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Ministry of Education
General Directorate of Curricula

BIOLOGY

1

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PREFACE

Biology is a rapidly developing branch of science. The major advances being made continuously affect our life on earth. Some of these important advances are included here.
The results of a recent survey on the attitudes towards existing literature available to high school students showed that many were unhappy with the material used in teaching and learning. Those questioned identified a lack of the following: accompanying supplementary material to main text books, current information on new developments, clear figures and diagrams.

This book aims to improve the level of understanding of modern biology by inclusion of the following: main texts, figures and illustrations, extensive questions, articles and experiments. It is the intention and hope of the authors that the contents of this book will help to bridge the current gap in the field of biology at this level.

This book has been carefully reviewed and the language is considered suitable for students for whom English is a second language.

To the students

Being curious students, you may have wondered why you resemble your parents or why you need to breathe. In this book, I try to summarize some major subjects of biology. These are the most promising and perhaps the most complicated subjects of modern biology.

Group work will greatly enhance your learning abilities as well as give you an opportunity to share your knowledge and experience with your friends. I hope that, being assiduous students, you will work hard throughout this academic year and do your best to satisfy your scientific curiosity and, of course, to pass all of your exams successfully.

The author

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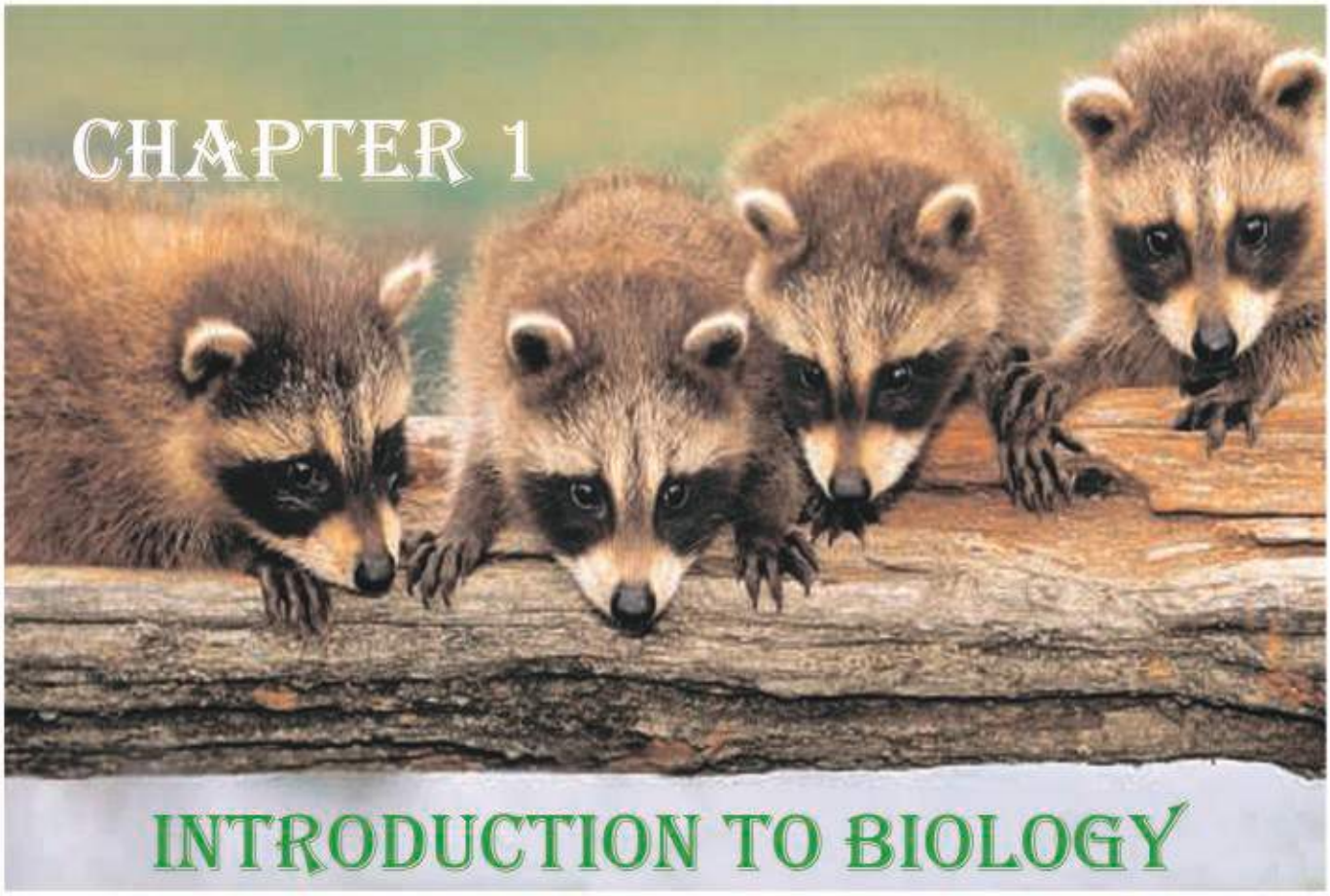


CHAPTER 1

INTRODUCTION TO BIOLOGY

Biology is a natural science concerned with the study of life and living organisms, including their structure, function, growth, distribution, and taxonomy.

Biology deals with the study of the many varieties of living organisms. Clockwise from top left: Salmonella typhimurium (a type of bacteria), Phascolarctos cinereus (koala), Athyrium filix-femina (common lady-fern), Amanita muscaria (fly agaric, a toxic toadstool), Agalychnis callidryas (red-eyed tree frog) and Brachypelma smithi (Mexican Red-kneed Tarantula)

What is Biology?

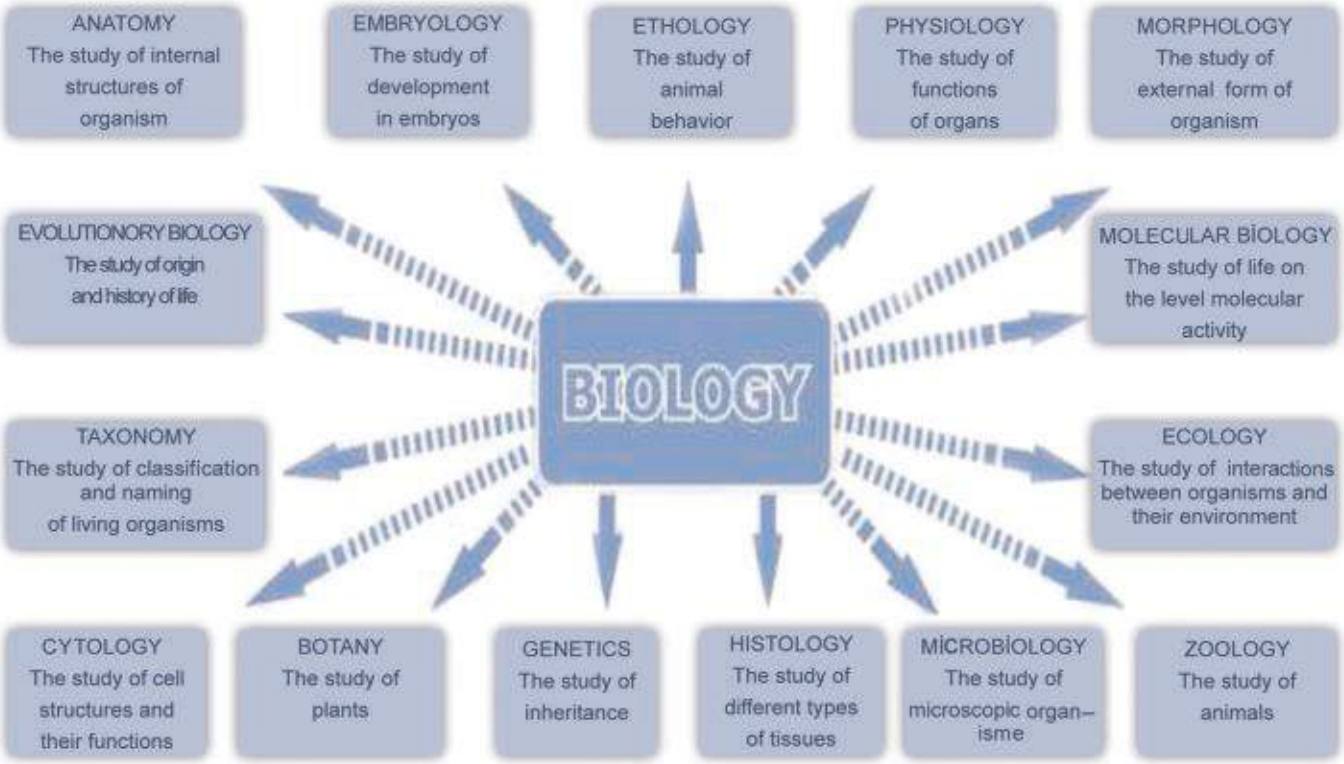
Welcome to the study of biology.
Bio means "**life**" and logy means "**science**".

Biology is the science of life or the study of living organisms. If you look your environment carefully, you can see many things related with biology. There are million kinds of plants and animals around us. For example, singing birds, barking dogs, the nice smelling of flowers in your garden etc.

Biologist is a person who deals with living things and makes experiment with living organisms in the laboratory. Not only biologists but also engineers and other scientists have to know biology for developing technology. For example, birds showed the way of flying and fish showed the swimming underwater. Finally, people invented plane and submarine.

Branches of Biology

The field of biology today is very large. Therefore it has been divided into branches. As biologists open up the world of biology by research new branches continue to discover.

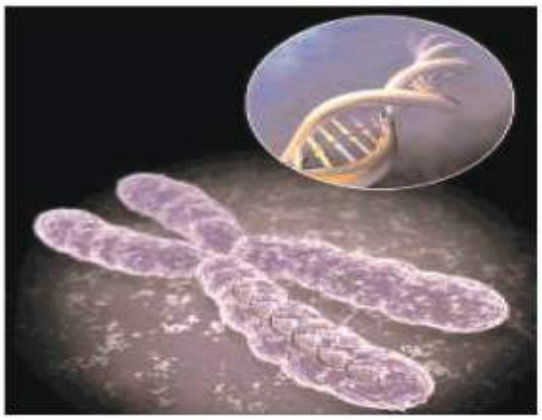


a) Zoology is the study of animals.
Examples: Lion, Bear etc.

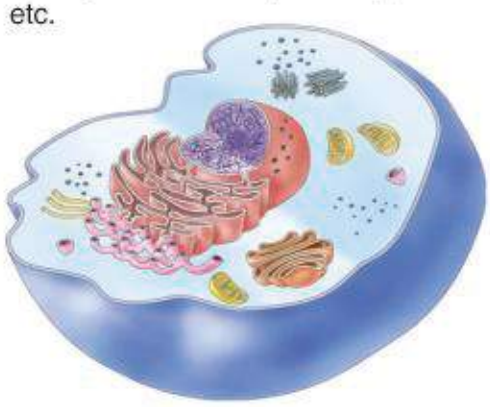
b) Botany is the study of plants.
Example: Rose

c) Ecology is the science which studies the relationship of living organisms between each other and their environment.

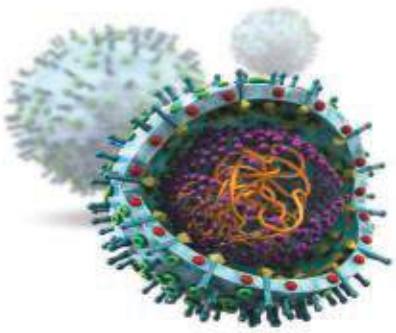
d) Genetics is the study of how genetic information is passed to offspring from their parents.



e) Cytology is the study of cells.
Example: Onion cell, ameoba, blood cells etc.



h) Microbiology is the study of microscopic organisms. Such as; bacteria and virus .



Contributions of Muslim and Arabic scientists to Biology

Allah (c.c) ordered to all people to be open to the knowledge and science in Holy Qur`an. Consequently Muslim and Arabic scientists contributed to development of biology and become useful for humanity. Dar`ul Hikmet college in Baghdad contributed to development of science and many scientific books are translated from Greek to Arabic in there. This studies passed to the Europe by aid of Andalusian and helped the Europian to awake from the deep darkness.

El- Jahid (768 - 873 A.C)

He was born in Basra and did studies on languages and biology. El- Jahid observed plants and animals, classified them according to their nutrition type, ecosystem and behaviours. He published a book in name of '**Animals**'.

El Razi

El-Razi (850-925 A.C)

He made many different studies. In one of them he suggested that meat cannot rotten by itself and there are some small organisms which cause it. After that scientist Louis Pasteur proved that bacteria causes the rotten of meat.

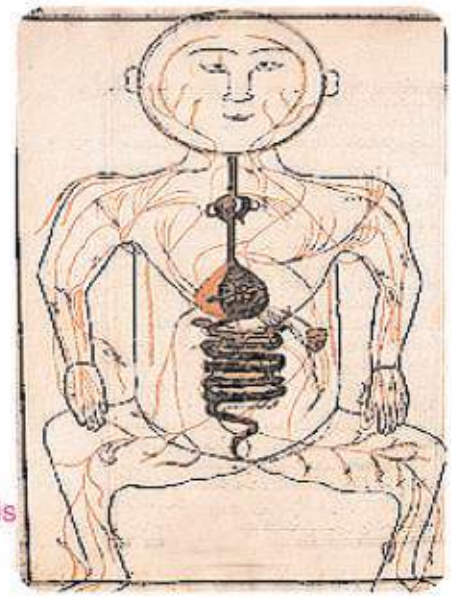
Ibn-Rushd (1126 - 1189 A.C.)

He lived in Andalus and discovered the infection method of smallpox.

Ibn El-Nafis (1218 - 1289 A.C.)

Discovered the pulmonary circulation and invented some anatomical equipments which are still used.

Skeletal system drawing of Ibn_El-Nafis



Drawing of Ibn_El_Nafis about pulmonary

Contributions of Foreign scientists

William Harvey

English scientist, made some studies on physiology and proved the pulmonary circulation which discovered by Ibn El-Nafis.

Gregor Mendel

He is an Austrian scientist and made many experiments on pea plants and found how genetic characteristics pass from one generation to the next.

Robert Koch

He was a famous German scientist. He discovered the bacteria which cause tuberculosis and made the vaccine for this disease.

Robert Koch

Koch bacillus (Bacteria that cause tuberculosis)

SELF CHECK
INTRODUCTION TO BIOLOGY

A. Key Terms

Biology	Zoology
Botany	Ecology
Genetics	Cytology
Scientist	Biologist
Macroscobic	Microscobic

B. Review Questions

1. Give two examples around you which related to biology.
2. List the branches of biology.
3. How did El-Jahid classify organisms?
4. What should we use to see microscobic organisms?
5. Explain how Muslim scientists contributed to the biology?

C. True or False

1. Anton Van Leeuwenhook is the first person who discovered the blood circulation.
2. Mendel have studied on zoology.
3. William Harvey is the first scientist who dis cover the pulmonary circulation.
4. Microbiology is a branch of science which study on plants.

D. Matching

a. Ibn Rushd ( ) Observed the cell first time.
b. Cytology ( ) Study on relationships between organisms.
c. Microscope ( ) Study on cell.
d. Robert Hooke ( ) Discovered the infection methods of smallpox.
e. Ecology ( )Used to magnify microorganisms.

E. Multiple choice

1-"Biologists are the people who study living things. They ask questions about living things and search for answers to their questions"

Which question should not be asked by a biologist?

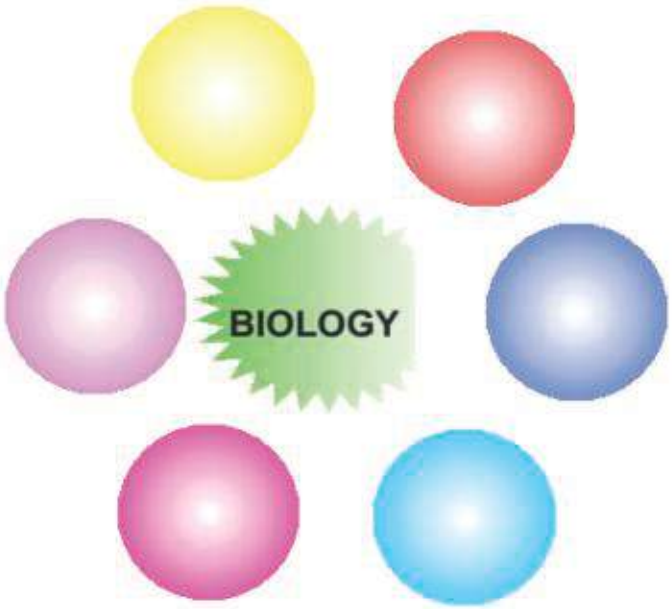
A) Why leaves change color in the autumn?
B) Why a bee sting hurts?
C) What living things are made up of?
D) Why a chalk fell down if we drop it?

2- Which of the following parts of biology studies the transmission of hereditary information from one generation to another?

A) Anatomy B) Histology
C) Zoology D) Genetics

F. Concept Map

Fill each bracket by a branch of biology.



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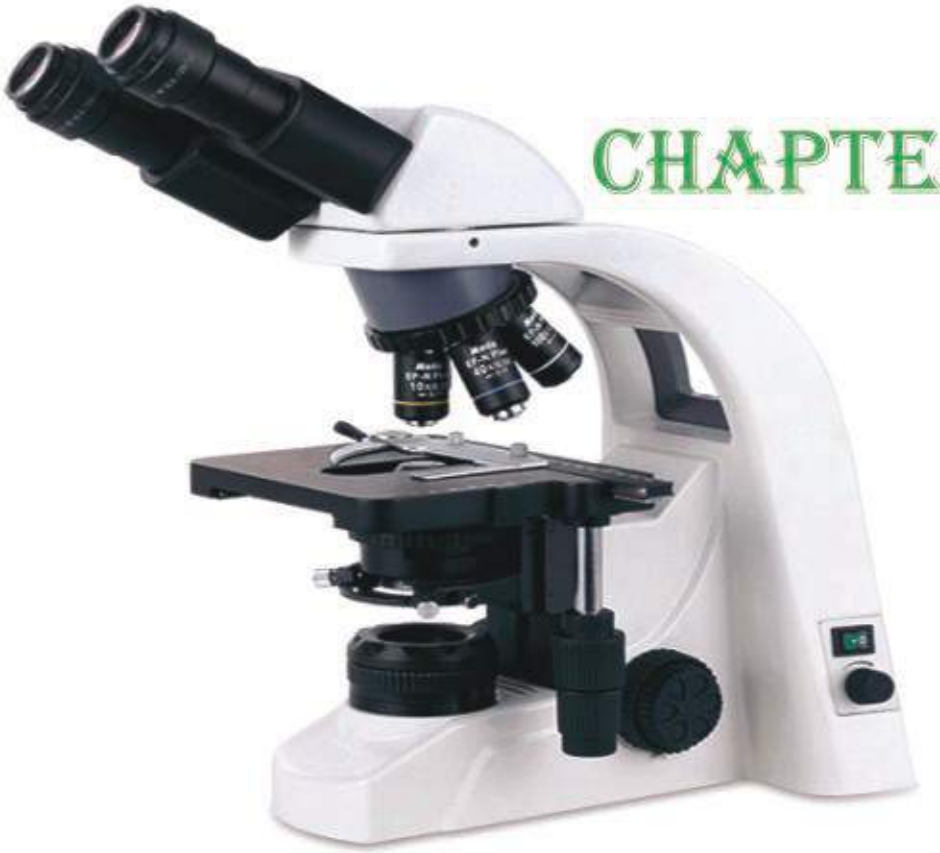
G X O P L L A M S O E S A E S I D E M Z K R Y W A F L H L L
Y P O P J Y O Y L O R U B I T C V L O X T Q D Z J N R H C V
O B J E B J N X U L R I O Z N B I O L O G Y X B J J R O L F
E G B O W J L U H O Y P Y F A F S T K L B Z Y G A N D E R Y
X C R C G V P M A G T Y Z Z Y P E U U S O S S D U S Q O G W
I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

BACILLUS
BACTERIA
BASRA
BIOLOGY
BOTANY
CELL
CHROMOSOME
CYTOLOGY
DISEASE
ECOLOGY
ELRAZI
GENETICS
IBNSINA
INFECTION
LIFE
MENDEL
MICROBIOLOGY
ONION
SKELETAL
SMALLPOX
VIRUS
ZOOLOGY



CHAPTER 2

MICROSCOPE

MICROSCOPE

Biology is the study of living things. Some living things are macroscopic, we can see them with naked eyes. For example: Lion, bear etc.

But some living organisms are microscopic so, we can't see them with our naked eyes. **Biologists** use magnifying glass or microscope as an instrument to see them.

Microscope was first discovered by **Anton Van Leeuwenhook** in the beginning of the 17th century. Then a new microscope was developed by Robert Hooke in 1665. He observed cork cells by microscope.

Anton Van Leeuwenhook and his microscope

Using the microscope

- Always carry the microscope with two hands - one on the arm and one under near the base of the microscope

- Switch on the lamp (if there is one), or turn the mirror towards the light
- Rotate the low power objective into place

- Some materials are best viewed in dim light, others in bright light. The light intensity can be regulated by using the diaphragm.

- Put the studying material on the stage

- Firstly use coarse adjustment to see something roughly, then use fine adjust ment to see materials clearly.

Hold your microscope by two hands.

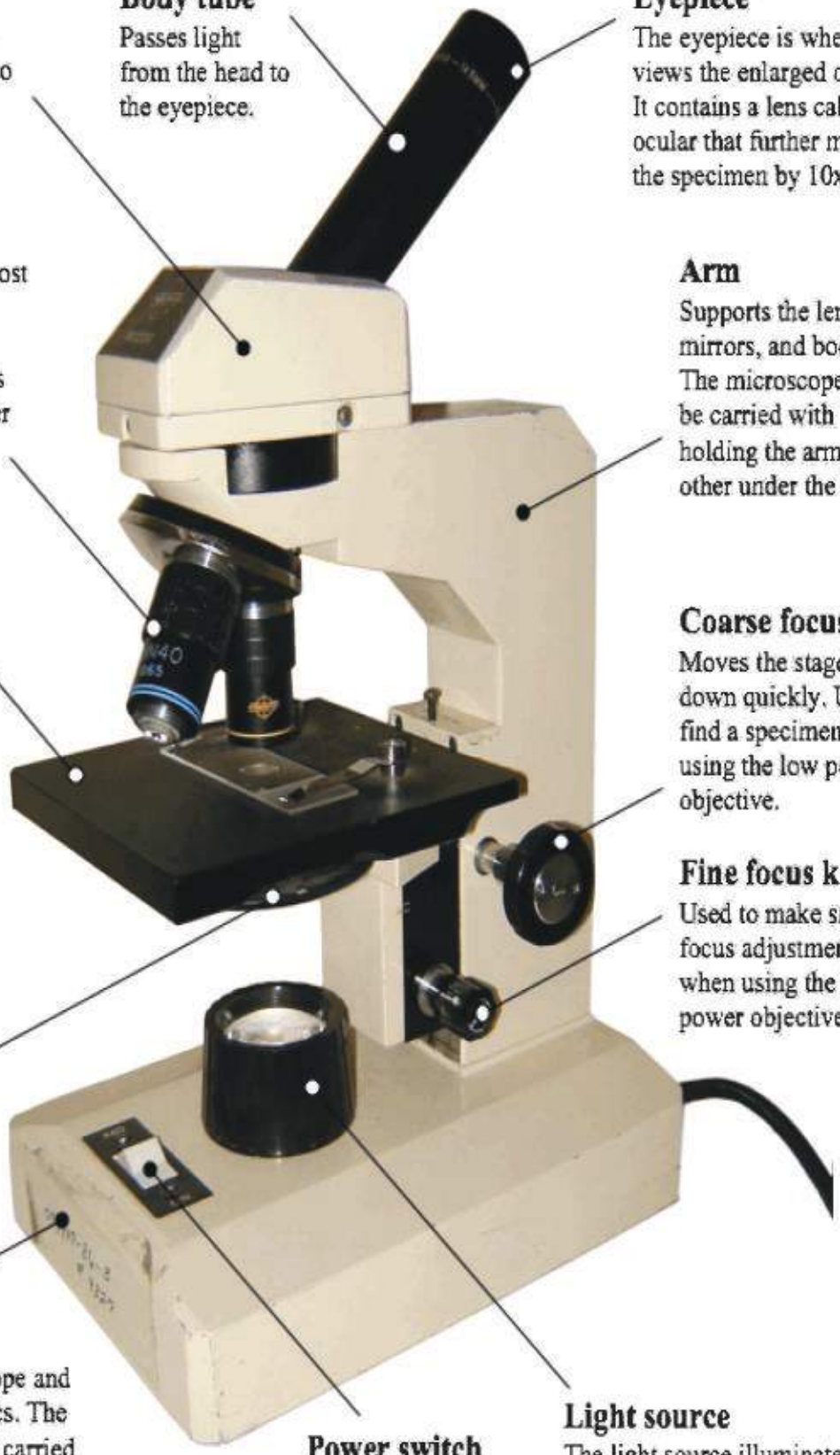
Magnifying glass

Koch's microscope

Light microscope

Electronic Microscope

A wide of magnifications is possible in electron microscope, from about 10 times to more than 500,000 times, about 250 times the magnification limit of the best light microscopes.



Rotating head
Contains mirrors and allows the body tube to rotate 360°.

Body tube
Passes light from the head to the eyepiece.

Eyepiece
The eyepiece is where one views the enlarged object. It contains a lens called the ocular that further magnifies the specimen by 10x.

Objective lens
Objectives produce most of the magnification. The high-power lens (blue stripe) magnifies 40x and the low-power lens (yellow stripe) magnifies 10x.

Arm
Supports the lenses, mirrors, and body tube. The microscope should be carried with one hand holding the arm and the other under the base.

Stage
Holds the slide and contains an opening that allows light to pass through the specimen on its way to the objective.

Coarse focus knob
Moves the stage up and down quickly. Used to find a specimen when using the low power objective.

Diaphragm
Rotating dial that controls the passage of light through the stage. Numbers on the dial indicate the relative amount of light passing, with "5" being the most and "1" being the least.

Fine focus knob
Used to make small focus adjustments, esp. when using the high power objective.

Base
Supports the microscope and contains the electronics. The microscope should be carried with one hand under the base and the other holding the arm.

