G	B	Y	T	Y	E	O	X	M	R
H	U	U	C	Z	Y	H	P	R	F	T	H	Z	V	C	N	V	G	J	K	S	I	Z	L	T
K	I	O	I	U	R	E	R	T	J	G	H	L	L	D	M	K	L	O	P	U	Y	Q	P	F
B	S	T	A	G	E	C	L	I	P	S	F	R	Y	H	N	M	M	K	Q	T	A	B	C	V

Answer Key

What' s More

1625- Galileo Galilei invented one of the first compound microscope
1665- Robert Hooke coined the term "cell"
1674- Anton van Leeuwenhoek one of the first scientists able to observe bacteria movement in a single drop of pond water.
1830- Joseph Jackson Lister was credited for his prototype of the compound microscope
1872- Ernst Abbe provided the calculations that allowed for the maximum resolution in microscopes possible
1903- Richard Zsigmondy developed the ultra- microscope
1932- Frits Zernike invented the phase- contrast microscope
19^{th} century- Charles Spencer began producing fine optical microscope

What' s In

TOOL/S	USE/S
1. magnifying glass	Used to produce a magnified image of an object
2. telescope	Used to look through distant objects look closer and larger
3. binoculars	Equipment with two parts that holds against your eyes and look through to see distant objects more clearly
4. periscope	Used for looking over the top of something esp. for looking at the surface of the sea from a submarine

Assessment

1. B
2. D
3. B
4. D
5. A
6. A
7. C
8. B
9. C
10. D
11. D
12. C
13. D
14. C
15. D

What I Know

1. B
2. D
3. B
4. A
5. C
6. A
7. C
8. D
9. C
10. A
11. C
12. C
13. D
14. D
15. C

What I Have Learned

SCIENTISTS	CONTRIBUTIONS
1. Robert Hooke	He coined the term "cell"
2. Hans & Zacharias Janssen	Produced the first compound microscope
3. Anton van Leeuwenhoek	First person to describe a living cell from a single drop of pond water
4. Richard Zsigmondy	Developed the ultra- microscope that could study objects below the wavelength of light

Additional Activities

X	V	L	M	M	V	B	A	S	E	T	R	D	F	G	L	O	Q	X	Z	T	Y	O	P	F
R	V	B	H	Y	T	U	I	N	X	M	V	A	W	U	T	C	C	C	C	T	T	Y	K	I
E	S	R	T	U	V	B	O	L	T	E	Z	A	Z	H	G	U	V	X	A	Y	G	H	L	N
V	E	C	Y	Y	B	R	G	H	L	P	O	R	A	B	V	L	B	F	R	B	B	B	N	E
O	R	Z	B	B	T	E	A	P	I	L	O	M	P	C	B	A	N	N	T	Z	B	Z	F	A
L	Y	A	N	O	X	S	B	R	Y	Q	I	S	O	X	H	R	Z	K	G	X	J	X	X	D
V	G	E	M	L	W	O	O	B	M	D	L	T	U	V	N	D	A	U	B	C	O	D	Z	J
I	B	F	E	P	W	R	A	H	U	X	J	V	U	B	H	T	S	U	N	T	P	R	Y	U
N	B	T	C	M	Z	T	T	B	R	V	H	C	J	N	N	G	D	J	H	Y	G	Y	T	S
G	N	Y	X	I	Q	T	D	C	E	G	G	Z	D	I	A	P	H	R	A	G	M	I	O	T
N	G	P	T	R	Y	B	A	X	W	G	V	V	C	F	T	E	N	U	N	U	U	I	P	M
O	Z	I	G	R	P	N	P	Z	T	O	R	G	F	E	C	D	H	J	V	S	T	A	G	E
S	S	Y	B	O	O	M	O	R	Y	A	Y	H	H	R	B	R	Y	B	B	N	H	R	I	N
E	T	H	V	R	I	O	U	T	R	T	J	J	T	Y	B	T	W	L	G	O	M	S	K	T
P	Y	T	G	U	O	T	H	Z	E	B	R	S	R	U	O	Y	W	P	T	B	A	A	Q	X
I	U	B	O	R	T	E	W	Z	V	T	B	Y	T	O	D	G	Q	X	A	J	T	T	W	Z
E	H	Y	G	Z	W	Q	T	Y	H	B	O	Y	V	O	Y	B	E	C	A	E	W	Y	R	Y
C	O	A	R	S	E	A	D	J	U	S	T	M	E	N	T	B	R	Z	S	C	W	R	T	T
E	Q	M	T	Y	I	O	O	P	X	Z	C	V	S	Q	U	N	T	X	S	T	L	G	G	S
T	W	M	W	E	R	J	K	G	X	T	T	Q	Y	T	B	M	X	X	Q	I	I	G	H	D
R	R	N	S	F	F	V	M	Y	O	E	T	S	R	G	E	R	Y	T	O	V	P	B	N	E
F	Y	V	X	C	H	Y	O	T	G	N	T	Z	T	V	G	B	Y	T	Y	E	O	X	M	R
H	U	U	C	Z	Y	H	P	R	F	T	H	Z	V	C	N	V	G	J	K	S	I	Z	L	T
K	I	O	I	U	R	E	R	T	J	G	H	L	L	D	M	K	L	O	P	U	Y	Q	P	F
B	S	T	A	G	E	C	L	I	P	S	F	R	Y	H	N	M	M	K	Q	T	A	B	C	V

References

Books

Alvie J. Asuncion et.al. *K to 12 Science Grade & Leraners Material.* Pasig City: Bureau of Learning Resources (DepEd- BLR), 2017.

Laurente, Jomar Aries T., Ryan John G. Garcia, Faith Celeste B. Ole, Von Anthony G. Torio, and Arnie C. Osabel. *Science for the 21st Century Learner 7.* 2015.

Websites

biologyonline.com. n.d. https://www.biologyonline.com (accessed June 5, 2020).

Google.com. n.d. https://sites.google.com/a/amschool.org/7th-grade-math/grade-2/march23-26 (accessed June 1, 2020).

micro.magnet. n.d. https://micro.magnet.fsu.edu/primer.primergal.html (accessed June 2, 2020).

MicroscopeWorld. n.d. www.MicroscopeWorld.com (accessed June 2, 2020).

Peñol, Joevanie S. *slideshare.net.* n.d. https://www.slideshare.net/mobile/joevani_007-parts-and-functions (accessed June 6, 2020).

Pinterest.ph. n.d. https://www.pinterest.ph/pin/93449761002851047/ (accessed June 1, 2020).

sciencing.com. n.d. https://sciencing.com (accessed June 5, 2020).

tes.com. n.d. https://www.tes.com/teaching-resource/history-of-microscopes-comprehension-task-6377321 (accessed June 5, 2020).

Viau, Francois. *teach-nology.com.* n.d. https://www/teach-nology.com (accessed June 6, 2020).

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