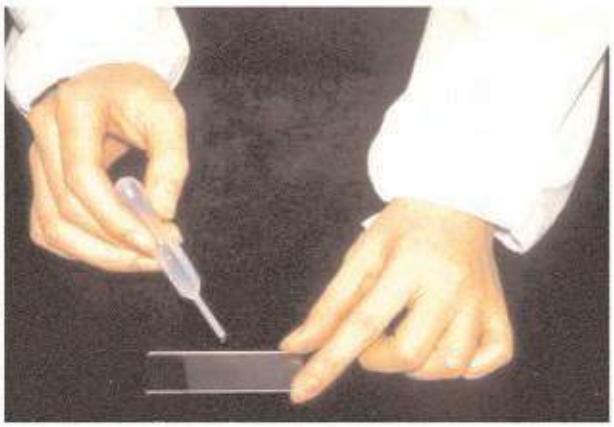
Power switch
Turns the light on and off.

Light source
The light source illuminates the specimen by shining bright light through it.

Preparing of objects to observe

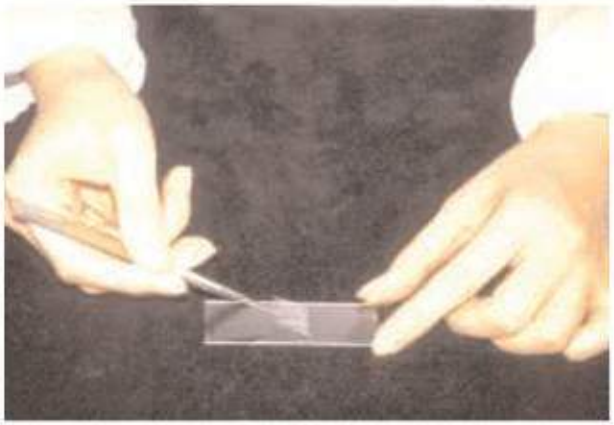
Preparing of objects is very important for good observation under the microscope. We can observe small organisms easily with microscope but we must cut big objects for observation.

Too small
Blood cells, bacteria and protists are very small, we use microscope to see them.

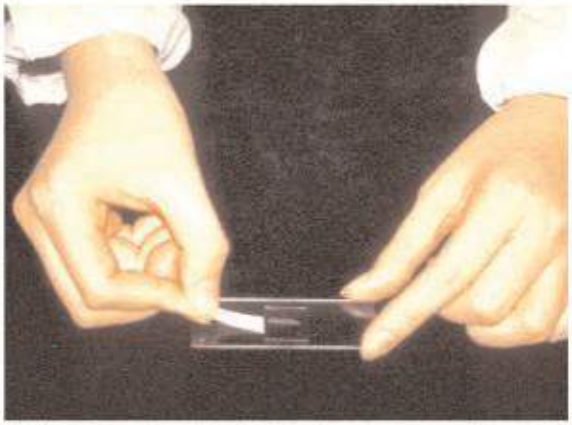


1. Put one drop of water on the slide.

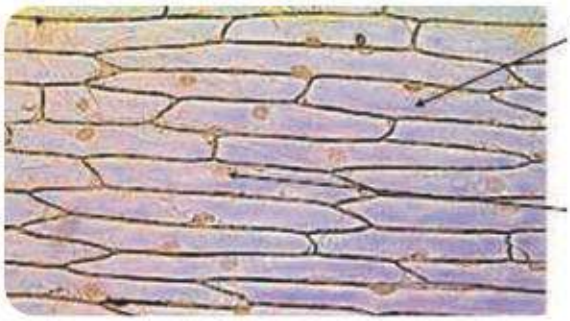
2. Place an object on the slide.



3. Lower the cover glass slowly to avoid air pockets, pull the tweezers out.

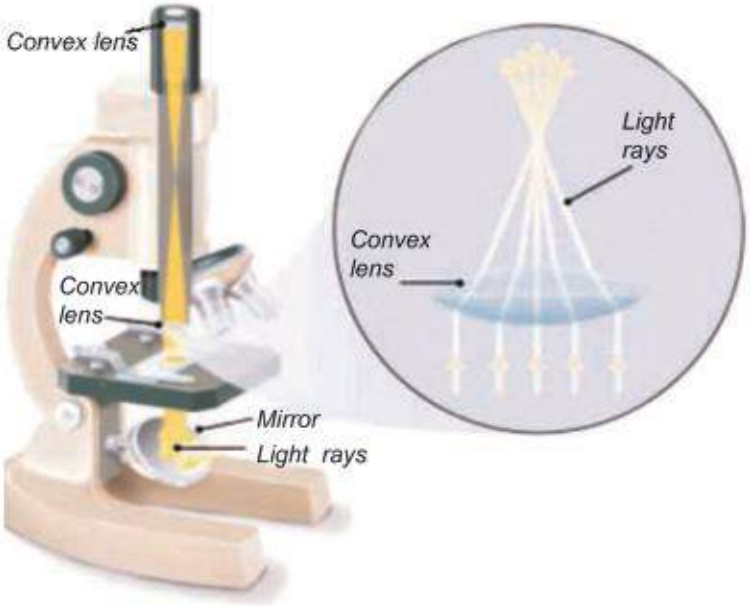


4. After placing the cover glass, the excess water should be absorbed with paper.



View of cross section of onion leaf in microscope

The Compound Microscope



Magnification

The total magnification of an object is the power of the eyepiece lens multiplied by the power of the objective lens. The low power objective is often 10x, and that of the ocular is 10x. When the low -power objective in use, the total magnifying power of the microscope is 10 x 10, or 100x. This means that the image is 100 times grater than its actual object.

IMPORTANT
Don't use coarse adjustment with 40x,60, and 100x objectives

Eye piece	Objective	Magnification
10X	4X (low power)	40
10X	10X (low power)	100
10X	40X (high power)	400
16X	100X (oil immersion)	1600

SELF CHECK MICROSCOPE

A. Key Terms

Microscope
Magnification
Low power objective
Cover glass
Diaphragm
Eyepiece
Slide

B. Review Questions

1. Give two examples for each microscopic and macroscopic organisms?
2. List the parts of microscope.
3. Why we must cut the big object to observe under the microscope? Discuss your answers with your classmate.
4. What should we use to see microscopic organisms?
5. How should we carry the microscope?

C. True or False

1. The light intensity can be regulated by using diaphragm.
2. Microscope first discovered by Leeuwenhook.
3. Robert Hooke observed cork cells.
4. We use microscope to see macroscobic organisms.

D. Matching

Label the parts of the microscope in figure.

E. Multiple choice

1. Which one is used to move the body tube of the microscope a whole lot?

A) Diaphragm
B) Stage
C) Coarse adjustment
D) Fine adjustment

2. What holds the slide on the stage

A) Diaphragm
B) Stage
C) Coarse adjustment
D) Spring clip

F. Drawing the object

Draw the overview of cross section of onion leaf you observed under the microscope.

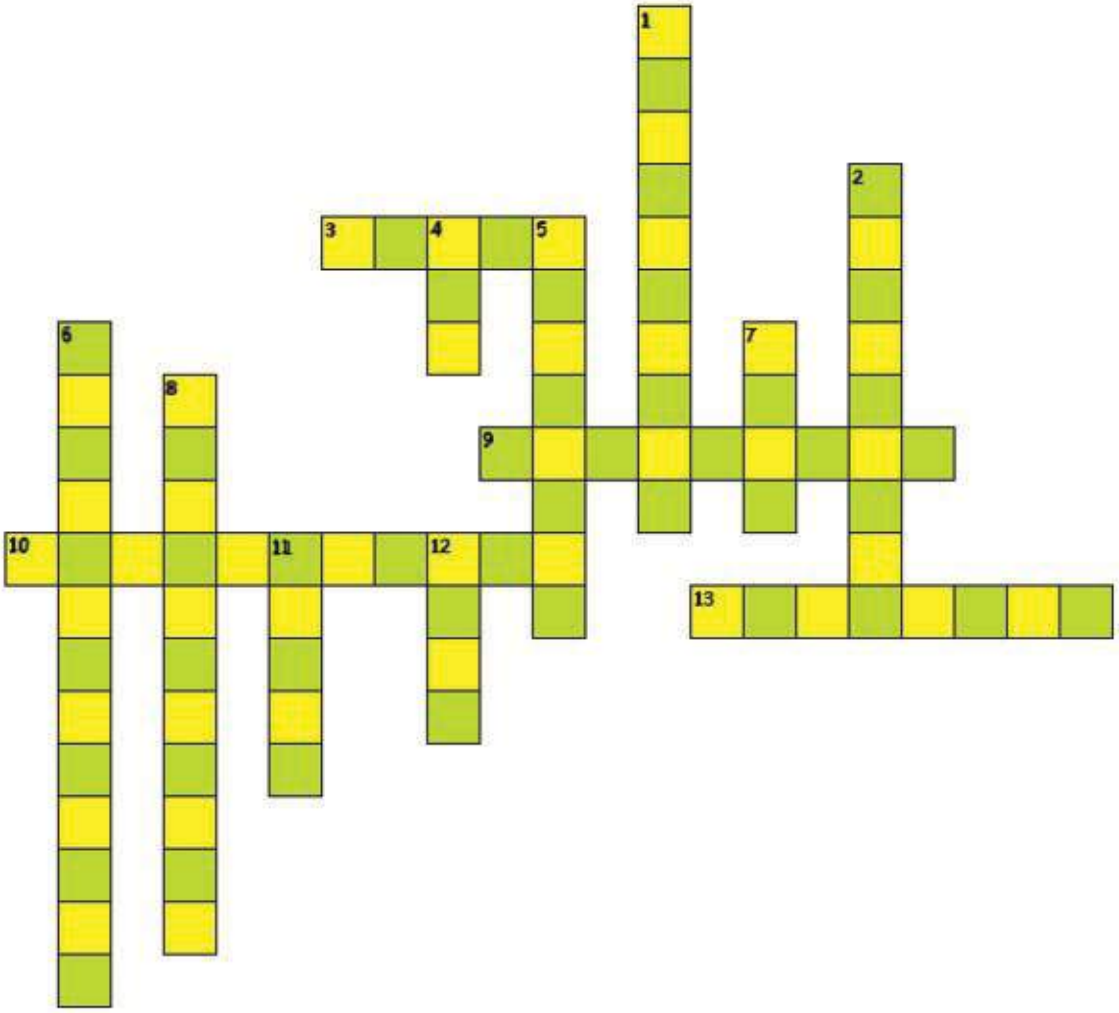
G. Summarize the preparation of a sample to observe in microscope in 4 steps?

a.

b.

c.

d.



Across

3. THE BIGGEST MAMMALIAN ANIMAL IN WATER
9. CONTROLS THE AMOUNT OF LIGHT THAT ENTERS THE MICROSCOPE
10. TOO SMALL TO BE SEEN BY NAKED EYE
13. SMALL ORGANISM SEEN BY MICROSCOPE ONLY

Down

1. IT IS USED TO OBSERVE MICROSCOBIC ORGANISMS
2. PERSON WHO STUDIES BIOLOGY.
4. SUPPORTS THE MICROSCOPE
5. CONTAINS MAGNIFYING LENS YOU LOOK THROUGH IT
6. WHAT DOES MICROSCOPE USED FOR?
7. ROBERT HOOK FIRST OBSERVED ..... CELLS
8. IT IS ENOUGH BIG TO SEE BY NAKED EYE
11. SAMPLE OBJECT PUT ON IT TO OBSERVE
12. SUPPORTS THE MICROSCOPE

CHAPTER 3
CELLULAR ORGANIZATION

The Cell

Do you know that there are lots of small things in your body that have many abilities?

They can eat, respire and remove waste materials as you do. They even help and communicate with each other.

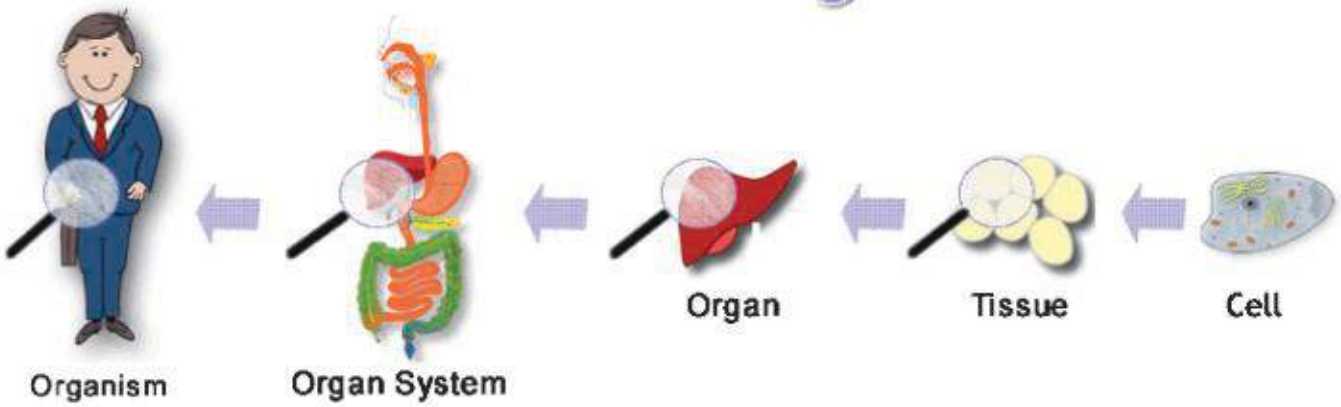
These small and functional units are called as "**cells**". Cells come together and form your body. Not only you, all living things are composed of cells.

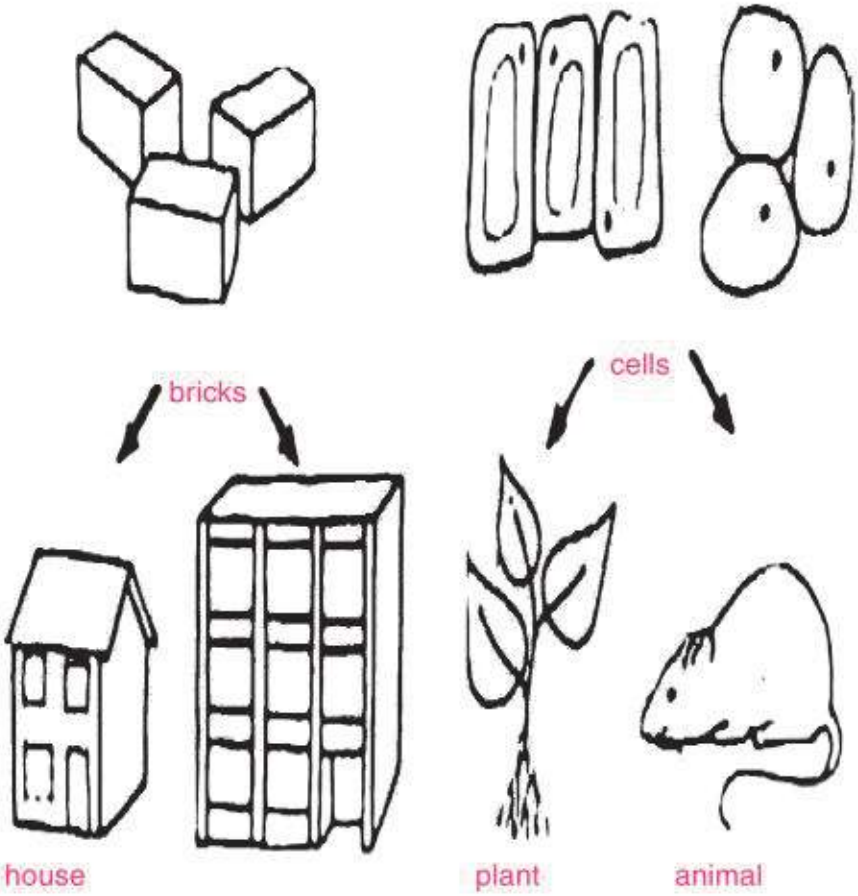
Anton Van Leeuwenhook invented the microscope in the late 1600's, which first showed that all living things are composed of cells.

Also he was the first to see microorganisms. Cell means "**empty room**" but now we know they are not empty.

What are the building blocks of life?

Levels of Cellular Organization





Bricks are non living things. They are the units which make up walls, houses and the other buildings.

The cell is the smallest unit of life that can carry out all the functions of a living thing.

The Cell Theory

M. Schleiden

Matthias Schleiden and Theodor Schwann proposed the cell theory.

The Cell Theory

- All organisms are composed of one or more cells
- The cell is the smallest functional unit of life
- All cells are produced from other cells

T . Schwann

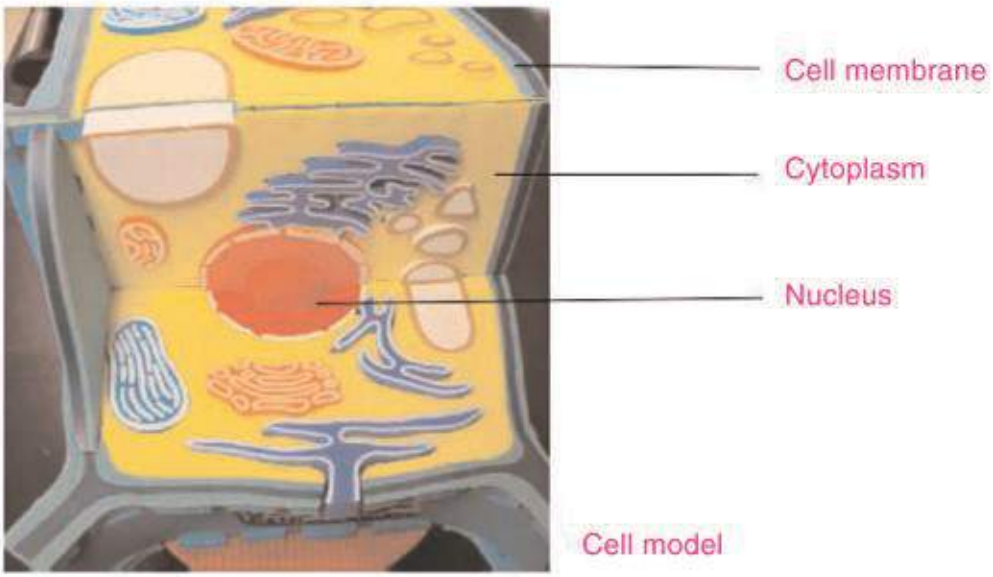
In 1665 Robert Hooke put some cork under his microscope. The cork was made of 'brick - like' units. Hooke called each "brick" as a cell. Cells are the units which make up all living things. The parts of cells can be seen with microscope

The structure of all cells is similar. Every cell has:

a) Plasma membrane (cell membrane) to protects and limits the cytoplasm.

b) A cytoplasm for metabolic activities. Cytoplasm has many organelles which have specific function for life of cell.

c) Genetic material (DNA) to directs metabolic activity and to provides genetic continuity.

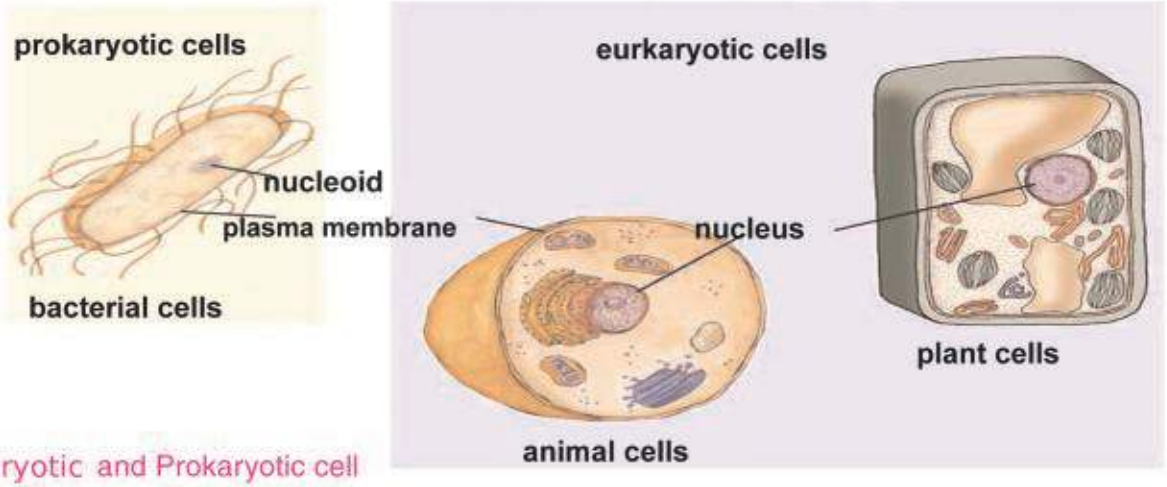


Cell model

Types of Cells

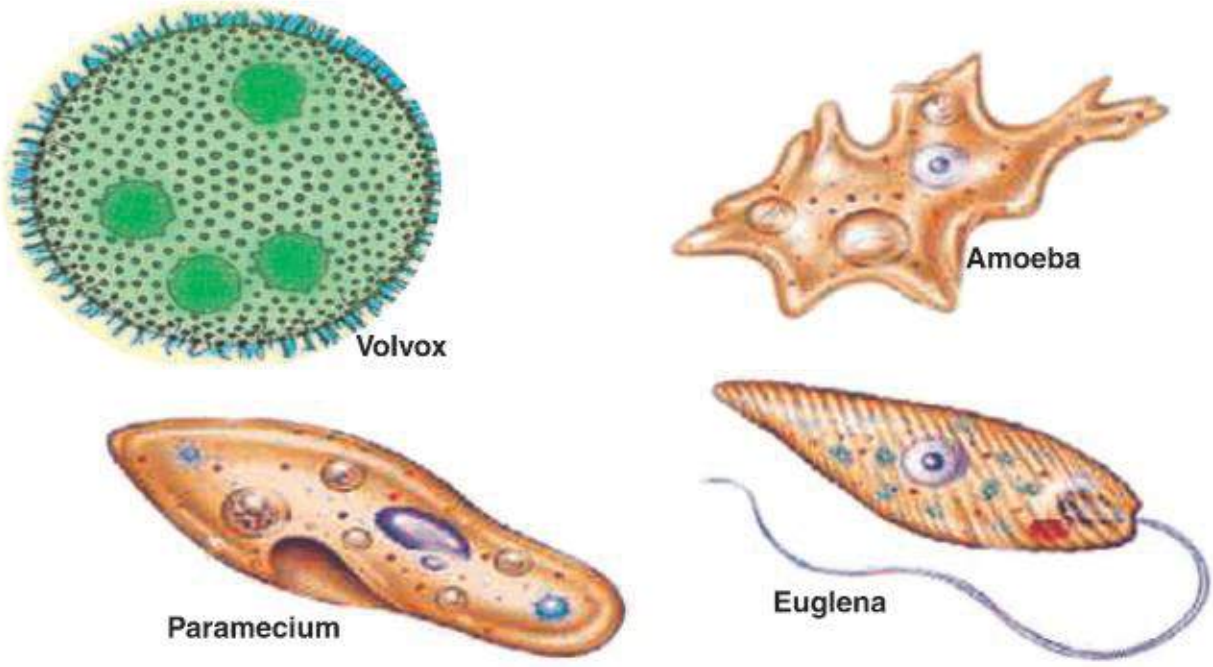
Cells are categorized basically into two groups according to nucleus.

1) **Prokaryotic cells** have no true nucleus and hereditary material is free in the cytoplasm. They lack (don't have) any membranous (with membrane) organelles. Only ribosome is present. ex: (Bacteria)



Eukaryotic and Prokaryotic cell

2) **Eukaryotic cell** types include both single celled or "**unicellular**" organisms like paramecium and amoeba, and **multicellular** organisms like human, animals, plants and fungi. Eukaryotic cells contain a nucleus and many organelles such as mitochondria, endoplasmic reticulums, ribosome, golgi complex, vacuole, lysosome, chloroplast, centrioles, etc.



Examples for eukaryotic cells

In the world, there are many organisms that have only one cell, like bacteria. They are called as "**unicellular organisms.**"

Other organisms are composed of many cells. They are called as "**multicellular organisms**"

Size of organisms depends on number of cells. The cells of ant and elephant are almost the same size. Elephant is larger than ant due to the number of cells.

One single ANT can't stop an Elephant?!!
BUT
Together? What CAN they achieve?!!

The cellular structure

All types of eukaryotic cells have these structures:

1 - Cell membrane **2 -** Cytoplasm **3 -** Nucleus

1- Cell Membrane

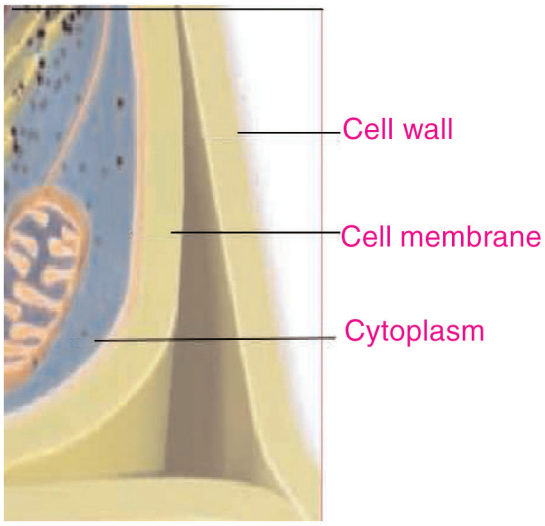
Cell membrane forms the outside boundary that separates the cell from its environment.

•Cell membrane has tiny pores that let substances into and out of the cell.
For example; food, water, oxygen can enter the cell and harmful and waste products can leave.
•Cell membrane gives regular shape to the cell.
•Cell membrane protects the cell from external effects.

Cell membrane holds parts of cell as a bag

Cell wall is a rigid (very hard) layer of nonliving material that surrounds the plant cells and some other organisms. And it has some distinctive features like;

•Protects and supports the plant cell.
• It is not present in animal cells.
• Gives strength to the plant cell.
•Has big pores and let passage of big molecules such as starch and protein.



2 - Cytoplasm

The gel–like structure that is placed between plasma membrane and nucleus is called as cytoplasm.

- Cytoplasm contains cytosol (liquid part of cytoplasm) and organelles. 90% of cytosol is water.
- All organelles and the nucleus are embedded in cytoplasm.

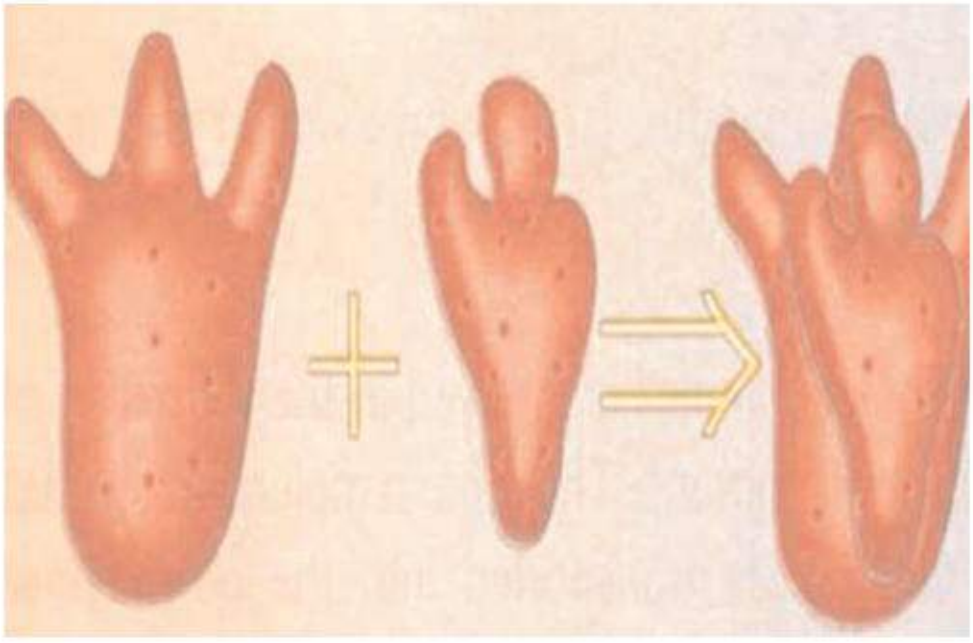
Cytoplasm = Cytosol + organelles

Organelles

An organelle is a small structure within the cell (organelle literally means 'tiny structure'). Some examples of cell organelles are …

a. Ribosomes – "protein factory" they make proteins and pass it to the endoplasmic reticulum.

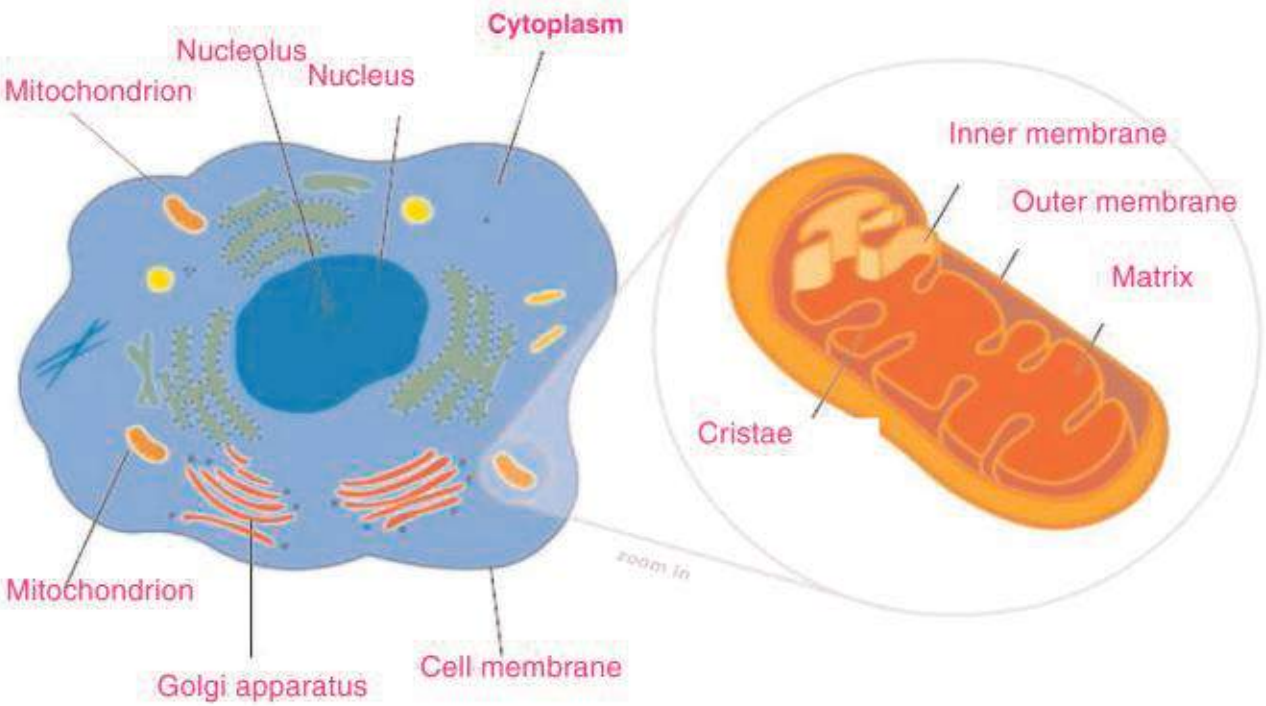
- They are the smallest organelles of cells.
- Ribosomes are non-membranous organelles; for that reason prokaryotic and eukaryotic cells have ribosomes.
- Some ribosoms can be found freely in cytoplasm.



Ribosome found in all cells either eukaryotic or prokaryotic

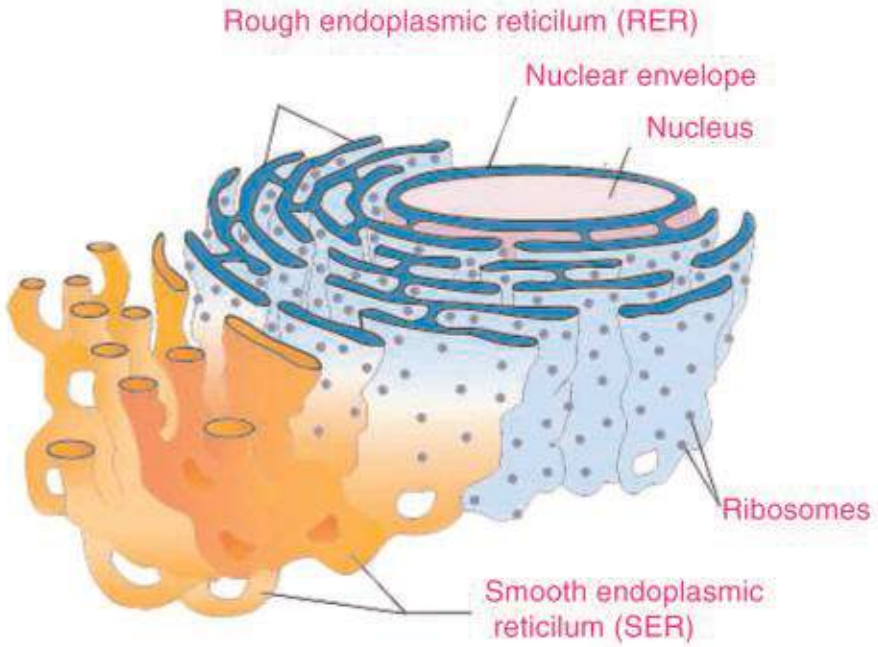
b. Mitochondria (sing. mitochondrion)

"**POWERHOUSE**" produce most of the energy which cells need. They can reproduce by themselves.



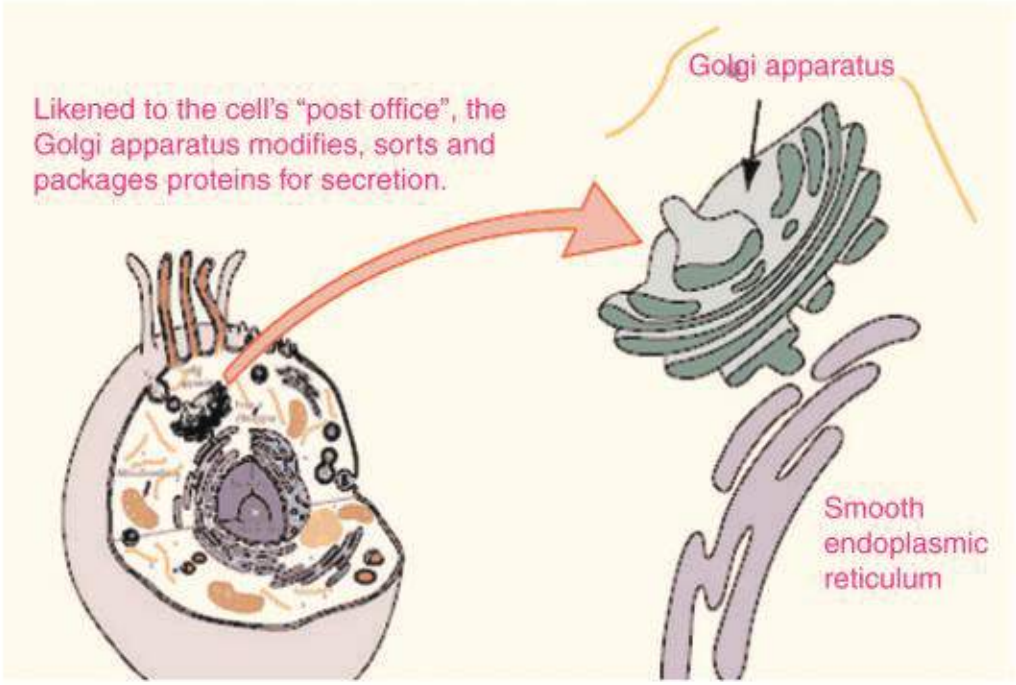
c. Endoplasmic Reticulum

It consist of long tubules within cytoplasm. It carries proteins from one part of the cell to another.



d. Golgi Bodies

"**Mailroom**" they receive proteins, package and distribute them to other parts of the cell. Also release materials to the outside of the cell.



e. Plastids

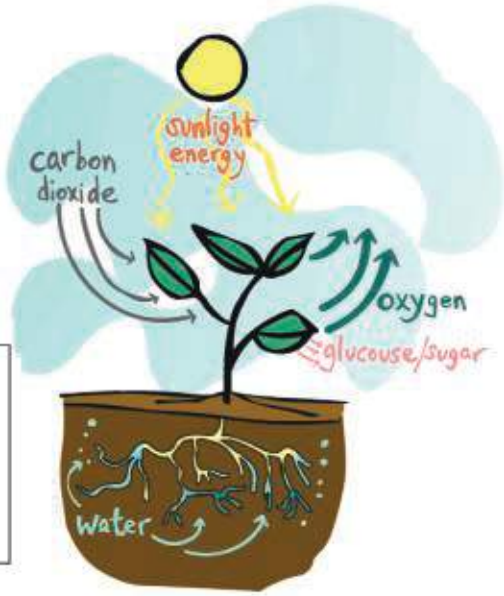
Plastids are special organelles that produce and store food material in plant cells. They also give different color to plants. Only plant cells have plastids.

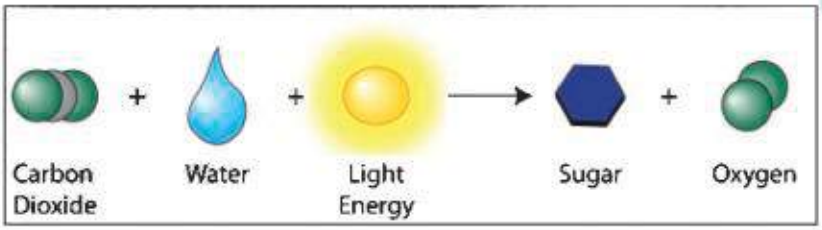
There are three main types of plastids:

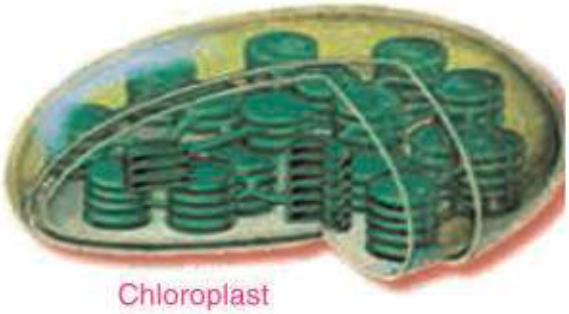
Chromoplasts contain pigments that give color to flowers and fruits. Such as, orange color of a carrot, red color of an apple.

Leucoplasts are colorless plastids that do not have any pigment. Their main function is the storage of starch.

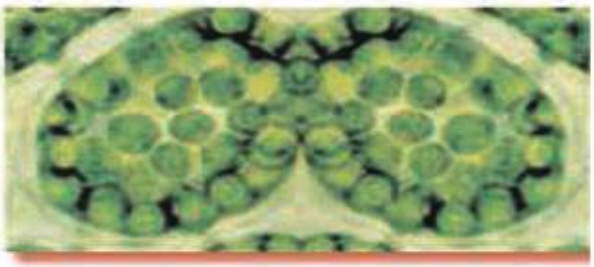
Chloroplasts are found mainly in leaf cells. They are the most important plastids, because of photosynthesis. Cells produce oxygen and foodstuffs by means of photosynthesis.







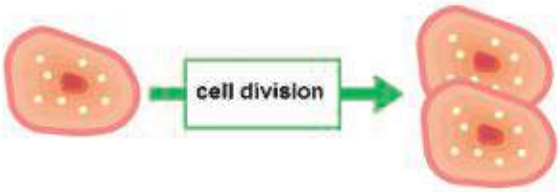
Chloroplast

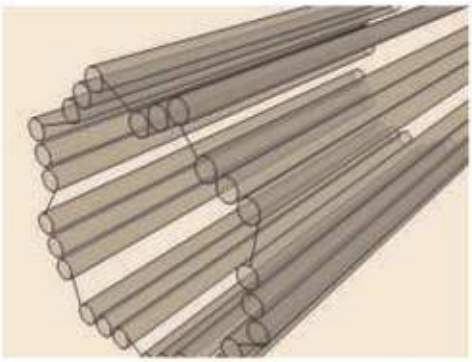


Chlorophyll

Chlorplast found in green plants and contains green colored chlorophyll

f. Centrioles - are found in human body cells and animal cells. Help the cells to divide.

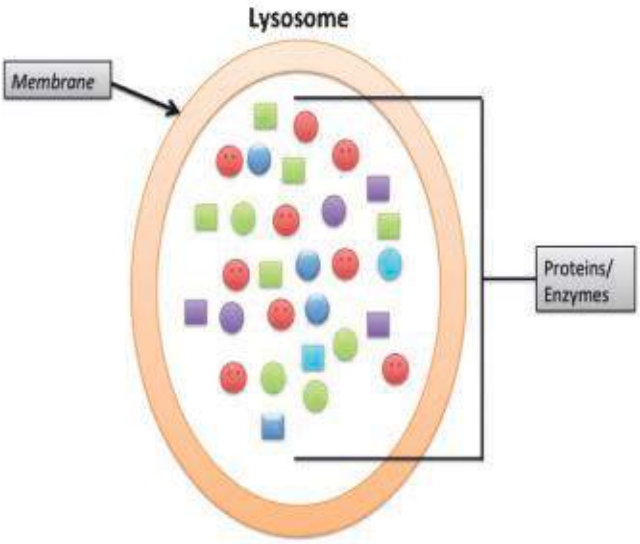




g. Lysosome

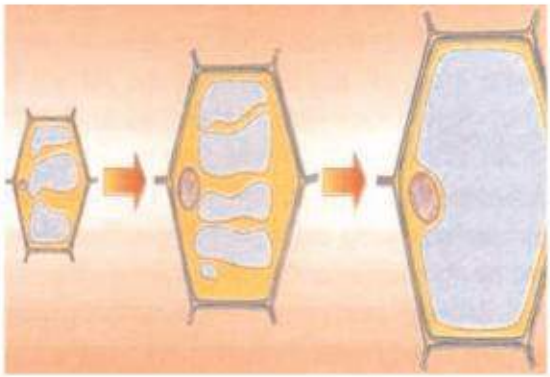
The main function of lysosome is the digestion of food stuffs and foreign substances inside of the cell.

They are single membranous vesicles that contain digestive enzymes.



Lysosome Structure

h. Vacuoles – "**storage tanks**" water filled sac in cytoplasm.
Most plants have one large vacuole some animal don't have a vacuole others do. Vacuoles can store food wastes salts and water. The size of vacuole enlarges during aging.



Vacuole Full

Vacuole empty

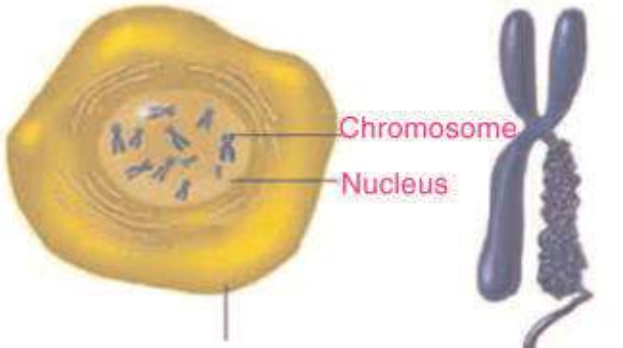
3- Nucleus (Brain or President)

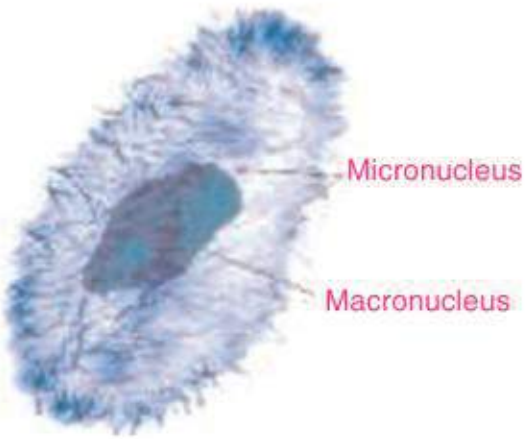
Nucleus is one of the three main parts of a cell. In most cases, nucleus (plural nuclei) is spherical or oval in shape.

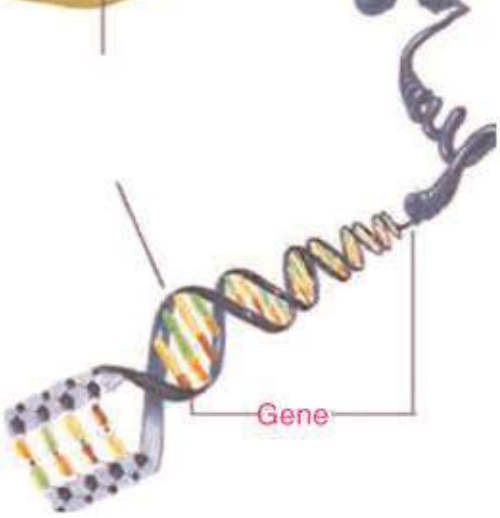
Nucleus is the control center of cells.
All information about cell is hidden in nucleus in genetic material (DNA).
During the cell division all information of cell passes to a new generation by genetic material.

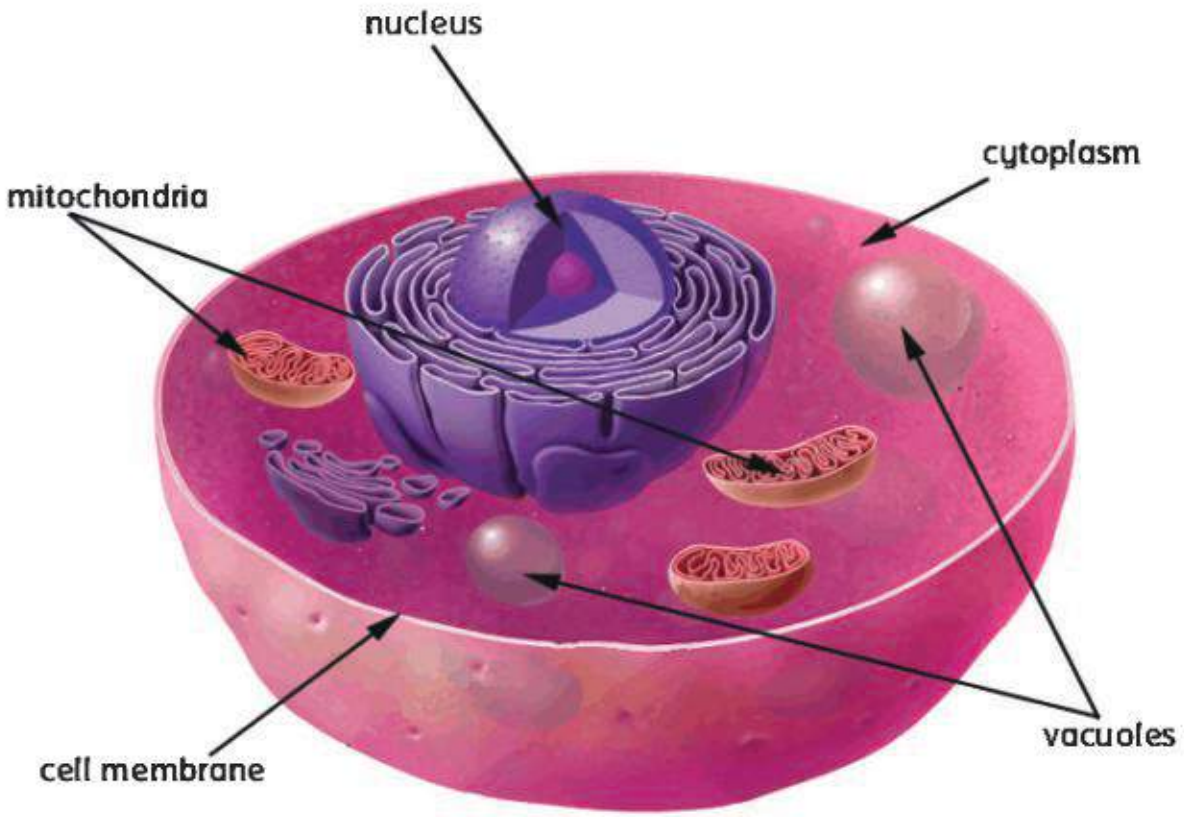
Generally eukaryotic cells have one nucleus but mature red blood cells do not have nucleus. Also, some cells have more than one nucleus.

For instance, paramecium (a kind of unicellular organism) has two nuclei.

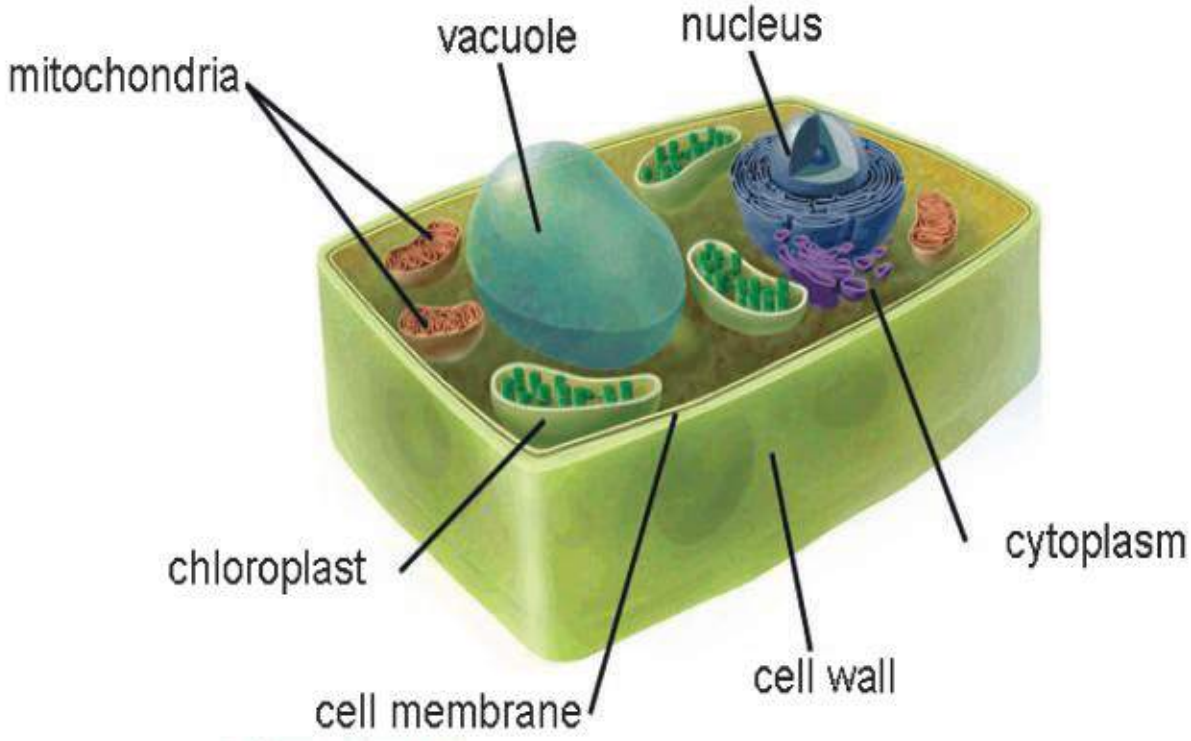








Typical animal cell



Typical plant cell

Comparison of plant and animal cells.

Plant Cells	Animal Cells
1- Have cell membrane	1- Have cell membrane
2- Have cell wall	2- No cell wall
3- Have large vacuoles	3- Have many small vacuoles
4- No contrioles	4- Have centrioles
5- Have plastids	5- No plastids
6- Can produce their own food	6- Can not produce their own food
7- Generally comered shaped	7- Oval shaped

Both have these organeses: ribosomes, mitochondria, ER, Gorgi Complex, Lysosome, Vacuole and cell membrane

Cell Organization

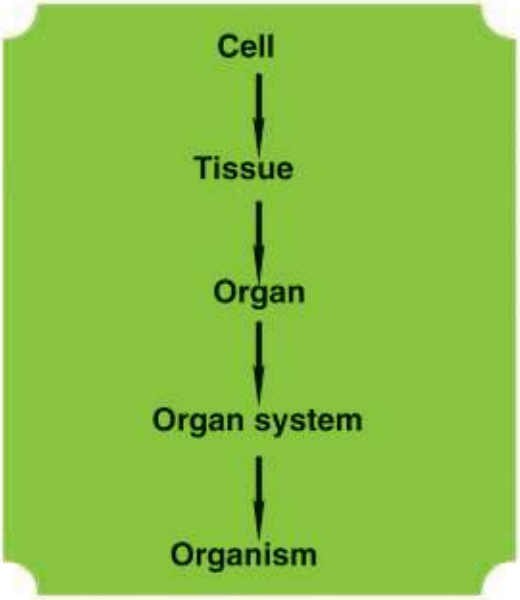
In multicellular organisms, a group of closely associated similar cells are adapted to carry out specific functions and form tissues.

Each kind of tissue is composed of cells with a characteristic size, shape and arrangement. Some tissues are specialized to transport materials, whereas others contract to enable organisms to move.

Tissues associate to form organs such as heart or stomach. Similar functional **organs** come together and form **systems**.

For example, stomach, intestine and mouth form the digestive system.

Lastly, all systems such as circulatory system, nervous system, digestive system and etc. associate to form organisms.

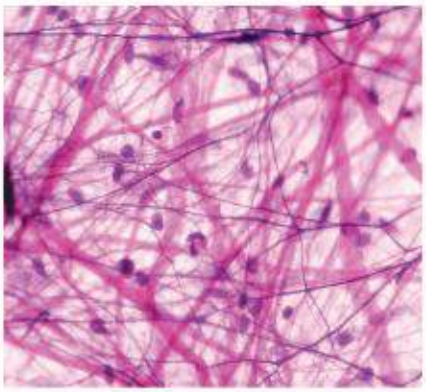


If we summarize that:

Cells	**The basic unit of structure of all living things**
Tissuess	**Each group of specialized cells are organized into tissues**
Organs	**A group of tissues that work together to perform special functions**
Organ System	**A group of organs that work together to make an Organ System**
Organism	**All organisms carry out life processes and the different organs to keep the organism alive**

Cells Working Together

A **tissue** is a group of cells that work together to perform a specific job. The material around and between the cells is also part of the tissue. The cardiac muscle tissue, shown in figure, is made of many cardiac muscle cells. Cardiac muscle tissue is just one type of tissue in a heart.

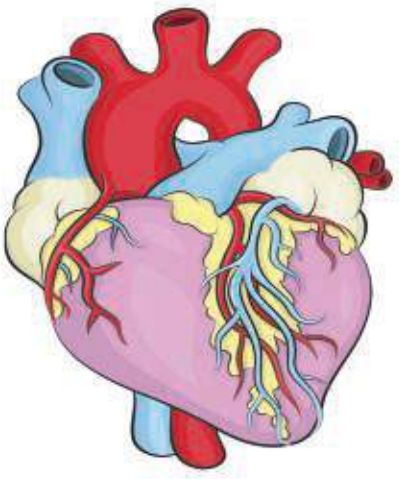


Animals have four basic types of tissues: nerve tissue, muscle tissue, connective tissue, and protective tissue.

In contrast, plants have three types of tissues; transport tissue, protective tissue, and ground tissue. Transport tissue moves water and nutrients through a plant. Protective tissue covers the plant. It helps the plant retain water and protects the plant against damage.

Tissues Working Together

A structure that is made up of two or more tissues working together to perform a specific function is called an **organ**.



For example, your heart is an organ. It is made mostly of cardiac muscle tissue. But your heart also has nerve tissue and tissues of the blood vessels that all work together to make your heart the powerful pump that it is.

Plants also have different kinds of tissues that work together as organs. A leaf is a plant organ that contains tissue that traps light energy to make food. Other examples of plant organs are stems and roots.

Organs Working Together

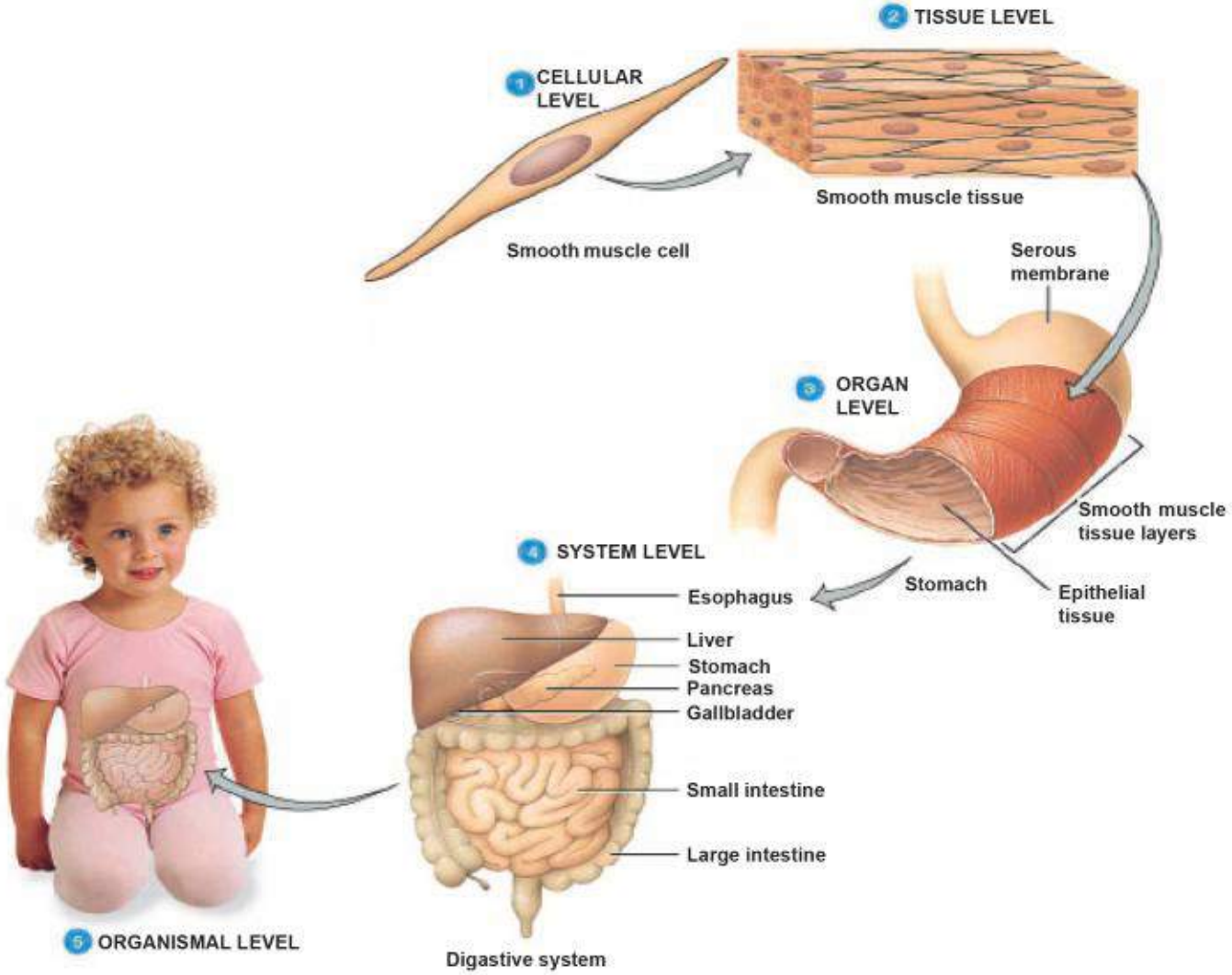
A group of organs working together to perform a particular function is called an **organ system.** Each organ system has a specific job to do in the body.

For example, the digestive system is made up of several organs, including the stomach and intestines. The digestive system's job is to break down food into small particles. Other parts of the body then use these small particles as fuel. In turn, the digestive system depends on the respiratory and cardiovascular systems for oxygen.

Digestive system

Organism

Anything that can perform life processes by itself is an **organism.** An organism made of a single cell is called a **unicellular organism.** Bacteria, most protists, and some kinds of fungi are unicellular.



SELF CHECK
CELLULAR ORGANIZATION

A. Key Terms

Cell
Organelle
Chlorophyll
Organ
Prokaryotic cell
Photosynthesis
Tissue
Organism

B. Review Questions

1. Write differences between plant and animal cells?
2. Write the levels of organization in order and give an example for each?
3. Numarate the mebraneous organelles of eukaryotic cells?
4. Write the functions of cell membrane?
5. Write differences between eukaryotic cell and prokaryotic cell?

C. True or False

1. Paramecium is an eukaryotic unicellular organism.
2. All organisms consist of number of cells.
3. Ribosome produce energy for cell.
4. Heart is an example for organism.
5. Plant cells can produce their own food.

D. Fill in the blanks correctly

1. A group of organ working together to perform a particular function is called as an ..... .
2. The..... is the smallest functional unit of life.
3. ..... receive proteins, package and distribute them to the other parts of cell.
4. Cytoplasm = ... + ...
5. Multicellular organisms consist of .....

E. Multiple choice

1. Which one of the followings organelles is more active during exercises?

A) Lysosome
B) Ribosome
C) Mitochondria
D) Nucleus

2. In which of the followings orgenelle and its function paired correctly?

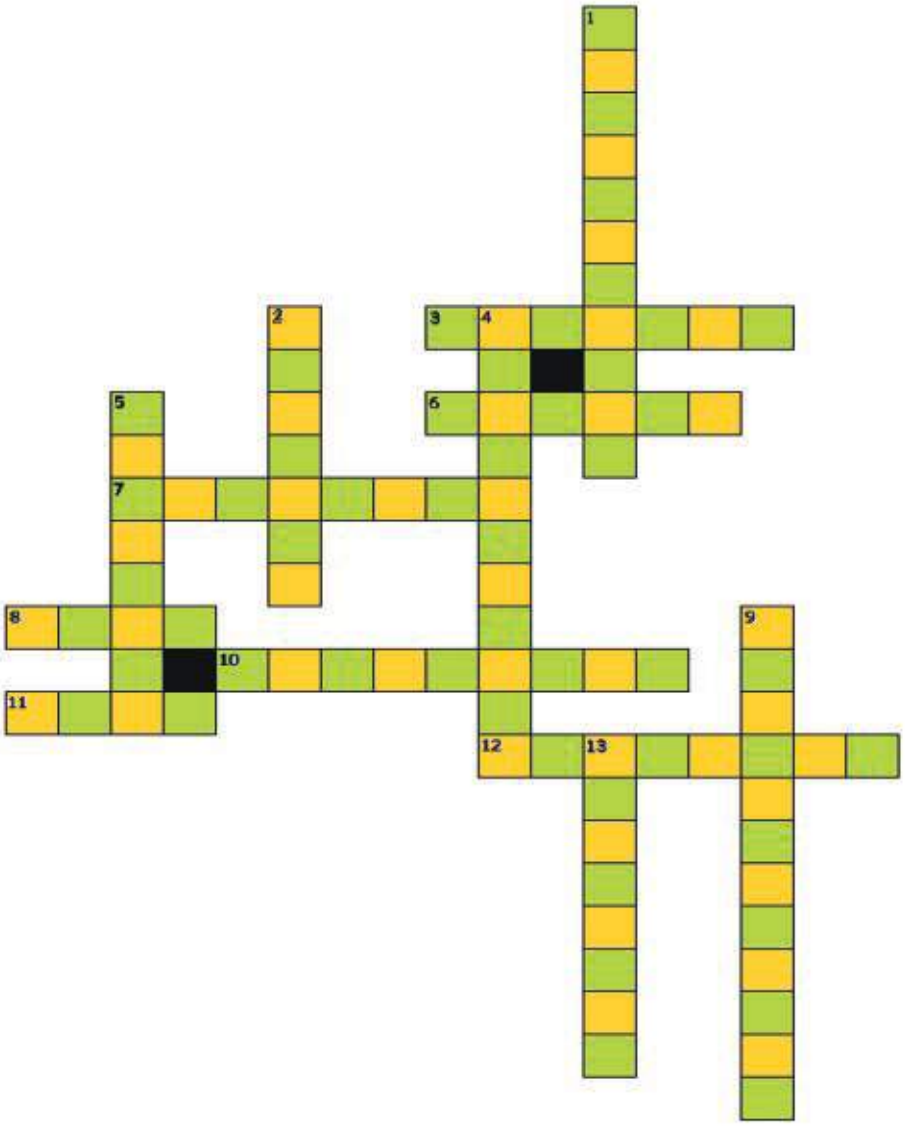
A) Ribosome - Carries proteins and others
B) Vacuole - Produce protein
C) Endoplasmic reticulum - Release materials to the outside
D) Centriole - Help cells to divide

3. _____ are come together and forms your body, not only your body all living things are made up of these small units of life.

A) Tissues
B) Blocks
C) Cells
D) Microorganisms

4. Which one of the organelles is found only in plant cells?

A) Plastids
B) Cell membrane
C) Centriole
D) Vacuole

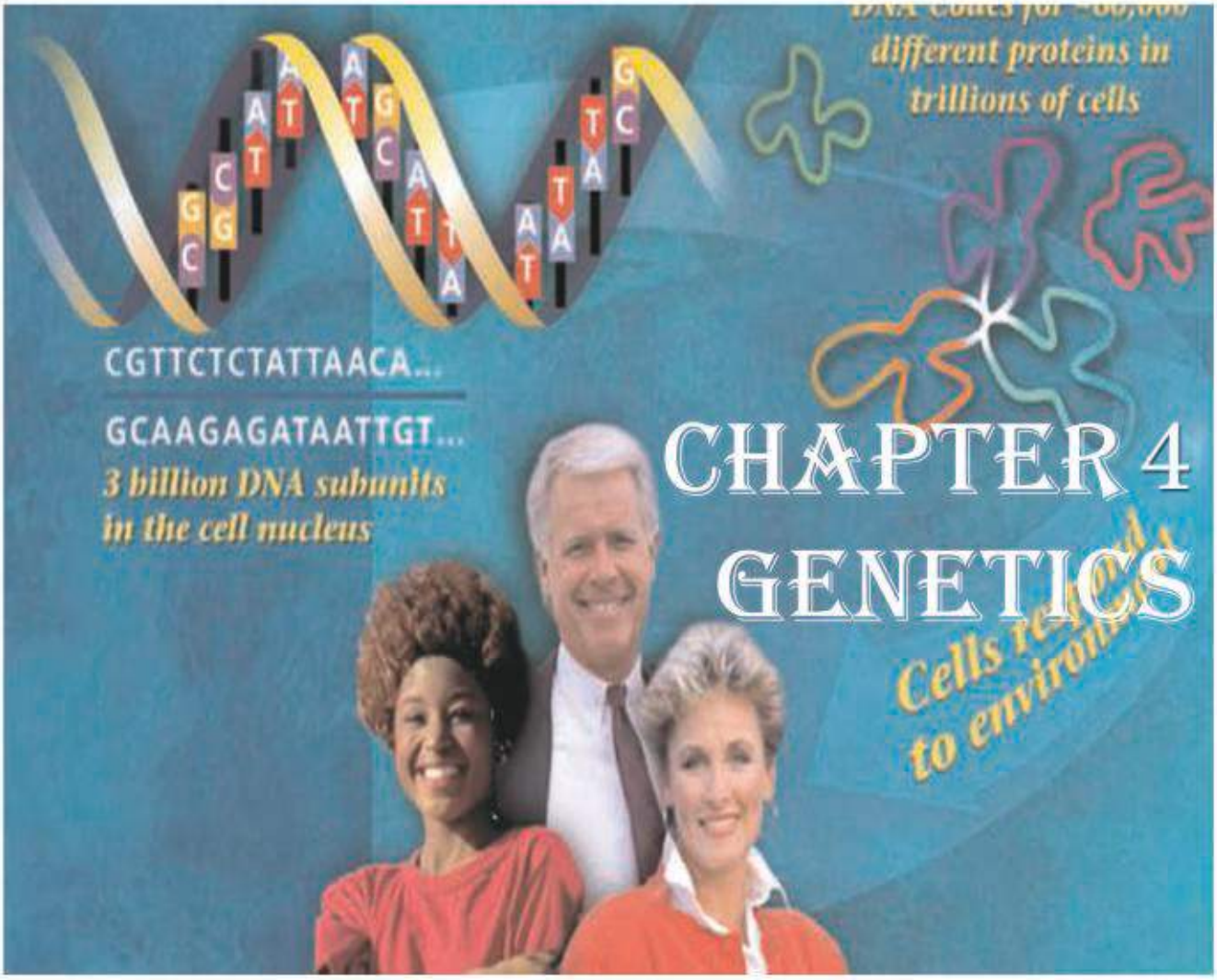


Across

3. CONTROL CENTER OF CELL
6. A GROUP OF SIMILAR CELLS
7. STOMACH OF CELL
8. A PLANT ORGAN
10. LIQUID PART OF CELL
11. BUILDING BLOCK OF LIFE
12. PRODUCE PROTEIN

Down

1. IT GIVES RED COLOR TO THE APPLE
2. STORAGE TANKS
4. MADE UP OF ONLY ONE CELL
5. PROTECTS THE PLANT CELL
9. POWER HOUSE OF CELL
13. A KIND OF PROKARYOTIC CELL



Do you look more like your father or grandfather? Do you have your father's eyes? What about Uncle Adam's cheekbones? Brown eyes, blue, green, or gray; black, brown, blond, or red hair–these are just a few examples of the traits that are inherited from parents. What genetic principles account for the transmission of such traits from parent to offspring? The answer is the gene.

What is genetics?

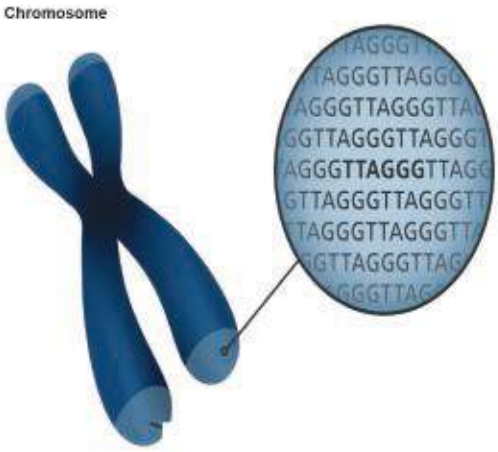
Genetics is the study of genes. In other words, it is the branch of biology that deals with the study of heredity. A **gene** is a segment of DNA that codes a particular trait. It is the basic unit of hereditary. Genes are located on chromosomes. They control an organism's body form and function. The different forms of a trait that a gene may have are called **alleles**.

Some alleles can be **dominant** and others can be **recessive**. If you get a dominant gene from either of your parents, you will look more like the one from whom you received that gene.

Wherever you go, look around you. You don't have the same skin color, the same kind of hair, or the same height as everyone else. Why do you resemble some people but do not look like others at all?

The molecular basis of inheritance

Why was the alphabet one of the first things you learned when you started school? Letters are a code that you need to know before you learn to read.



A cell also uses a code that is stored in its hereditary material. The code is a chemical called **deoxyribonucleic acid**, or **DNA**. It contains information for an organism's growth and function.

DNA is stored in cells that have a nucleus. When a cell divides, the DNA code is copied and passed to the new cells.

In this way, new cells receive the same coded information that was in the original cell. Every cell that has ever been formed in your body or in any other organism contains DNA.

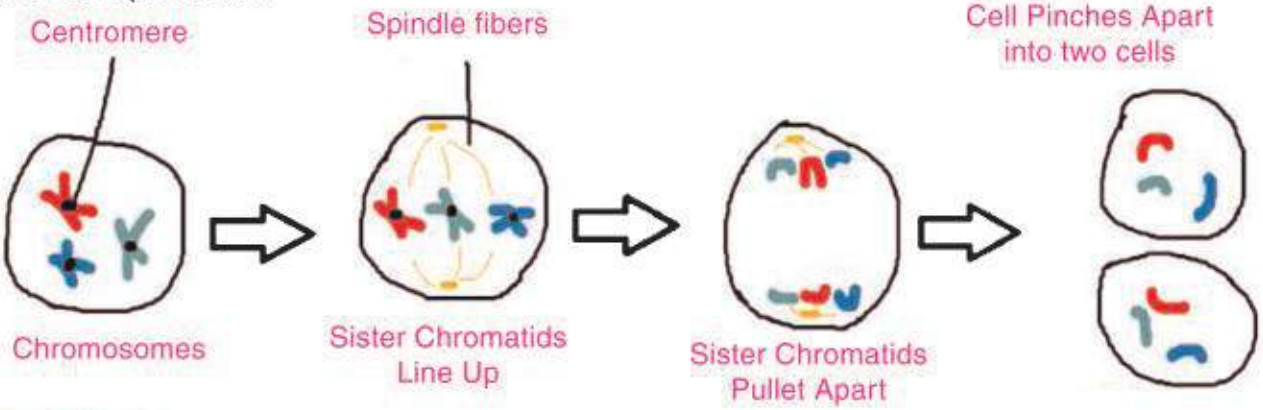
Most of your characteristics, such as the color of your hair, your height, and even how hings taste to you, depend on the kinds of proteins your cells make. DNA in your cells stores the instructions for making these proteins. And DNA in each body cell is identical because each cell come from another cell by means of cell division. In this way, new cells receive the same coded information that was in the original cell. Every cell that has ever been formed in your body or in any other organism contains DNA.

Cell Division

There are two kinds of cell division according to type of cell.

1. Mitosis

Mitosis is a kind of cell division in which a parent cell divides into two daughter cells. In mitosis, parent and daughter cells have the identical genetic makeup. In multicellular organisms, mitosis enables growth and development and repair of damaged organs. But in unicellular organisms, it is a kind of asexual reproduction.



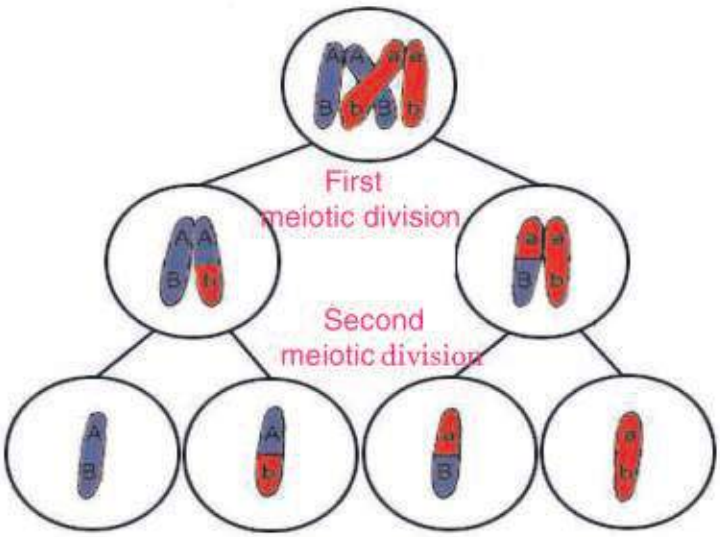
Mitosis stages

2. Meiosis

Meiosis is a kind of cell division that reduces the chromosome number by half and produces gametes. Gametes, also called **reproductive cells**, are sperm and eggs.

Meiosis produces gametes. Each gamete has a unique genetic makeup. So meiosis provides great variety and diversity in off-spring.

Crossing over during synapsis of prophase



Species have different numbers of chromosomes. Humans have 46, mice 40, cows 60, sugar cane 80 and dogs have 78 chromosomes. The number of chromosomes is not what makes each organism unique, but rather the information specified by the genes in the chromosomes.

What is genetic engineering?

Genetic engineering is the process of manually adding new DNA to an organism. The goal is to add one or more new traits that are not already found in that organism. Examples of genetically engineered (transgenic) organisms currently on the market include plants with resistance to some insects, plants that can tolerate herbicides, and crops with modified oil content.

SELF CHECK
GENETICS

A. Key Terms

Genetics
Chromosome
Mitosis
Gene
DNA
Meiosis

B. Review Questions

1. What is the material which transmit traits from parents to offspring?
2. What is the function of DNA?
3. Do you look like your father or mother? Why?
4. Write the importance of mitosis for multicellular organisms?
5. Write the importance of meiosis?

C. True or False

1. In mitosis parent cell and doughter cell have identical genetical make up.
2. Eggs are formed by meiosis.
3. Unicellular organisms reproduce by meiosis.
4. Genetics is study of cell.
5. We inherit eye color from our parents.

D. Multiple choice

1. How many cells formed at the end of mitosis?

A) 2
B) 3
C) 4
D) 5

2. Genes located on .....?

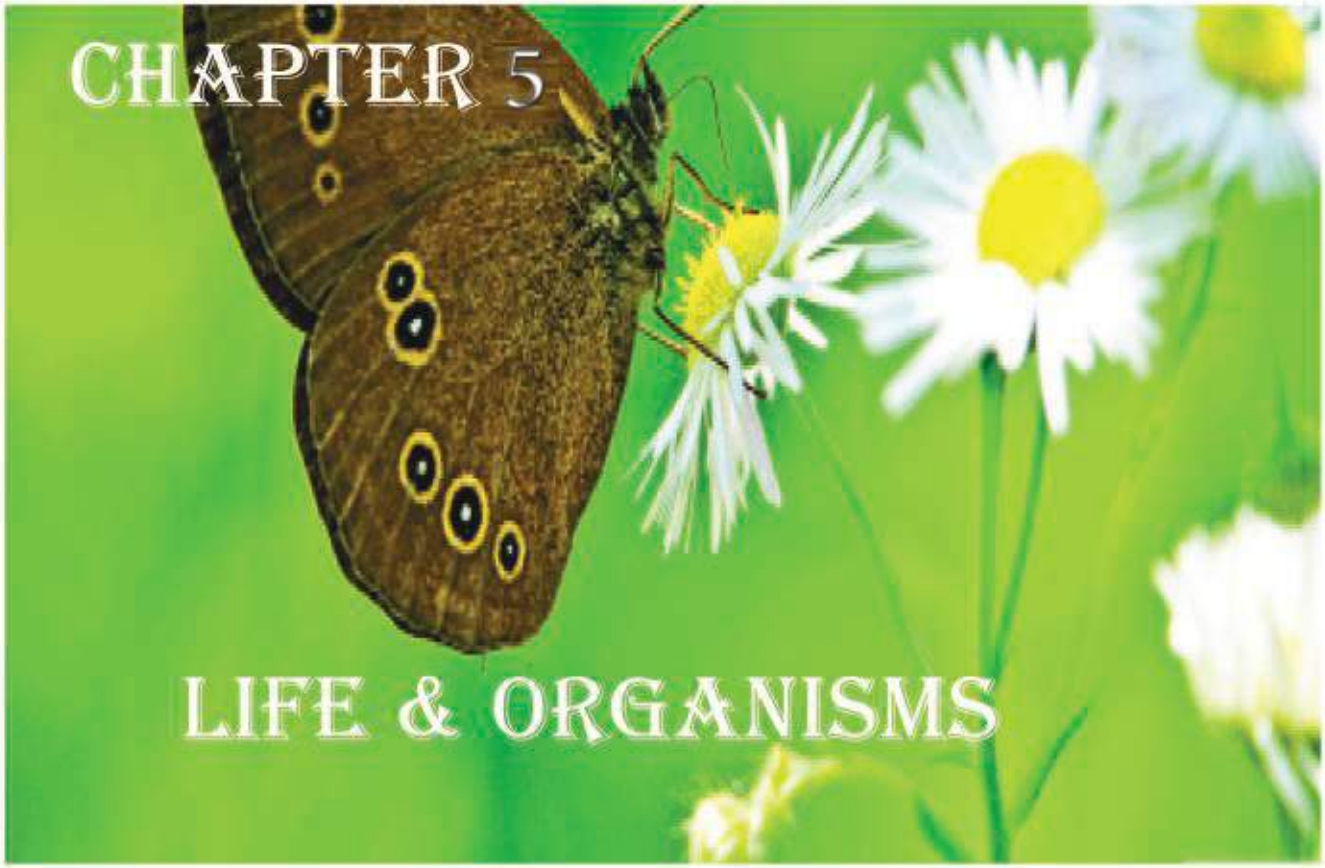
A) Cell
B) Meiosis
C) Cell membrane
D) Chromosome

3. Which of the following is true for meiosis.

A) 2 cells are formed
B) Identical cells formed
C) 4 identical cells are formed
D) 4 different cells are formed

4. Which of the followings not inherit from parents?

A) Height
B) Hair color
C) Strong muscle
D) Eye color



CHAPTER 5

LIFE & ORGANISMS

Life is a characteristic that distinguishes objects that have signaling and self-sustaining processes from those that do not, either because such functions have ceased (death), or else because they lack such functions and are classified as inanimate. **Biology** is the science concerned with the study of life.

Common characteristics of living things

In nature, all living things have some common properties that share similar characteristics.

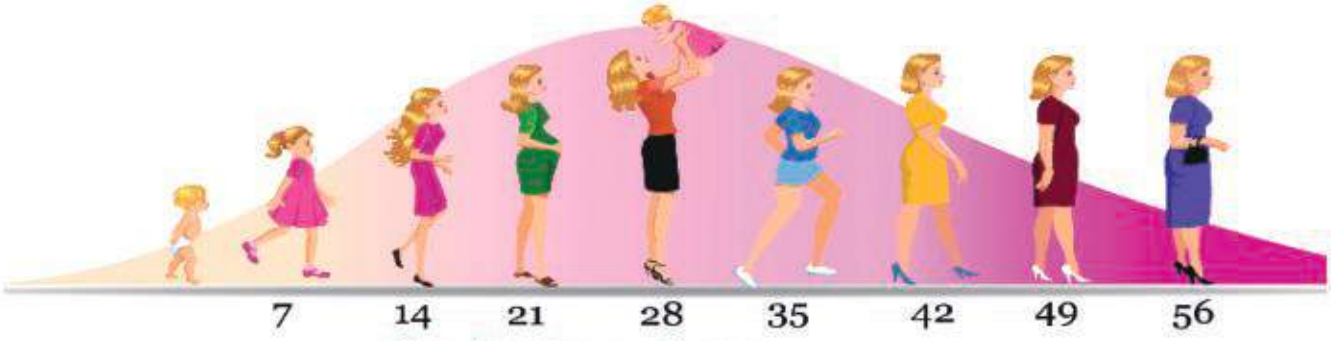
a) Cellular Organization

All living things are made up of cells. Some of them are composed of only one cell (unicellulars), others are made up of many cells (multicellulars). Cells are the basic units of life. Cells like bricks which are used to build house.

The largest cells are birds' eggs.

b) Growth

All living things grow. Growing in multicellular organisms is performed by increasing in number of cells. For example a 40 kg teenager has about 40 trillion cells while a 80 kg man has about 80 trillion cells. Growing of plant is unlimited. Human or animals grow until reach a certain size. Then they stop growing.



Growth and aging in human

c) Movement

All living things move. Some parts of plant can move. Animals usually move their whole bodies. Plant movements are very slow, their leaves move but they cannot move from one place to another. Most animals can move from one place to another place to find their food.

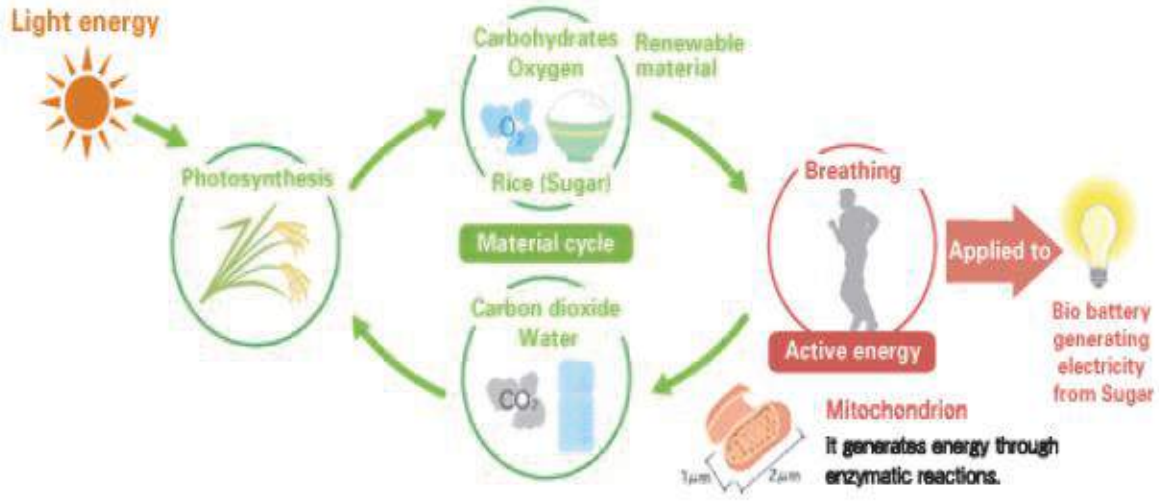
d) Sensitivity

All living things are sensitive. They detect and response to changes in their environments. Plants grow towards light. A bat detect his food is ready. It responds by flying towards the food. We detect changes in our body and in our environment. We feel hunger, thirst, pain or pleasure.

Sensitivity in different organisms

e) Energy

All living things need energy. They use energy to maintain the organization, growth and reproduction.Green plants get energy from sunlight by **photosynthesis**. Other organisms get energy from food stuffs. They can eat plants, animals or both.



f) Excretion

Excretion is the removal of waste substances from the body. All organisms excrete waste materials from the body. Waste substances are unneeded or harmful materials for living things. They are produced during life activities. These substances must be removed from the body. Each organism excretes waste materials by different ways. For example:We excrete excess water, salt and some harmful materials by sweating.

Excretion in human (sweating) and in plants (guttation)

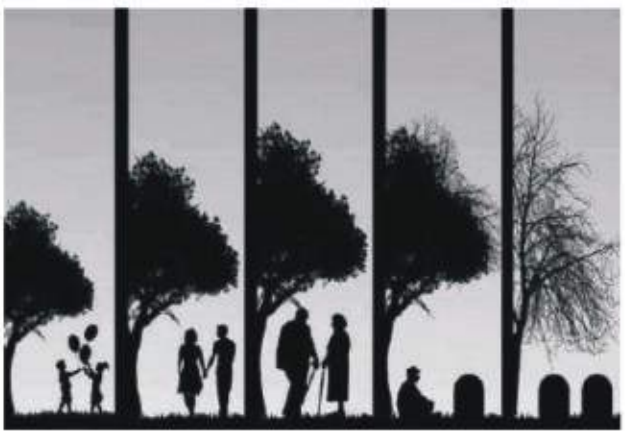
g) Nutrition

All living things have to feed to survive. They need food and water for production of energy. Human and animals eat plants or other organisms but plants don't need other organisms to produce energy, they can produce their own food.

h) Reproduction

Reproduction is producing new organisms similar to their parents. All living things must reproduce for continuity of their generation. Organisms don't need reproduction to survive but they need it for continuity of their generation.

i) Death



Death is the cessation of all biological functions that sustain a living organism. Commonly death comes by biological aging, predation, malnutrition, disease, accidents or trauma resulting in terminal injury. Bodies of living organisms begin to decompose shortly after death.

The most common cause of human deaths in the world is heart disease, followed by stroke and other cerebrovascular diseases, and in the third place lower respiratory infections.

SELF CHECK
LIFE & ORGANISMS

A. Key Terms

Growth
Reproduction
Sensitivity
Excretion
Movement
Cell

B. Review Questions

1. Explain how plants move?
2. Numarate the common charactheristics of living things?
3. Give two examples for excretion.
4. Do plants need to take food from environment?
5. How can organisms continue their generation?

C. True or False

1. Organisms need reproduction to survive.
2. Excretion is the removing of wastes from body.
3. All Living organisms grow, age and die.
4. All Living organisms give responses to changes in their environment.
5. Cells are basic units of life.

D. Fill in the blanks correctly

1. We excrete excess water, salt and some harmful materials by ..... .
2. The most common cause of human deaths in the world is ..... .
3. ..... in plants is unlimited.
4. All living things must ..... for continuity of their generations.
5. Plants get energy from ..... .

E. Multiple choice

1. Which of the following is not common property of living things?

A) Walking
B) Excretion
C) Movement
D) Reproduction

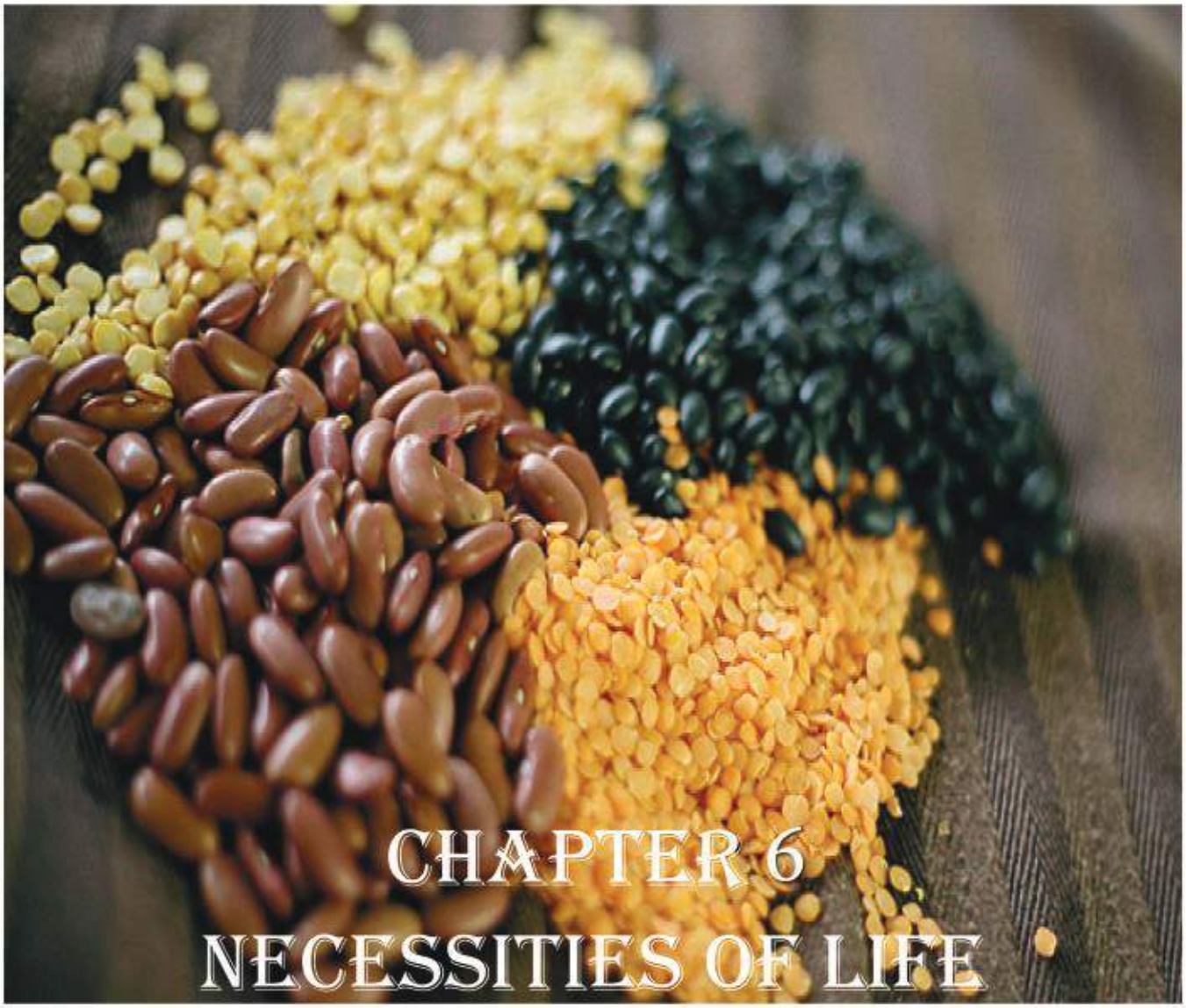
2. Organisms don`t need _____ to survive but they need it for continuity of their generation.

A) Sensitivity
B) Energy
C) Nutrition
D) Reproduction

F. Find the hidden terms in puzzle

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

ENERGY
EXCRETION
GROWTH
MOVEMENT
NUTRITION
ORGANISM
REPRODUCTION
SENSITIVITY



CHAPTER 6
NECESSITIES OF LIFE

The Incredible Human Machine

Even now, in the age of technology, the human body is definitely the most complicated machine in the world, because it performs amazing feats of engineering, chemistry and physics.

There is a perfect division of labor among body parts. Each part of the body has a specific function. With our bodies, we see, hear, breathe, walk, run and sense pleasure. Our bones, muscles, arteries, veins and internal organs are organized according to a marvelous design. When we examine this design in detail, we find even more amazing facts.

A building is built of structural units called bricks. Similarly, we are built of our own structural units-**cells**. Although cells are very tiny (approximately one-thousandth of a millimeter), they are the structural units that form our body and everything in it. They are able to unite into higher-level organized structures, such as bones, liver, skin and eye. Since cells are able to form different organs, they ought to differ one from another as well, and that is also true.

These organs, in turn, form different systems. Since there are multiple functions for a human to perform, careful attention to specialization is required. It is very unlikely that your teacher, being a biologist, would be as good as your chemistry teacher at teaching chemistry to you. Similarly, systems that are specialized to perform respiration are unable to also perform digestion.

That's why the human organism has many complex systems, such as the digestive system, circulatory system, respiratory system, immune and lymphatic systems, urinary system, integumentary system, skeletal system, muscular system, nervous system, endocrine system, and reproductive system.

In the average life span, your heart beats about 3 billion times and pumps about 300 million liters of blood, you blink your eyes 415 million times, you produce 40 thousand liters of urine, 145 liters of saliva, 950 kilometers of hair, 28 meters of finger nails, 2 meters of nose hair, 19 kg of dead skin cells and you walk about 22,000 kilometers.

Why do you eat?

Look around yourself. Cars need gasoline to move. A television needs electricity to work. Gasoline and electricity are the energy types which are used by these devices. In the same way that a television needs electricity to work, you need food to carry out your daily activities, because the energy and nutrients you need is stored in the food.

There are six kinds of of nutrients in food: proteins, carbohydrates, fats, vitamins, minerals, and water. Proteins, carbohydrates and fats are used as energy sources. Water, minerals and vitamins do not provide energy. We need them for the regulation of normal body functions.

You are what you eat. The food you eat supplies materials for the production of new cells, which become part of your body. It also supplies energy, which allows you to do the things you want to do.

Bioenergetics

All living things require energy because life processes involve work. Energy is the capacity to do work. Cells need energy to grow and reproduce, but even non-growing cells need energy to survive.

Sun is the source of energy almost all organisms depend on. In photosynthesis, plants and other photosynthetic organisms capture solar energy and convert it to chemical energy.

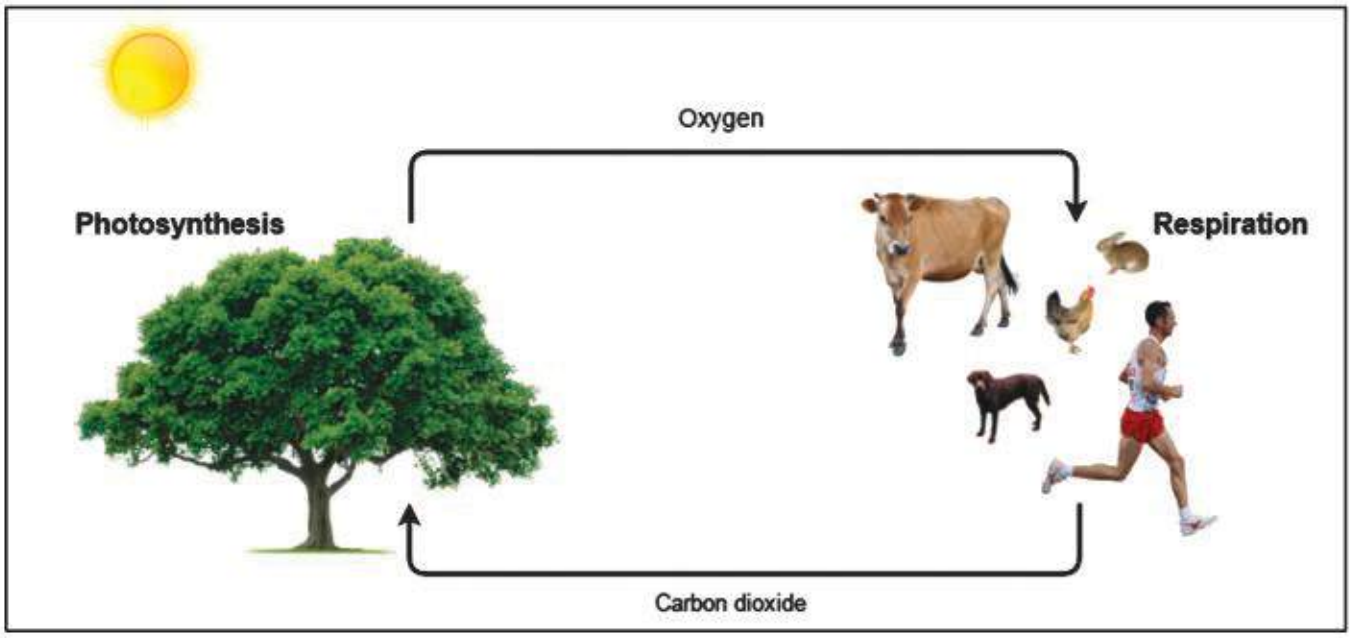
Metabolism

Metabolism is the sum of the biochemical reactions in the cell. All life activities in the cell are also called metabolism.

Metabolism can be divided into two types: **anabolism** and **catabolism**.

Anabolism is the biosynthesis reactions. In anabolic reactions, such as **photosynthesis**, big molecules are made from simple ones.

Catabolism is the breaking down reactions. In catabolism, such as cellular respiration, big molecules are broken down into simple ones.



In an average life span, we use nearly: 2 tons of oxygen gas 6-10 tons of water 2 tons of food 7 million kilocalories.

Carbohydrates

Some food molecules made up of sugars are called **carbohydrates**. Cells use carbohydrates as a source of energy and for energy storage. An organism's cells break down carbohydrates to release the energy stored in them. There are two kinds of carbohydrates; simple carbohydrates and complex carbohydrates.

Simple Carbohydrates

Simple carbohydrates are made up of one sugar molecule or a few sugar molecules linked together. Table sugar and the sugar in fruits are examples of simple carbohydrates.

Complex Carbohydrates

When an organism has more sugar than it needs, its extra sugar may be stored as complex carbohydrates. Complex carbohydrates are made of hundreds of sugar molecules linked together. Plants, such as the potato plant in Figure 5, store extra sugar as starch. When you eat mashed potatoes, you are eating a potato plant's stored starch. Your body then breaks down this complex carbohydrate to release the energy stored in the potato.

The extra sugar in a potato plant is stored in the potato as starch, a complex carbohydrate.

Lipids

Lipids are compounds that cannot mix with water. Lipids have many important jobs in the cell. Like carbohydrates, some lipids store energy. Other lipids form the membranes of cells.

Fats and Oils

Fats and **oils** are lipids that store energy. When an organism has used up most of its carbohydrates, it can get energy from these lipids. The structures of fats and oils are almost the same, but at room temperature, most fats are solid, and most oils are liquid. Most of the lipids stored in plants are oils. Most of the lipids stored in animals are fats.

Vitamins

Vitamins are essential to cellular metabolism, many are protective against illnesses. Vitamins are required in the diet in quantities that are quite small compared with the relatively large quantities of essential amino acids and fatty acids humans need.

The functions of vitamins in maintaining human health

- Promotion of body growth
- Help in maintaining overall health
- Promotion of the normal functioning of the nervous and digestive system
- Promotion of body immunity against disease

In the deficiency or absence of a vitamin in the body, dependent reactions slow down or decrease resulting in health disorders.

At room temperature, most fats are solid like butter, and most oils are liquid like olive oil and corn oil.

VİTAMİN	SOURCES	EFFECTS OF DEFICIENCY
A (Retinol)	Milk, Butter,Carrots, Fresh vegetables	Night blindness, Dry scelling
B_1 (Thiamine)	Legumens, Peanuts, Liver	Beriberi - Nerve disorders
B_2 (Folacin)	Liver, Legumes, Orange and Green Veg.	Anaemia, Birth defects
C (Ascorbicacid)	Fruit and vegetables, Cabbage, Tomatoes	Scurvy - Teeth, Skin and Blood vessels disorders
D (Calcipherol)	Fish oil, Milk,Egg yolk	Rickets - Bone disorders
E (Tocopherol)	Vegetable oils, Nuts, Seeds	Nerve damage Reduced fertility
K (Phylloqul-none)	Green vegetables, Tea Made by Intestinal bacteria	Slow blood clotting

SELF CHECK
NECESSITIES OF LIFE

A. Key Terms

Metabolism
Catabolism
Anabolism
Carbohydrates
Lipids

B. Review Questions

1. Write the six kind of nutriens in food?
2. What is the differences between anabolism and catabolism?
3. Give 2 examples for both simple and complex carbohydrates?
4. Write the differences between fats and oils?
5. Write the functions of vitamins?

C. True or False

1. Deficiency of vitamin A causes the anaemia.
2. Vitamin K helps blood clotting.
3. Lipids can mix with water.
4. Carbohydrates are source of energy.
5. Some lipids form the membrane of cell.

D. Fill in the blanks correctly

1. ....., ..., and ..... do not provide energy.
2. Metabolism divided into two types they are; ..... and ..... .
3. The extra sugar in potato is stored as .....
4. All life activities in the cell are called .....
5. Deficiency of vitamin D causes the .....

E. Multiple choice

1. Which of the followings not source of energy?

A) Proteins
B) Fats
C) Carbohydrates
D) Vitamin A

2. Which of the following matches is false for vitamin and disease which seen in its deficiency?

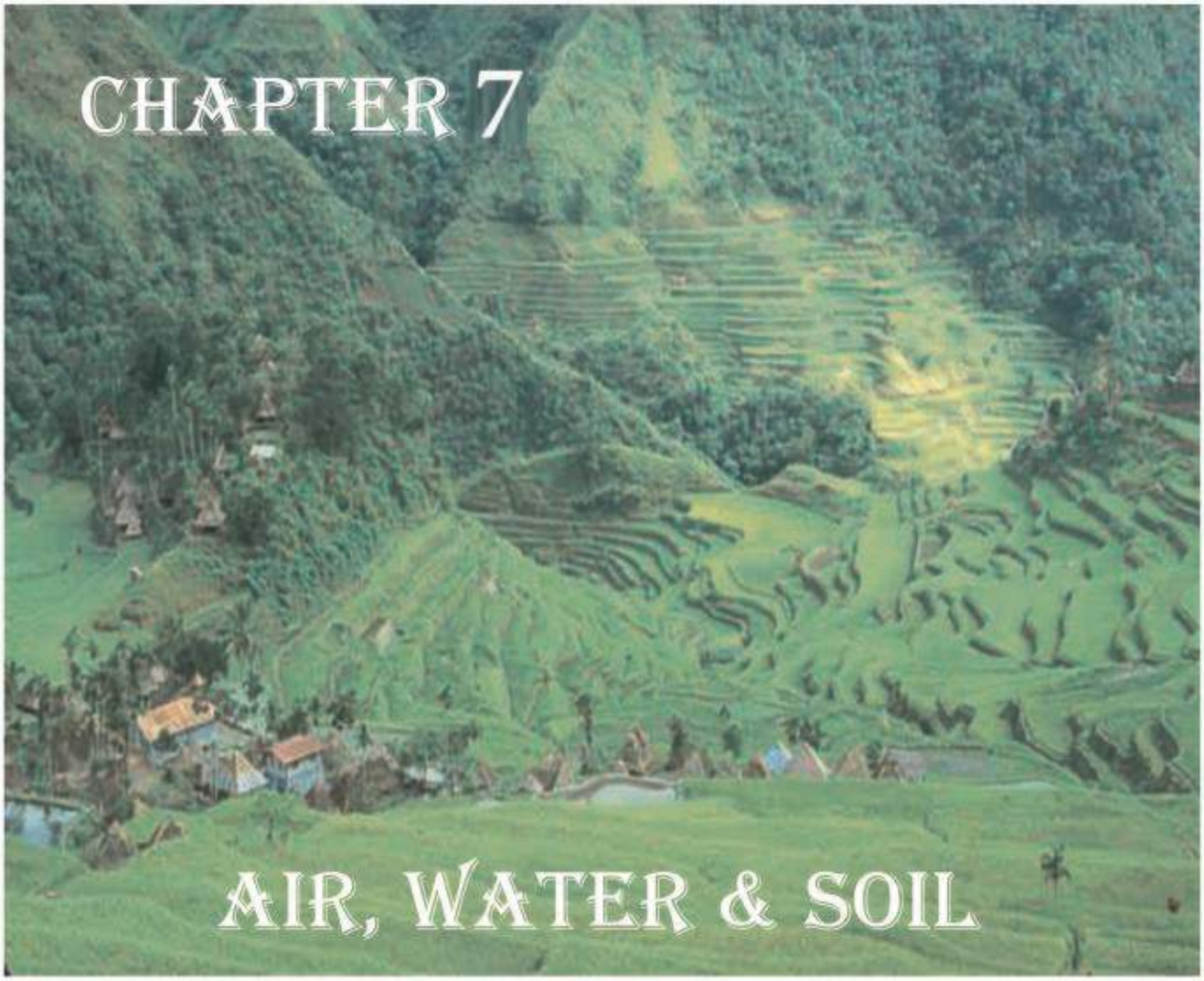
A) Vitamin D - Rickets
B) Vitamin A - Night blindness
C) Vitamin C - Scurvy
D) Vitamin B9 - Slow blood clotting

3. _____ are come together and forms your boWhich of the following is nota function of vitamins?

A) Promotion of body growth
B) Help in maintaining overall health
C) Producing energy for body activities
D) Promotion of body immunity against disease

4. Which one of the followings does not mix with water?

A) Olive oil
B) Simple carbohydrates
C) Complex carbohydrates
D) Table sugar



The Air

The common name given to the atmospheric gases used in breathing and photosynthesis is air. Air is a mixture of gases which provide a place for animals and other organisms to move, live and increase in number. The oxygen gase in air provides production of energy from food by organisms.

Atmosphere

The atmosphere of Earth is a layer of gases surrounding the planet Earth that is retained by Earth's gravity. The atmosphere protects life on Earth by absorbing ultraviolet solar radiation, warming the surface through heat retention (greenhouse effect) and reducing temperature extremes between day and night (the diurnal temperature variation). By volume, dry air in atmosphere contains 78.09% nitrogen, 20.95% oxygen, 0.039% carbon dioxide and small amounts of other gases.

Atmosphere Layers

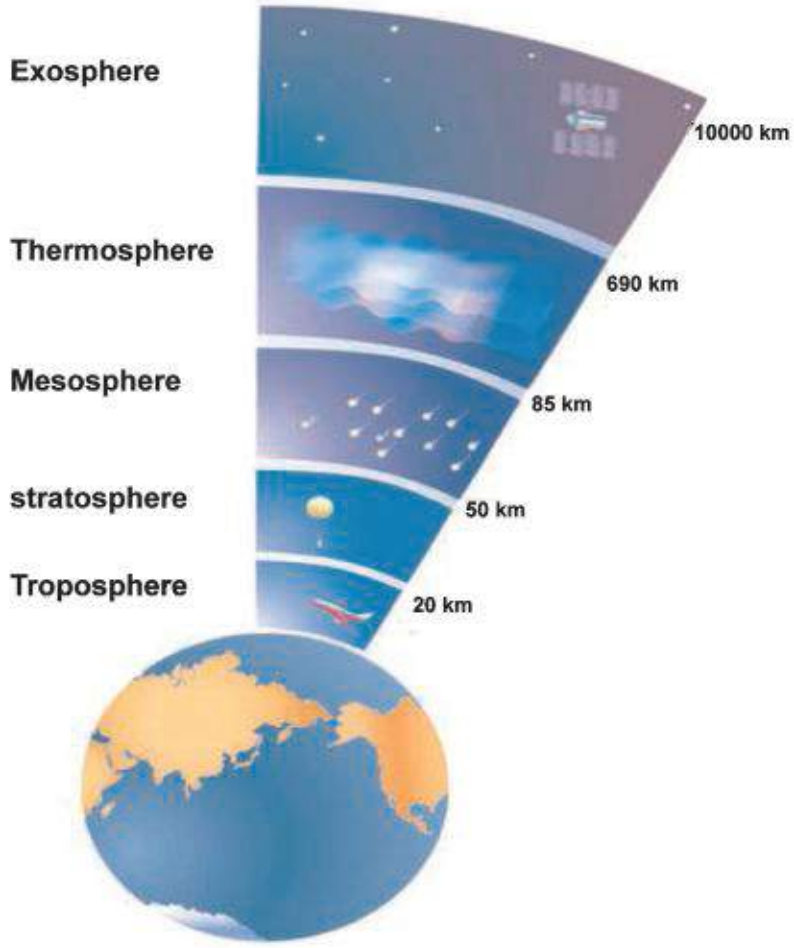
Exosphere - the outermost layer of Earth's atmosphere, extending beyond the exobase at an altitude of about 600 contains few particles that move into and from space.

Thermosphere — temperature increases
with height. The temperatures can rise to 1,500 degrees Celsius, but it would not feel warm because of the low air pressure in this layer.

Mesosphere — the layer in which mostmeteors burn up after entering Earth's a mosphere and before reaching Earth'stsurface.

Stratosphere — contains the ozone layer; the layer where volcanic gases can affect the climate.

Troposphere — the layer closest to Earth's surface in which all weather occurs.

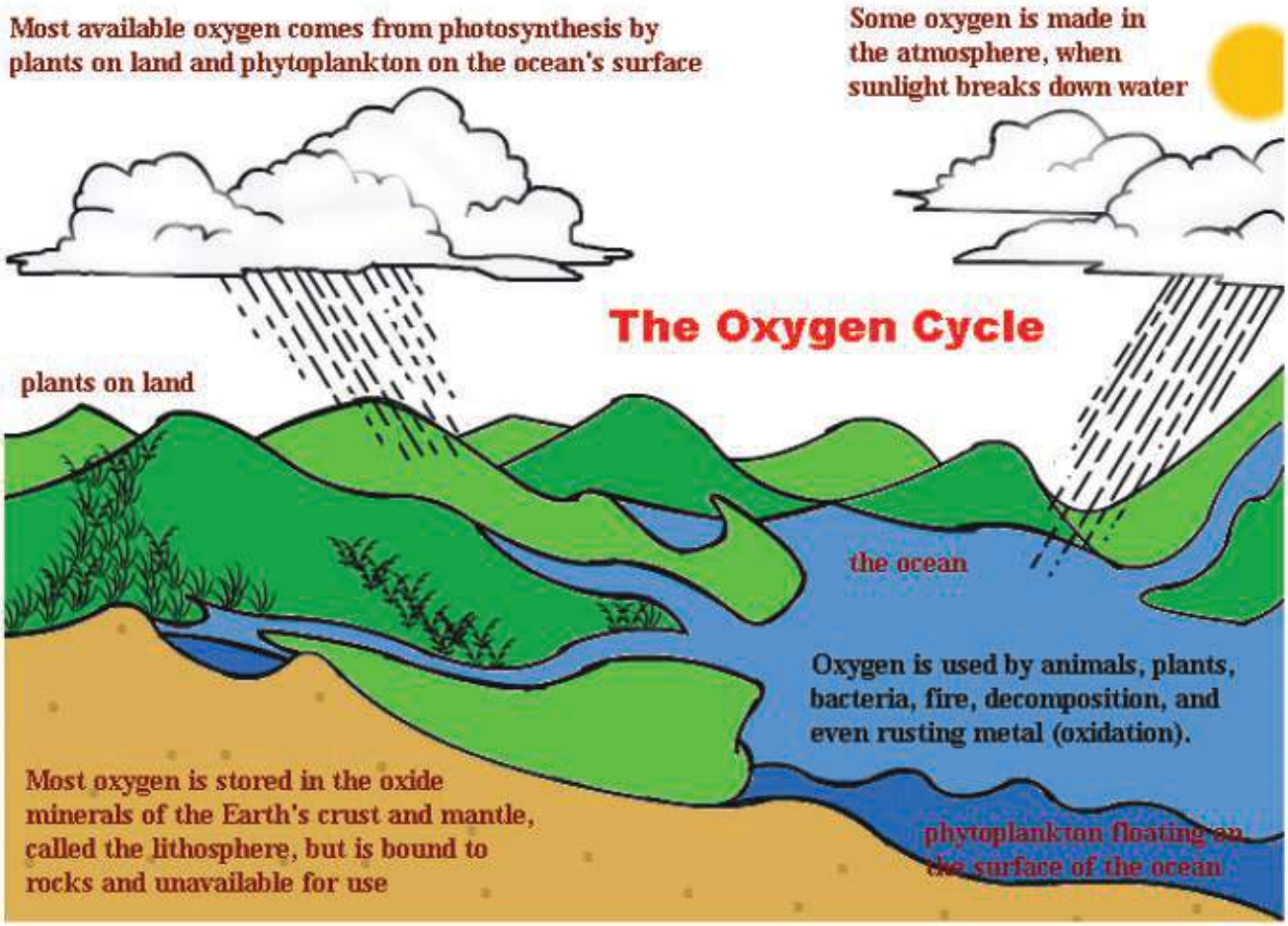


The orange layer is the troposphere, which gives way to the whitish stratosphere and then the blue is mesosphere.

Biochemical Cycles

1. Oxygen Cycle

Most of us suffer from lack of oxygen. Whether from improper breathing poor diets, air pollution or lack of exercise, our cells are being deprived of this vital element and thus weakening our immune system. Oxygen (O_2) is one of the most important elements required to sustain life. Without it, our health begins to suffer and/or we die. Unhealthy or weak cells due to improper metabolism lose their natural immunity and are thus susceptible to viruses and lead the way to all kinds of serious health problems. O_2 not only gives us life but destroys also the harmful bacteria in our bodies without affecting the beneficial bacteria that we need. No antibiotic or drug can make that claim.



The role of oxygen in our body

Unlike plant life, our bodies are designed to "**burn**" oxygen in each body cell to produce energy with which we perform all body activities from digestion and elimination to thinking and movement. This is the essential role of oxygen in the body. If one gets low on oxygen, which is the case with almost everyone today exposed to pollution and not breathing deeply enough, becomes tired and cellular energy production decreases. This slowly causes the body to decay and opens one up to many types of illnesses, both physical and emotional. One of the main ones is cancer.

Smoking damages the lungs, often severely and leads to much worse oxygenation. Other causes may include impaired hydration, impaired circulation for any reason and even just allowing the body to become too cold. This impairs circulation and breathing and thus reduces oxygenation.

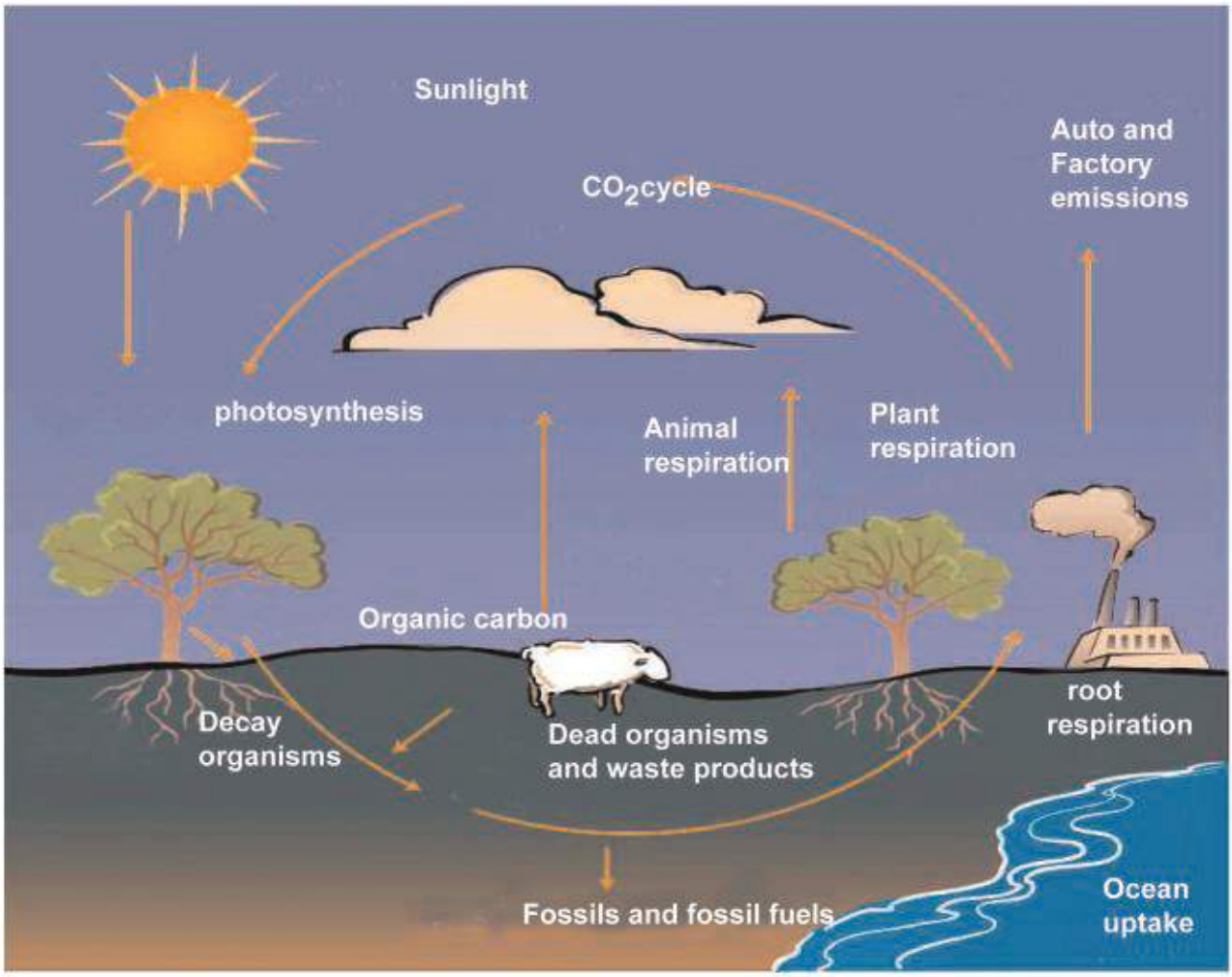
2. The Carbon Cycle

All living things are made of carbon. Carbon is also a part of the ocean, air, and even rocks. Because the Earth is a dynamic place, carbon does not stay still. It is on the move!

In the atmosphere, carbon is attached to some oxygen in a gas called carbon dioxide.

Plants use carbon dioxide and sunlight to make their own food and growth. The carbon becomes part of the plant. Dead plants gradually buried in soil may turn into fossil fuels made of carbon like coal and oil over millions of years. When humans burn fossil fuels, most of the carbon quickly enters the atmosphere as carbon dioxide.

Carbon dioxide is a **greenhouse** gas and traps heat in the atmosphere. Without it and other greenhouse gases, Earth would be a frozen world. But humans have burned so much fuel that there is about 30% more carbon dioxide in the air today than there was about 150 years ago, and Earth is becoming a warmer place. In fact, ice cores show us that there is now more carbon dioxide in the atmosphere than there has been in the last 420,000 years.

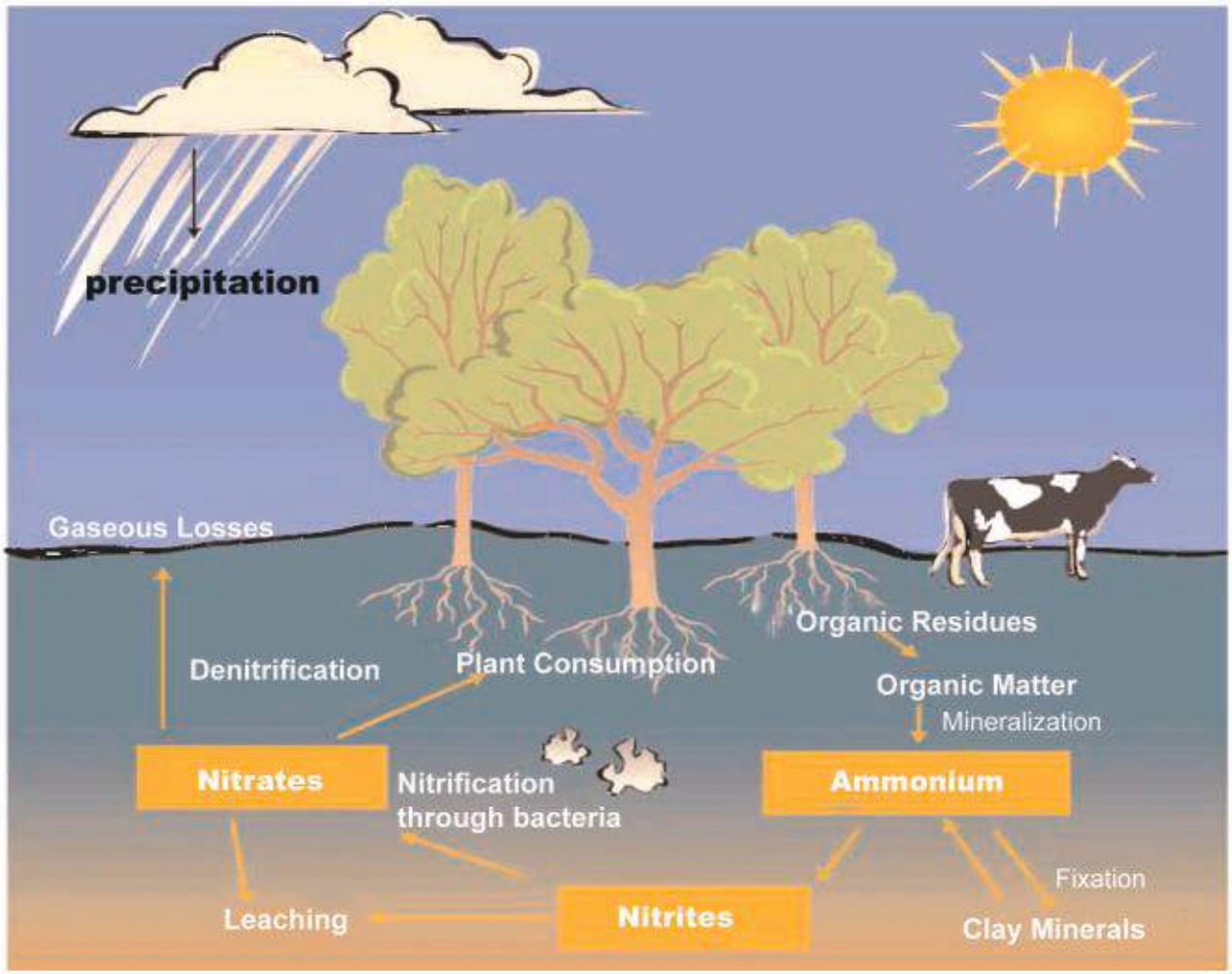


The carbon cycle

3. The Nitrogen Cycle

Take a deep breath. Most of what you just inhaled is nitrogen. In fact, 78% of the air in our atmosphere is made of nitrogen. Your body does not use the nitrogen that you inhale with each breath. But, like all living things, your body needs nitrogen. Your body gets the nitrogen it needs to grow from food.

Most plants get the nitrogen they need from soil. Many farmers use **fertilizers** to add nitrogen to the soil to help plants grow larger and faster. Both nitrogen fertilizers and forest fires add huge amounts of nitrogen into the soil and nearby lakes and rivers. Water full of nitrogen causes plants and algae to grow very fast and then die all at once when there are too many for the environment to support.

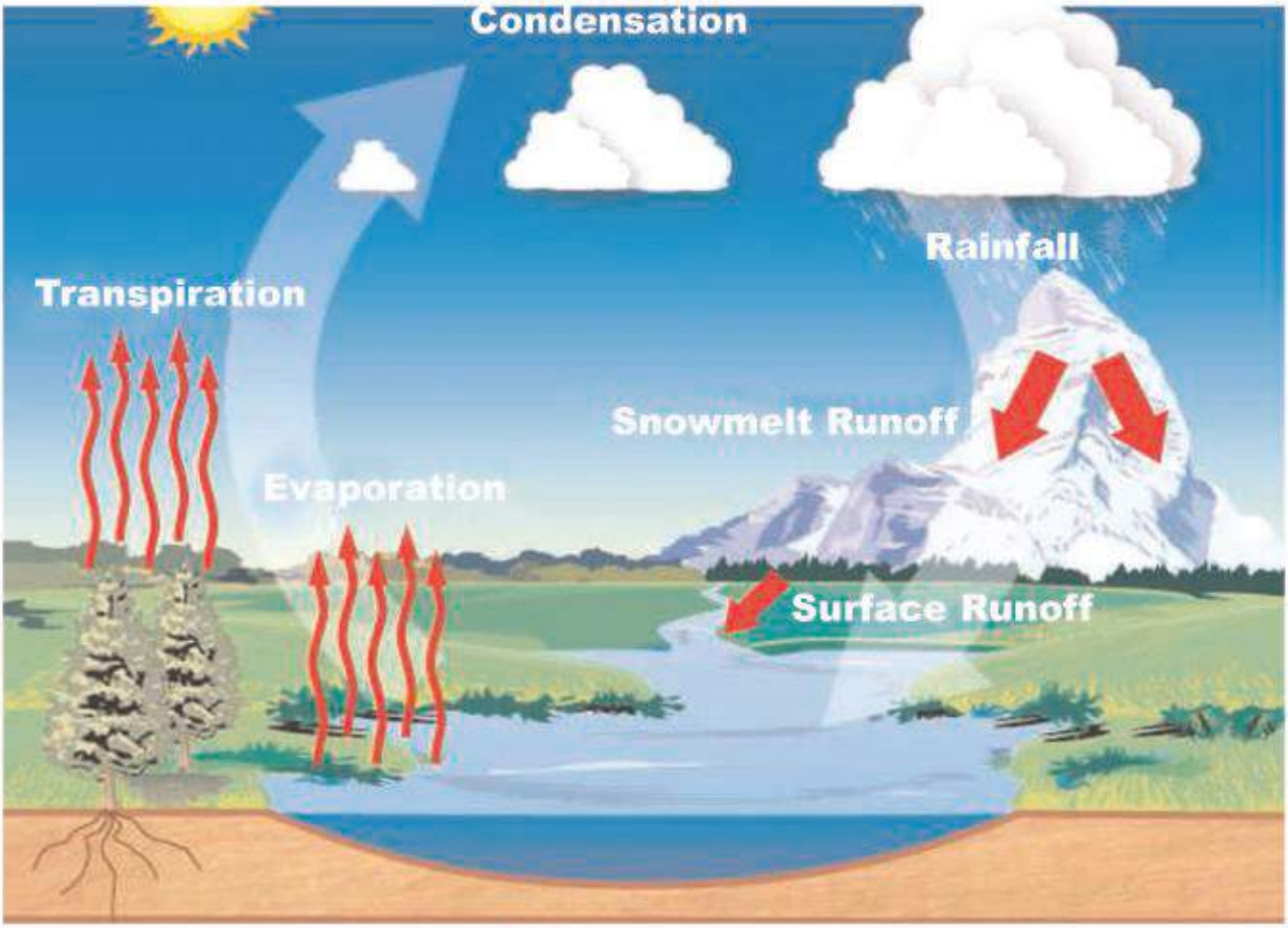


The nitrogen cycle

4. The Water Cycle

Water is a tasteless, odorless and colorless liquids that plays many different roles on the Earth. Some is at the poles in ice caps, and some is in the snow and glaciers at the tops of high mountains. Some is in lakes and streams, and some is underground. Some is vapor in the atmosphere. But most of the water on Earth is in the oceans.

Water is always on the move! The Sun's energy causes water to evaporate from oceans and lakes into the atmosphere. Plants and animals also release water vapor into the atmosphere as they breathe. When the atmosphere cools, water vapor condenses; making clouds that might produce rain or snow. Water has been recycled in its different forms as ice, liquid, or vapor for more than 3.5 billion years.



The water cycle

Water (H_2O) is often perceived to be ordinary as it is transparent, odorless, tasteless and Colorless It is the simplest compound of the two most common reactive elements, consisting of just two hydrogen atoms attached to a single oxygen atom. Indeed, very few molecules are smaller or lighter. Liquid water, however, is the most extraordinary substance.

Although we use to drink it, wash, fish and swim and cook (although probably not all at the same time), we nearly always overlook the special relationship it has with our lives. Droughts cause famines and floods cause death and disease. It makes up over about half of us and, without it, we die within a few days.

Water Pollution

Water pollution is the contamination of water bodies (e.g. lakes, rivers, oceans, aquifers and groundwater). Water pollution occurs when pollutants are directly or indirectly discharged into water bodies without adequate treatment to remove harmful compounds.

Water pollution affects plants and organisms in these bodies of water. In almost all cases the effect is damaging not only to individual species and populations, but also to the natural biological communities.

Drinking or using improper water may cause different diseases like, hepatitis, cholera, typhoid and bilharzia.

You can help

1. Never throw rubbish away anyhow.

2. Use water wisely. Do not keep the tap running when not in use. Also, you can reduce the amount of water you use in washing and bathing.

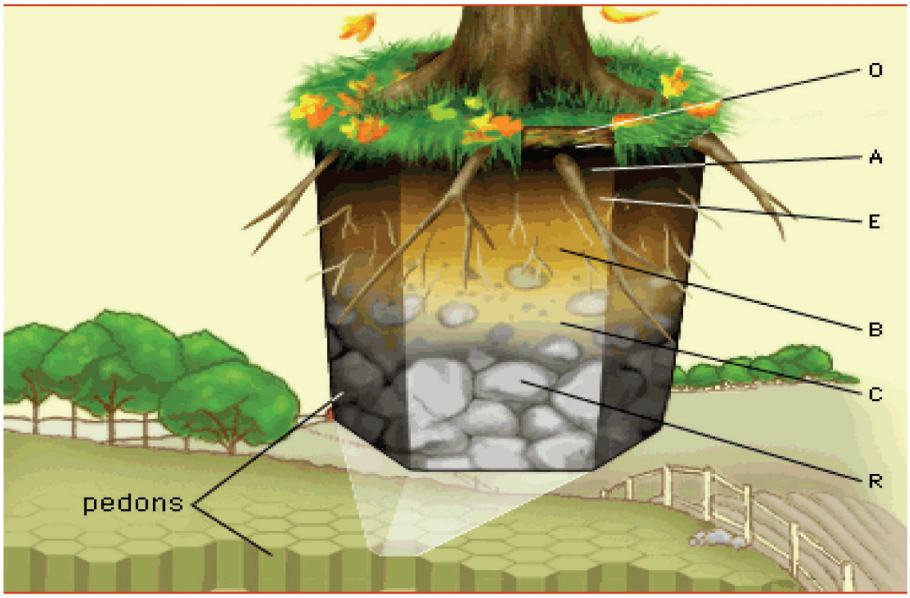
3. Do not throw chemicals, oils, paints and medicines down the sink drain, or the toilet.

4. Buy more environmentally safe cleaning liquids for the use at home and other public places.

WHAT IS SOIL?

Soil is a complex mixture of minerals, water, air, organic matter, and countless organisms that are the decaying remains of once-living things. It forms at the surface of land – it is the "skin of the earth." Soil is capable of supporting plant life and is vital to life on earth.

There are different types of soil, each with its own set of characteristics. Dig down deep into any soil, and you'll see that it is made of layers, or horizons (O, A, E, B, C, R). Put the horizons together, and they form a soil profile.



The horizons are:

O – (humus or organic) Mostly organic matter such as decomposing leaves. The O horizon is thin in some soils, thick in others.
A - (topsoil) Mostly minerals from parent material with organic matter incorporated. A good material for plants and other organisms to live.
E – (eluviated) Leached of clay, minerals, and organic matter, leaving a concentration of sand and silt particles of quartz or other resistant materials – missing in some soils but often found in older soils and forest soils.
B – (subsoil) Rich in minerals that leached (moved down) from the A or E horizons and accumulated here.
C – (parent material) The deposit at Earth's surface from which the soil developed.
R – (bedrock) A mass of rock such as granite, basalt, quartzite, limestone or sandstone that forms the parent material for some soils if the bedrock is close enough to the surface to weather.

SELF CHECK
AIR, WATER & SOIL

A. Key Terms

Air	Atmosphere
Mesosphere	Fossil
Water pollution	Soil
Bedrock	Sewage

B. Review Questions

1. Explain the importance of oxygen?
2. Numarate the atmospheric layes from out to in?
3. Explain how carbondoxide affects the ice cores?
4. Is there benefit of forest fires for plant growth? How?
5. How can we save our water sources?

C. True or False

1. The topsoil contains mostly organic materials.
2. We must drink less water to save it.
3. 80% of atmosphere is oxygen.
4. Troposphere is the closest layer to the earth.
5. Carbondioxide is a greenhouse gas.

D. Matching

a. Exosphere ( ) The skin of earth.
b. Oxygen ( ) Plants use it to grow faster
c. Nitrogen ( ) Most abundant gas in atmos-phere.
d. Fertilizer ( ) Provides production of energy from food
e. Soil ( ) Outermost layer of atmos-phere.

E. Multiple choice

1. Which one is the usage of oxygen (O_2) in nature?

A) Cleans the atmosphere
B) Production of energy
C) Help planes to fly
D) Help wind to flow faster

2. When human burn fossils most of the carbon enters the atmosphere as _____ .

A) Burned fossils
B) Carbon dioxide
C) Oxygen
D) Coal

3. Which layer of soil rich in minerals moved down and accumulate?

A) R - Bedrock
B) B - Subsoil
C) A - Top soil
D) O - Humus

F. Find the hidden terms in puzzle

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

ATMOSPHERE
CARBONDIOXIDE
EVAPORATION
HUMUS
NITROGEN
OXYGEN
POLLUTION
SOIL
TOPSOIL
TROPOSPHERE
WATER

WHY IT IS IMPORTANT TO SAVE WATER?

It is important to save water because one day the earth may run out of water. If you haven't noticed the oceans and rivers are slowly draining due to people using so much water. Once we don't have water we won't be able to live. One way we can save the water is by using **DESALINATION**. Water desalination is when you turn salty or brackish water in to fresh clean drinkable water So it is very important that you save water not only for us but for our planet and the other living creatures as well.

HOW TO SAVE WATER?

Did you know that less than 1% of all the water on Earth can be used by people? The rest is salt water (the kind you find in the ocean) or is permanently frozen and we can't drink it, wash with it, or use it to water plants.

As our population grows, more and more people are using up this limited resource. Therefore, it is important that we use our water wisely and not waste it.

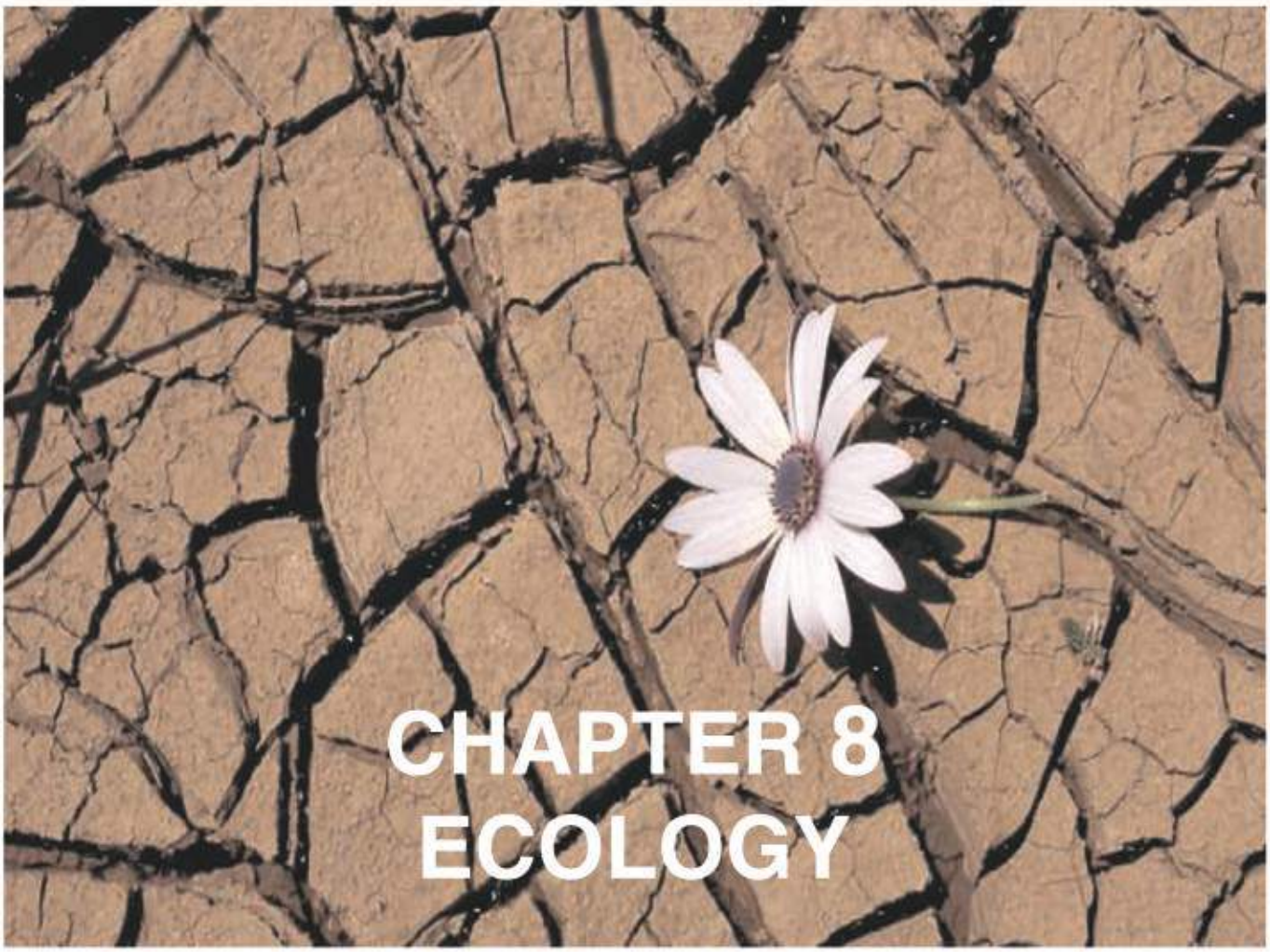
Just by turning off the tap while you brush your teeth in the morning and before bedtime, you can save up to 8 gallons of water! That adds up to more than 200 gallons a month, enough to fill a huge fish tank that holds 6 small sharks!

The same is true when you wash dishes. Turn off the tap! Scrape your dirty dishes into the trash—then put them in the dishwasher.

If your toilet has a leak, you could be wasting about 200 gallons of water every day. That would be like flushing your toilet more than 50 times for no reason!

Try this experiment: ask your parents to help you test for leaks by placing a drop of food coloring in the toilet tank. If the color shows up in the bowl without flushing, you have a leak!

A dripping tap can waste 20,000 litres of water in a year!



CHAPTER 8
ECOLOGY

Origin of Earth

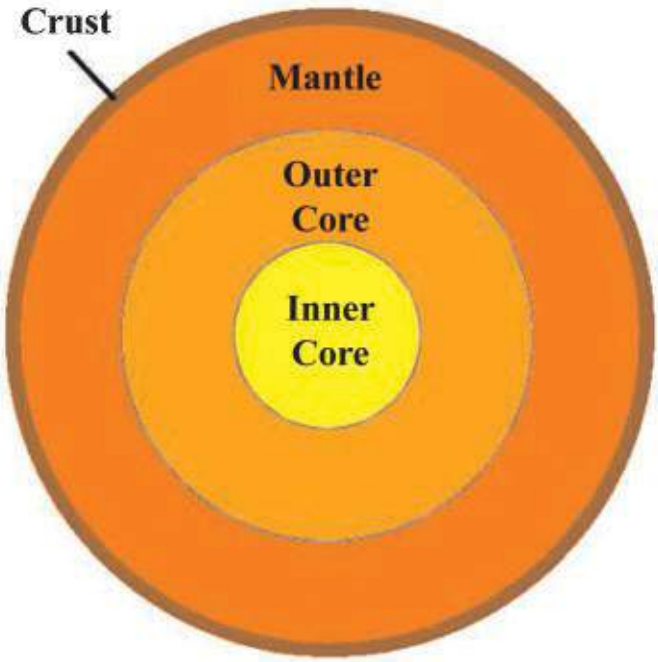
Earth is the only planet we know of that can support life. This is an amazing fact,considering that it is made out of the same-matter as other planets in our solar system,was formed at the same time and through the same processes as every other planet, and gets its energy from the sun.

Earth began to form over 4.6 billion years ago from the same cloud of gas that formed our sun and the rest of the solar system and even our galaxy. By 3.8 to 4.1 billion years ago, Earth had become a planet with an atmosphere and an ocean.

Composition of the Earth

It may seem like the earth is made up of one big solid rock, but it's really made up of a number of parts. Some of them constantly moving!

You can think of the earth as being made up of a number of layers, sort of like an onion. These layers get more and more dense the closer to the center of the earth you get. See the picture below to see the four main layers of the earth: the **crust, mantle, outer core**, and **inner core**.



1. Crust

The **crust** is the thin outer later of the Earth where we live. Well, it looks thin on the picture and it is thin relative to the other layers, but don't worry, we're not going to fall through by accident anytime soon. The crust varies from around 5 km thick (in the ocean floor) to around 70 km thick (on land where

2. Mantle

The next layer of the Earth is called the **mantle**. The mantle is much thicker than the crust at almost 3000 km deep.

Tectonic plates

The **tectonic plates** are a combination of the crust and the outer mantle, also called the lithosphere. These plates move very slowly, around a couple of inches a year. When the plates move and the boundaries bump up against each other it can cause an earthquake.

3. Outer Core

The Earth's **outer core** is made up of iron and nickel and is very hot (4400 to 5000+ degrees C). This is so hot that the iron and nickel metals are liquid!

4. Inner Core

The **inner core** is the hottest part of the Earth, and, at over 5000 degrees C, is about as hot as the surface of the sun.

Origin of life

The first living organisms on earth are protists that live in oceans. They are different from plants, fungi or animals and they can produce their own food by photosynthesis. Afterward new forms of life created like simple plants (ferns). And followed by animals like dinosaurs and big birds which are lived and became extinct today.

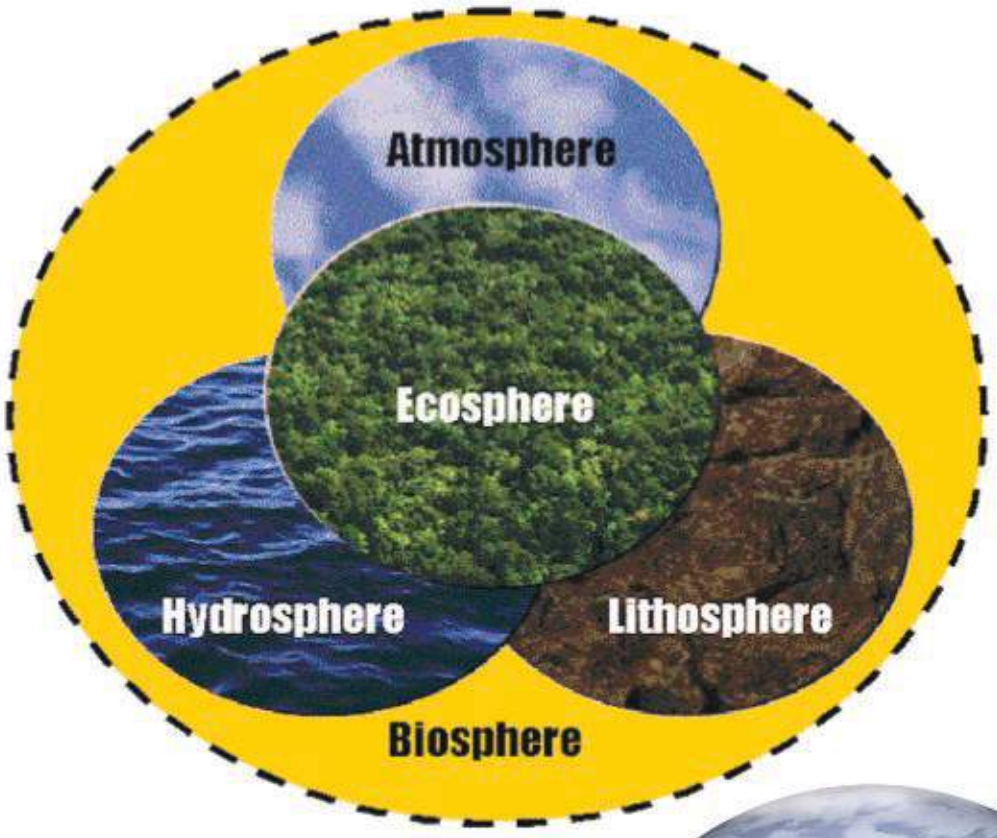
What is a fossil?

A **fossil** is the preserved remains or impressions of a living organism such as plant, animal, or insect. Some fossils are very old. Studying fossils helps scientists to learn about the past history of life on earth.

Some fossils of organisms lived before

Biosphere

The part of the earth and its atmosphere in which living organisms exist or that is capable of supporting life. The height of biosphere in atmosphere reach the 10000 m. Higher than this altitude living organisms not found. Level of biosphere for terrestrial animals reaches about 6500 m – 6800 m and 6200 m for plants. An also biosphere reach 5000 m in deep of ocean where some form of life observed. Biosphere contains air, water, soil and rocks and it is a suitable condition for living things.



Elements of Ecology

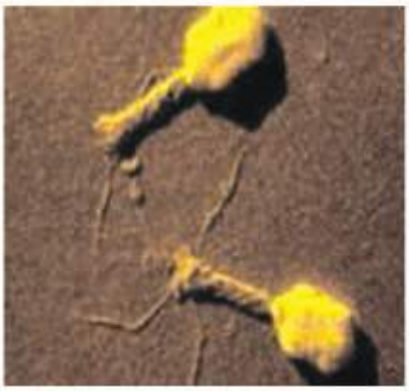
Ecology is the relationship of living things to each other and to what's around them. So, if you are learning about what kinds of relationships fish have with other animals and plants in their neighborhood, then you are learning about ecology.

1. Biotic Factors

Living things that effect on life of organism on it its environment are called as **biotic factors.** These factors can be unicellular organisms, plants or animals.

Some of these factors as follows:

Parasite means organisms which feed on or in another organism which called as host. Host is harmed by parasites; these parasites can be virus, bacteria, fungi or some animals.



Symbiosis is living of two organisms together in different forms. One of them; commensalism is a form of relationship between two organisms where one organism benefits without affecting the other.

Predation describes a biological interaction where a **predator** (an animal that is hunting) feeds on its **prey** (the animal that is attacked). Predators may or may not kill their prey prior to feeding on them, but the act of predation often results in the death of its prey.

2. Abiotic Factors

Temperature, water, soil, minerals, light, air, oxygen and other nonliving things that are necessary for living things are called **abiotic factor**.

a. Temperature

Differences in temperature effects on type of organisms in an ecosystem. For example, pole bears live in cold but desert camels live in hot climate, a hot climate tree date palm cannot grow in Russia.

b. Water

It is an important abiotic factor for organisms. Amphibian can live in lakes or damp areas. Also, because water is an essential factor for other animals they generally live nearby river, lake or any water resource.

Aquatic plants like water lily, a hydrophate, have features adapted to their environment. Wide leaves and the placement of stomata on the upper surface of the leaves ease the process of evaporation.

c. Soil

Amount of living things and nonliving inorganic materials determine the quality of soil. Earthworm, some insects, lizards and plants only a few examples which live in soil. All organisms directly or indirectly need soil.

d. Light

Plants are **producer** because they produce their own food and also they are food source for human and some animals. Plants need sun light to produce this food. Plants grow faster in spring and summer more than in autumn and winter because more amount of light.

Ecosystem

A group of organisms and abiotic factors which found in their environment together form an **ecosystem**. Organisms that live in same ecosystem depend on each other in many ways. There are different types of ecosystem like, aquatic ecosystem, terrestrial ecosystem and micro ecosystem.

1. Aquatic Ecosystems

Oceans, seas, lakes, rivers, pools and damps are examples for aquatic ecosystem.

2. Terrestrial Ecosystem

Greenland, deserts, caves, valleys and mountains are examples for terrestrial ecosystems.

3. Micro Ecosystem

Special areas where specific organisms can live are called as micro ecosystem. Ants where live in bark of a plant example for it.

Ecological Balance

Feeding relationships between organisms balance the ecosystem they live.

We classify organisms into three groups according type of feeding:

1. Producers

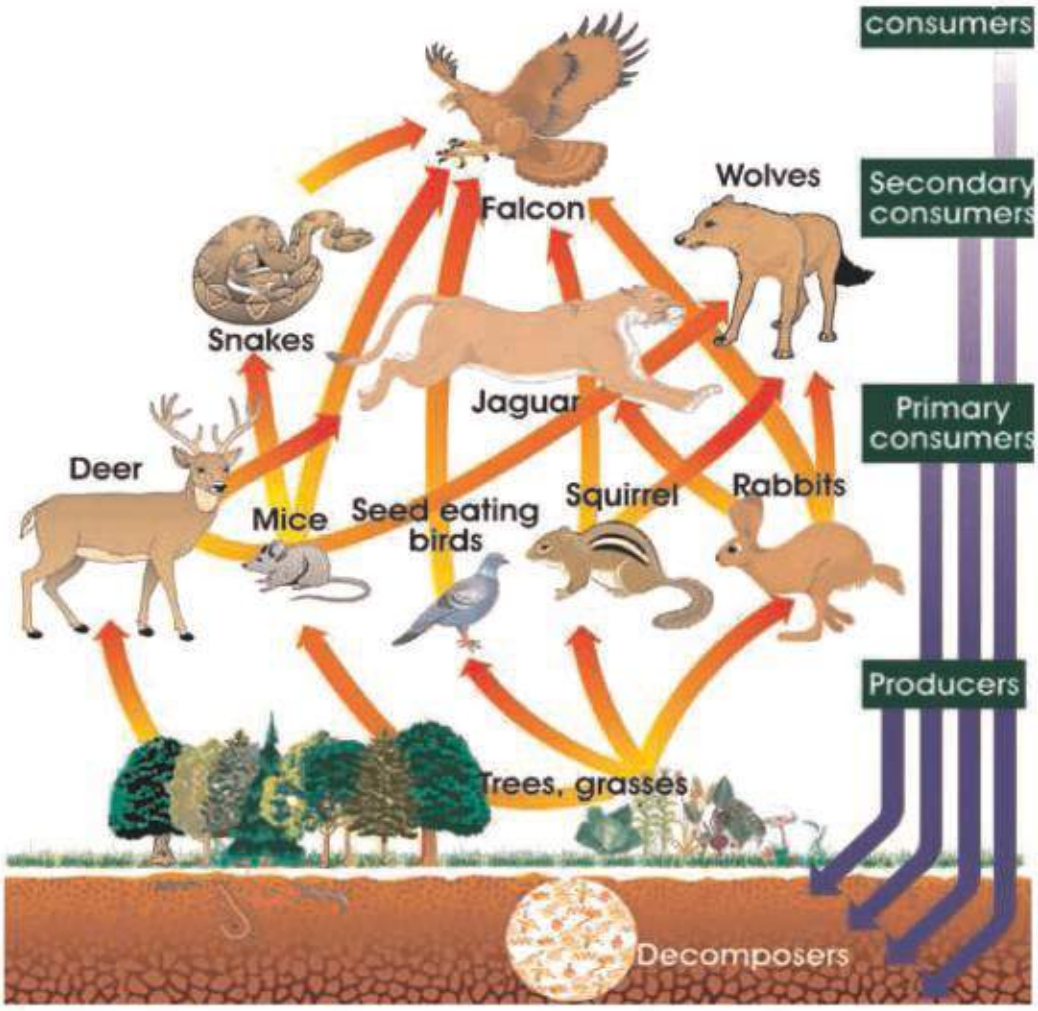
Organisms which can produce their own food by using sun light energy, water and carbon dioxide in presence of **chlorophyll**.

2. Consumer

Organisms which feed on another organism is called as **consumer**. Animals that feed on plants are primary consumers . Human and animals feed on other animals are secondary consumers.

3. Decomposers

These organisms feed on dead organisms and convert them into inorganic material.



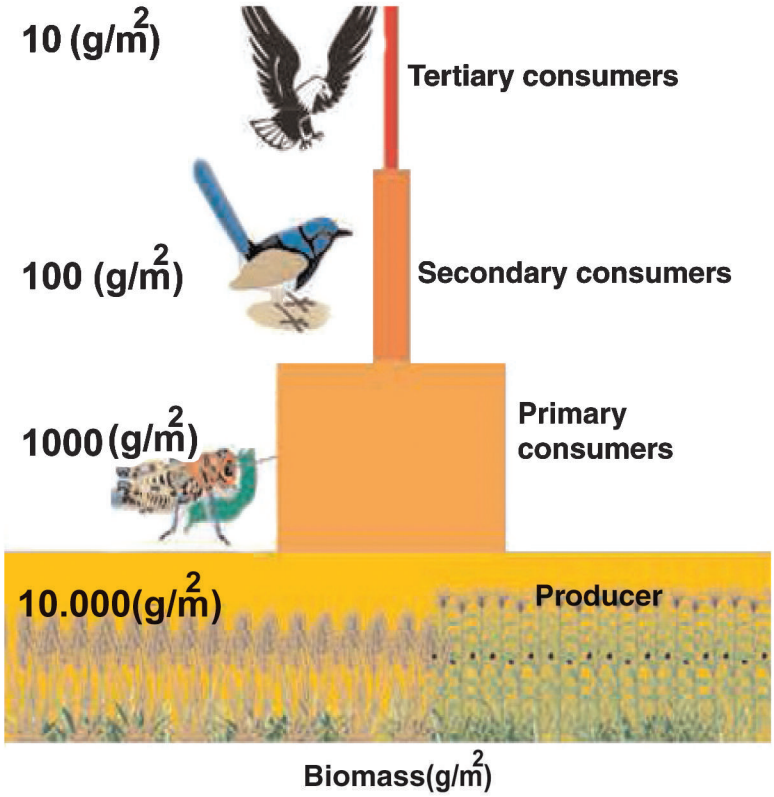
The food web in a terrestrial ecosystem, as in an aquatic ecosystem, starts with plants and continues with many food chains containing various animals

Ecological Pyramids

The values of some ecological factors can be shown in a pyramid for a concrete explanation. Examples are energy pyramids and biomass pyramids.

1. Pyramids of biomass

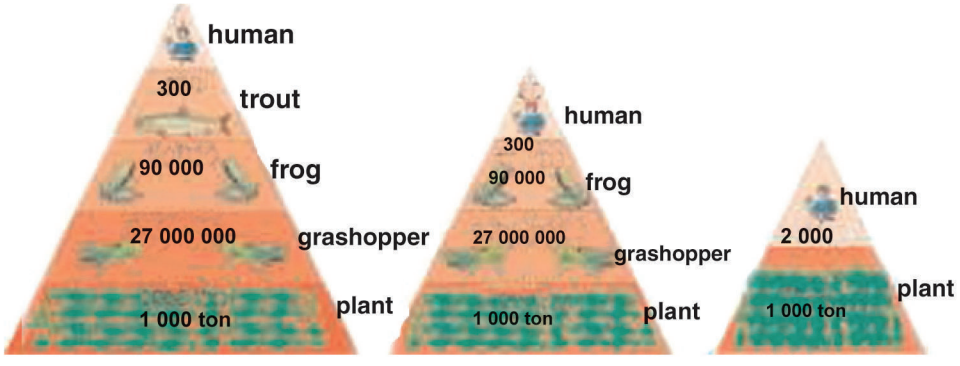
Biomass means "**living weight**". Biomass is a quantitative estimate of the total mass or amount of living material in a particular ecosystem. For example, the total weight of the roots, stems and spikes of wheat in a one hectare wheat field is called biomass. Organisms may be either plant biomass or animal biomass.



Biomass decreases from producers to-consumers. The organisms in the chain convert only 10% of the energy in food into biomass. Biomass decreases up to the end of the chain or pyramid.

2. Pyramid of numbers

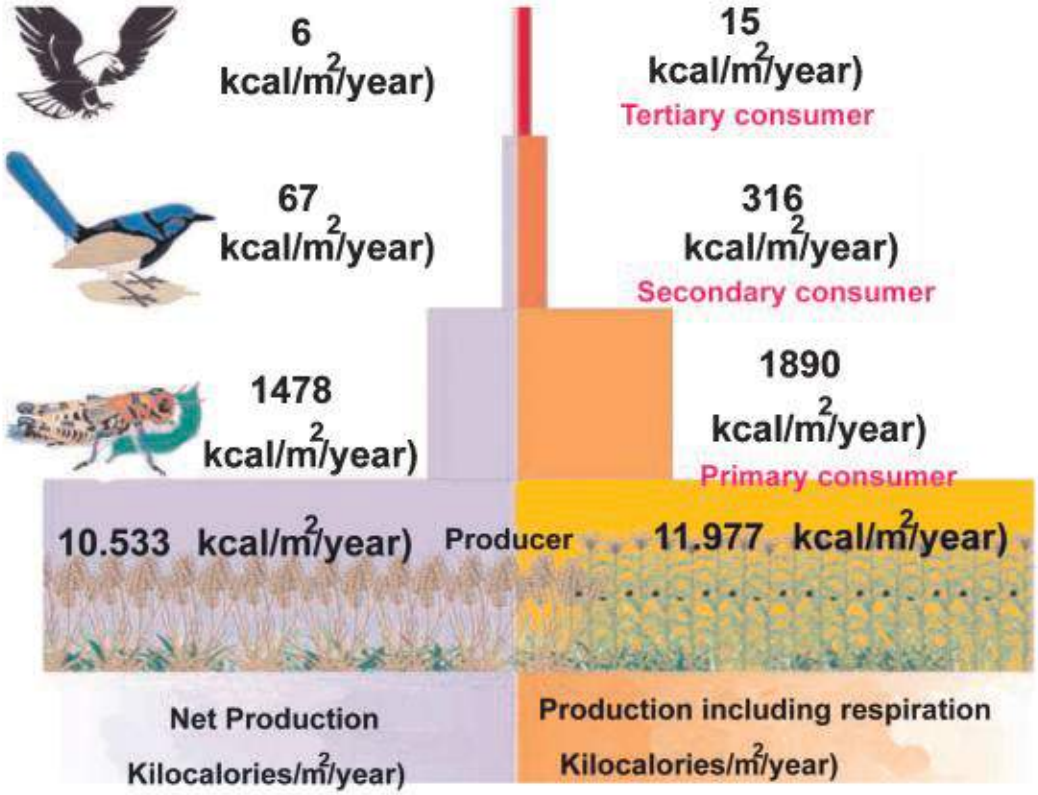
It shows the total number of organism at each trophic level in a given ecosystem. Let's explain this with an example. Plant - Grasshopper - Frog - Trout - Human. When you look at the following food chain carefully you will see that a human is at the end.



As seen in the figure, the-number of individuals is highest at the bottom of the pyramid and lowest at the top.

3. Pyramid of energy

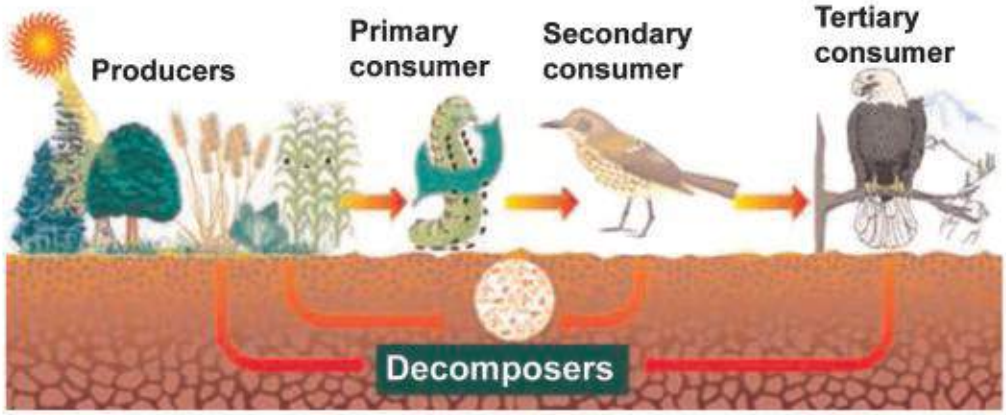
It indicates the energy content in the biomass of each trophic level. An **energy pyramid** is the best way to explain the flow of nutrients in an ecosystem.



Food chain and energy flow. Only 10% of the energy is captured at each step from producers to consumers. Therefore, the amount of energy at the end of the chain is the lowest.

Food Chain

A **food chain** consists of producers, consumers and decomposers. All organisms need energy to live and complete their life cycle. The main source of energy is the radiant energy from the sun but it is unusable by all organisms.



Biomes

The biosphere can be divided into regions called **biomes**. A biome is a large region that has a distinct combination of plants and animals. **Climate** is a factor in determining the type of biome that occurs.

The main factor that determines the kind of biome in a certain area is climate. Recall that climate is determined mainly by **temperature** and **precipitation**. Average temperature decreases from the equator to the poles.

The same kind of biome is found at the same latitude, or distance from the equator, in different parts of the world. Some examples of terrestrial biomes;

1. Deciduous forests

Climate changes from the north to the south. The northern parts are snowy and the soil is frozen. The southern parts are rainy and temperate. The annual rainfall is regular. Deer, bear, wolf, mountain lion, fox, mouse, wild turkey, woodpecker, and some reptiles, amphibians and insects.

2. Deserts

The temperature is very high during the day and falls suddenly at night. Rainfall is very low, as is moisture. Animals that need little water or store water can live in the desert. Fox, rabbit, antelope, lizards, snakes and some insect species are present.

Deciduous forests

Deserts

Tropical Forests

3. Tropical Forests

Annual rainfall is high and regular. High temperatures and moisture continue throughout the year. This biome has a rich fauna as well, including hibernating and migrating animals.

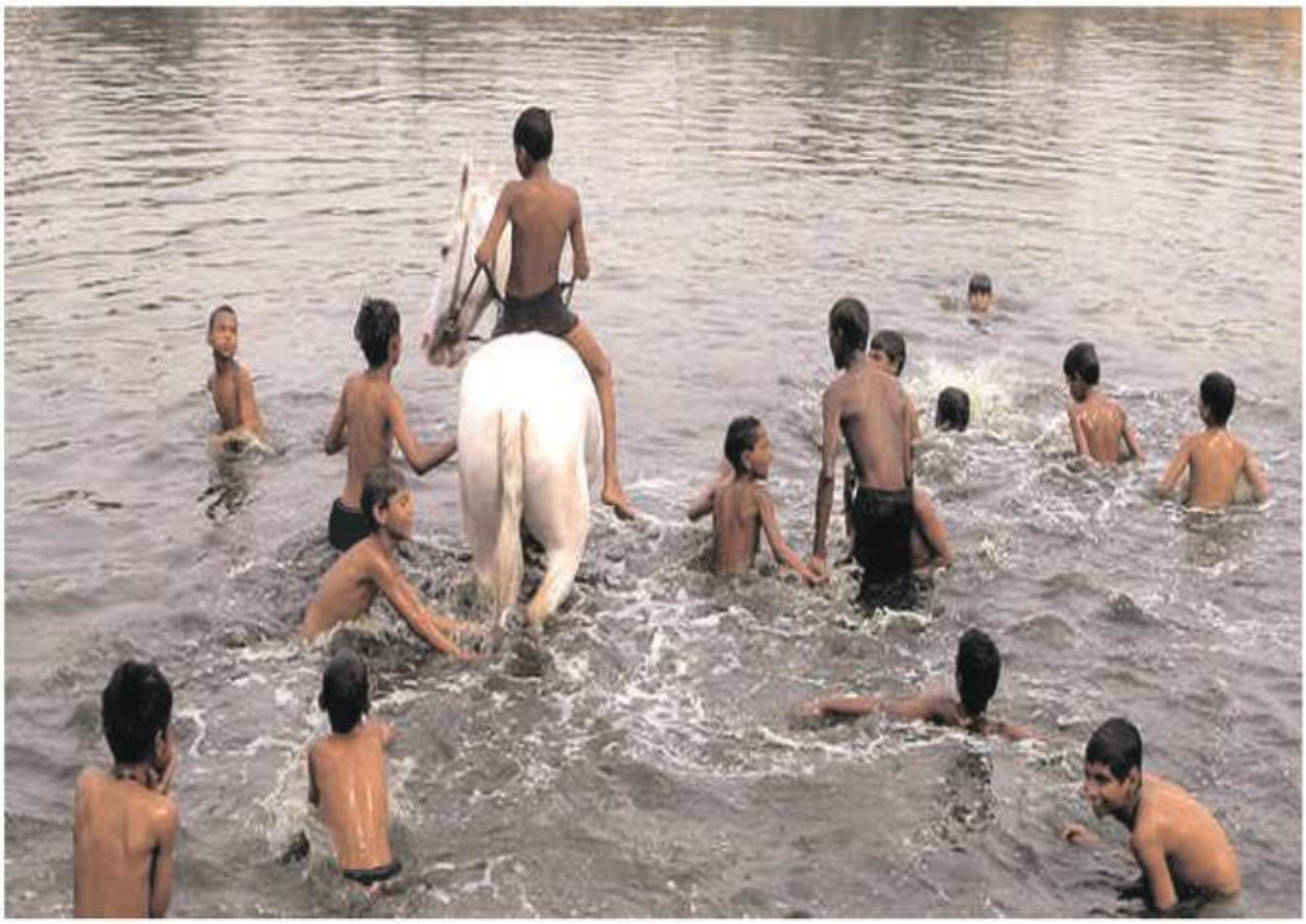
Pollution

Pollution can be defined as the accumulation of unwanted or harmful substances into the environment.Pollution caused by human activity has resulted in the extinction of various species of organisms on earth, like the dodo bird and the dusky seaside sparrow.

1. Water pollution

Water is one of the most essential necessities of life. All organisms, including humans, need water to live. The hygiene of drinking water is important for health. Factories constructed near rivers and lakes pollute the water. The ecological balance is disturbed. Some organisms die while others carry toxic chemicals in their bodies. Most of the countries are suffering from the pollution of their seas, lakes, rivers, and the running water, which is suitable for daily use. This problem is referred to many reasons:

- Contamination caused by living compounds that cause disease.
- Organic and inorganic compounds that are discharged by factories and house sewerage cause contamination
- Heat contamination produced by the nuclear- reactor cooling and discharged the factory hot water into the rivers and lakes.
- Kinetic pollution is produced by the movement of boats and ships or from damps.



The hygiene of fresh water is important for health. Only half of the world's population has access to clean water. Especially in some countries, people use water from the places where sewage is dumped. People drinking water from these sources are vulnerable to contagious diseases like cholera, diarrhea, and typhoid.

2. Soil pollution

Many chemical compounds pollute soil.These **pollutants** are transform to the soil by **irrigation**, **rain**, and **wind**. Also pollution may occur as a result of using **pesticides** or from factories waste (gases, radiant, and chemical wastes plastic, metals, wood, paper, packages). They are dissolved in soil and the plants absorb them and then they enters into their tissues. When the animals are fed with such plants, the pollutants will be moved to animal tissues as well. These can be transferred to people as a result of feeding from such plants and meet and dairy food from such animals.

Herbicidal chemicals, used widely to kill weeds and clear land, also have side effects.

3. Air pollution

The tiny layer surrounding the globe is the basic source of air that all living things need and depend on it to carry out their life process. Air contains different gases that they have stable ratios, such as Oxygen is %21, nitrogen is %78, carbon dioxide is %0.03. Nobel gases is %1 such as (Argon, Helium… etc) . Vapor water that range between %1 in cold and dry air to %4 during humid seasons in the tropical areas. Any change in the rate of air contents with foreign particles that are contained in air cause the contamination of air.

Low quality fossil fuels and exhaust released from vehicles are the main sources of air pollution. Though such pollution is temporary, if it stays longer in the air, it may cause death.

One of the factors that causes air pollution is CO gas released as a result of fires. Forest fires are the most common of these. Carbon mononoxide gas is released into the environment in vehicle exhaust.

4. Acid Rain

Normal rainwater has very little acid. Acids in the air react with water vapor and form **carbonic acid**. Emissions of sulphur dioxide and oxides of nitrogen from power stations, factories, and motor vehicles cause the formation of sulphuric acid and nitric acids in rain clouds. If rain falls through polluted air it picks up more of these gases and increases its acidity. Acidic clouds may be carried away by air currents. When rain falls from acid clouds, it causes a real environmental catastrophe. For this reason every country must be sensitive to this issue and take preventive measures. Acid rain is carried from soil to rivers, streams and lakes. The effect of acid rain is greater on the lakes than the rivers and streams. It increases the acidity of the lake water and the ratio of metal salts. As a result, natural life is threatened.

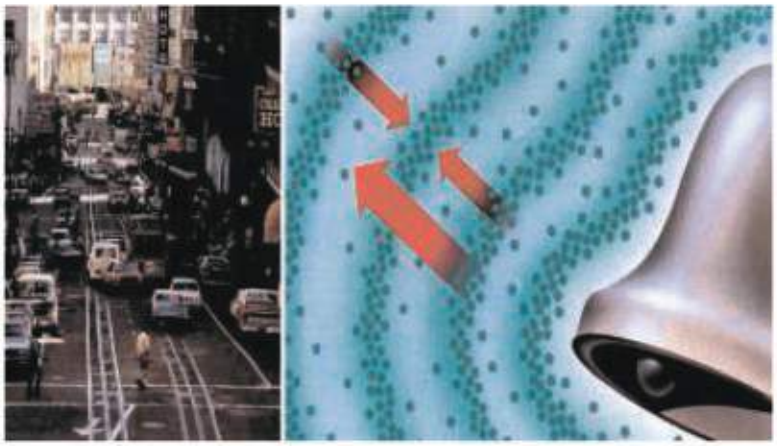
Sulfuric acid and nitric acid are produced from SO_2 and NO_2 gases that are released into the air and mix with water vapor. When this solution falls as acid rain, it causes damage to all organisms and the environment.

5. Noise pollution

Sound is such a common part of everyday life that we often overlook all that it can do. It provides enjoyment, for example, through listening to music or birdsong. It allows spoken communication. It can alert or warn us, say, though a doorbell, or wailing siren. Sound is a part of life. In natural conditions, bird, wind or water sound doesn't disturb us. But the sounds that we call noise disturb humans both physiologically and psychologically.

According to its source, noise falls under one of three headings: **transport (traffic) noise, industrial noise,** and **social noise**. Transport noise comes mainly from trains, planes, cars, buses, trucks, and motorbikes, and each of these produces noise in a variety of different ways.

Social noise includes the noises made by people in parks and at sporting events, as well as radio and TV sounds. Intense noise may rupture the eardrum and cause hearing problems. People living in areas with high levels of noise may experience hypertension, a fast breathing rate, and a high pulse. In addition, noise causes stress, discomfort, anger, and behavioral problems.



6. Radiation

Radiation is the process in which energy is emitted as particles or waves. The sun radiates energy continuously. Radiation pollution exists because humans use radioactive substances. Modern life, though offering many benefits to humanity, brings many problems. The energy produced from dams and thermal plants was insufficient and people started using nuclear power, the fission of radioactive isotopes, to produce energy. After the discovery of nuclear energy, scientists looked for ways to use it.

Also these countries made ships, submarines and aircraft carriers that run on nuclear energy. They are very efficient economically, but in the event of an accident, malfunction, or technical problem they are a potential threat to the environment and humanity. Nuclear energy is also used to make bombs.

Radiation affects the environment both physically and biologically. Nuclear trials and explosions spread dust and smoke which block sunlight. The biological effect of radiation is the damage to living things.

Measures against environmental pollution

Some measures that can be taken to reduce the dangers described are given below.

- The waste from factories should be recyclable. In this way we can save the raw materials and also prevent the pollution of the environment
- Fossil fuels used in heating should be high in calories and low in toxic substances so that air pollution is reduced.
- Chimneys of factories and houses, and exhausts of cars should have filtering devices to reduce toxic substances in the air.
- Tree planting should be encouraged so that the gas balance in the atmosphere is maintained and air pollution is reduced.
- Recyclable materials should be collected and used again.
- Recyclable materials should be used as much as possible.
- And, most importantly of all, everyone should be trained to be aware of environmental problems.

SELF CHECK ECOLOGY

A. Key Terms

Crust	Mantle
Fossil	Parasite
Ecology	Biotic factors
Ecosystem	Biome

B. Review Questions

1. Define the food chain and draw an example for it?
2. Write the types of organisms according to type of feeding and give an example for each?
3. Write the types of ecosystem and give an example for each?
4. Write the abiotic factors?
5. Write the four main layers of earth?

C. True or False

1. Earth formed 4.6 billion yaers ago.
2. The outer core is the hottest part of earth.
3. Virus is a kind of parasite.
4. Caves is an example for terrestrial ecosystem.
5. Noise pollution causes the stress in human.

D. Fill in the blanks correctly

1. A food chain consist of ....., ..., and .....
2. ..... and ..... are examples for aquatic ecosystems.
3. Living of two different organisms together is called as .....
4. The first living organisms on earth are .....
5. Living things that affect on life of organisms on its environment is called as .....

E. Multiple choice

1. Which of the followings not aiotic factor?

A) Temperature
B) Soil
C) Apple tree
D) Light

2. Which of the following is not a kind of ecological pyramids?

A) Pyramid of energy
B) Pyramid of numbers
C) Pyramid of ecology
D) Pyramid of biomass

3. _____ is the certain factor in determining the type of biome?

A) Food chain
B) Plants
C) producers
D) Climate

4. Which one of the followings does not causes the noise pollution?

A) Door bell
B) Train noise
C) Social noise
D) Bird singing

CHAPTER 9
FIRST AID

First Aid

First aid is the initial care of the injured or sick. It is the care administered by a concerned person as soon as possible after an accident or illness. It is this prompt care and attention that sometimes means the difference between life and death, or between a full or partial recovery.

First aid has limitations - not everybody is a doctor - but it is an essential and vital part of the total medical concept. FIRST AID SAVES LIVES! ...ask any ambulance officer or doctor who works in the emergency medical field.

The basic aims of first aid are:

- To save life
- To protect the casualty from getting more harm
- To reduce pain and Priorities of Casualty Treatment

Initial Assessment

Goal of the initial assessment:

Visually determine whether there are life-threatening or other serious problems that require quick care.

Breathing Bleeding Shock	Burn Choking	Heart Attack Fractures

Determine if victim is conscious - by tap and shout. Check for ABC as indicated:

A = Airway Open? – Head-tilt/Chin-lift.

B = Breathing? – Look, listen, and feel.

C = Circulation? – Check for signs of circulation.

Note:
These step-by-step initial assessment should not be changed. It takes less than a minute to complete, unless first aid is required at any point.

Bleeding Control

Control Methods For External Bleeding:

- Direct pressure stops most bleeding.
- Wear medical exam gloves (if possible)
- Place a sterile gauze pad or a clean cloth over wound
- Elevation injured part to help reduce blood flow.
- Combine with direct pressure over the wound (this will allow you to attend to other injuries or victims).
- If bleeding continues, apply pressure at a pressure point to slow blood flow.

Pressure point locations:

Brachial (Top of elbow)

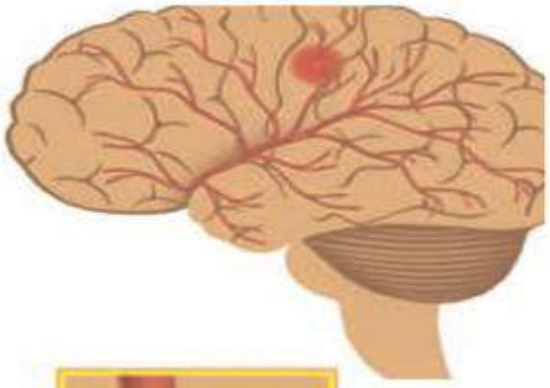
Femoral (Inside upper thigh)

Control Methods For Internal Bleeding:

Signs of internal bleeding:

- Bruises or contusions of the skin
- Painful, tender, rigid, bruised abdomen
- Vomiting or coughing up blood

Hemorrhagic stroke



What to Do:

For severe internal bleeding, follow these steps:

- Monitor ABC's (Airway Breathing Circulation)

- Keep the victim lying on his/her left side. (This will help prevent expulsion of vomit from stomach, or allow the vomit to drain and also prevent the victim from inhaling vomit).

- Treat for shock by raising the victim's legs 8"– 12"
- Seek immediate medical attention

Rupture of blood vessels leakage of blood

Shock

Shock refers to circulatory system failure that happens when insufficient amounts of oxygenated blood is provided for every body part.

This can be as the result of:

- Loss of blood due to uncontrolled bleeding or other circulatory system problem.
- Loss of fluid due to dehydration or excessive sweating.
- Trauma (injury)
- Occurrence of an extreme emotional event.

What to Look For?

- Altered mental status
- Pale, cold, and clammy skin, lips, and nail beds
- Rapid breathing and pulse
- Anxiety and restlessness
- Nausea and vomiting
- Unresponsiveness when shock is severe

What to Do?

After first treating life-threatening injuries such as breathing or bleeding, the following procedures shall be performed:

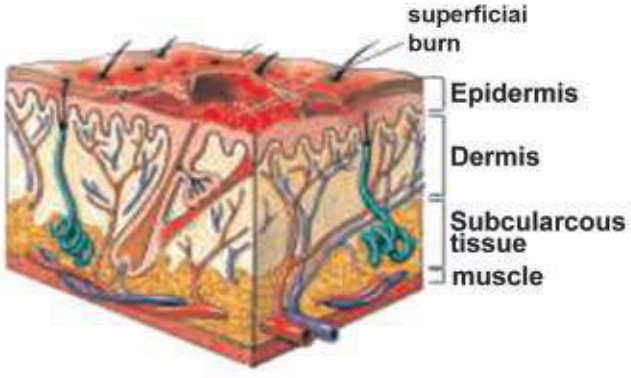
- Lay the victim on his or her back
- Raise the victim's legs 8" – 12" to allow the blood to drain from the legs back to the heart.
- Prevent body heat loss by putting blankets and coats under and over the victim

Burns

Burns have been described as:

First-degree burns

Only the skin's outer layer (epidermis) is damaged.
Symptoms include redness, mild swelling, tenderness, and pain.
Usually heals without scarring.



What to Do?

- Immerse in cold water 10 to 45 minutes or use cold, wet cloths.
- Cold stops burn progression
- May use other liquids
- Aloe, moisturizer lotion

Third-degree burns

Severe burns that penetrate all the skin layers, into the underlying fat and muscle.
Symptoms include: the burned area appears
gray-white, cherry red, or black.

What to Do?

- Usually not necessary to apply cold to areas of third degree
- Do not apply ointments
- Apply sterile, non-stick dressings (do not use plastic)
- Check ABC's
- Get medical help

Third degree burn

Run cool water over area of burn

Chemical burns

The result of a caustic or corrosive substance touching the skin caused by:

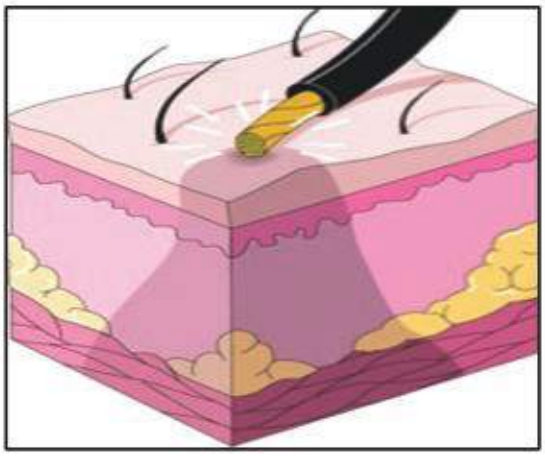
- Acids (batteries)
- Alkalis (drain cleaners- often more extensive)
- Organic compounds (oil products)

What to Do?

- Remove the chemical by flushing the area with water
- Brush dry powder chemicals from the skin before flushing
- Take precautions to protect yourself from exposure to the chemical
- Remove the victim's contaminated clothing and jewelry while flushing with water
- Flush for 20 minutes all chemical burns (skin, eyes)
- Cover the burned area with a dry, sterile dressing
- Seek medical attention

Electrical Burns

A mild electrical shock can cause serious internal injuries.



What to Do?

Make sure the scene is safe

Unplug, disconnect, or turn off the power.

If that is impossible, call the power company or EMS for help.

Do not contact high voltage wires

Consider all wires live

Do not handle downed lines

Do not come in contact with person if the electrical source is live

Check ABCs. (Airway Breathing Circulation)

If the victim fell, check for a spinal injury.

Treat the victim for shock by elevating the legs

8" – 12" if no spinal injury is suspected.

Seek medical attention immediately.

Choking

What is it?

Obstruction in the airway.
General Precaution

- If someone is coughing, leave the person alone.
- Do not perform the Heimlich Maneuver.
- Keep eyes on that person.
- Ask the person if he/she needs help.

Signs and Symptoms

Person is not able to breath or talk due to obstruction, choking sign given, distressed, and panic.
Hands wrapped around the neck is universal sign for choking.

What to Do?

Perform Heimlich Maneuver if you are properly trained
Conscious Victim:

- Approach from behind and wrap arms around the victim's waist.
- Place one fist just above the victim's navel with the thumb side against the abdomen.
- Second hand over the fist.
- Press into the victim's abdomen with one upward thrust
- Repeat thrust if necessary.
- Try to pop the obstruction out with swift thrusts in and up.
- Continue until the obstruction is relieved or victim collapses.

Have someone call for help.

Heimlich Maneuver

1. Lean the person forward alightly and stand behind him or her

3. put your arms around the person and grasp your fist with your other hand near the top of the stomach, just belew the center of the rib cage.

2. Make a fist with one hand

4. Make a quick, hard movement, inward and upward.

What to Do?

Unconscious Victim:

- Ask someone to call 122 for help
- Lower victim to floor on back or left side and perform Heimlich Maneuver
- Open airway with tongue-jaw lift
- Lock inside mouth – if you cannot see anything, do not do a finger sweep
- Try to give two full rescue breaths
- If these do not go in, reposition the head and give another breath
- Perform abdominal thrusts
- Continue until successful or help arrives

Choking Baby (Less Than 1 Year old): First Aid

1. Back blows: place she baby facedown on your fore arms with the baby's head slightly lower than the baby's slomach. Support the baby's head. Thurnp gentl but firmly 5 times between the baby's sholder blades.

2. Chest thrusts:if the baby does not start breathing, turn the baby over so that the baby is faceup on your torearm. keep the baby's head lower than the baby's stomach. Put your fingers in the center of the baby's chest and press 5 times

3. if the baby is still choking, repeat the back blows and chest thrusts until help arrives.

Fractures

There are two categories of fractures:

Closed (Simple) fracture
The skin is intact and no wound exists anywhere near the fracture site.
Open (Compound) fracture

- The skin over the fracture has been damaged or broken.
- The wound may result from bone protruding through the skin.
- The bone may not always be visible in the wound.

What to Look for:

General signs and Symptoms:

- Tenderness to touch.
- Swelling.
- Deformities may occur when bones are broken, causing an abnormal shape.
- Open wounds break the skin.
- A grating sensation caused by broken bones rubbing together can be felt and sometimes even heard.
- Do ot move the injured limb in an attempt to detect it.

Heart Attack

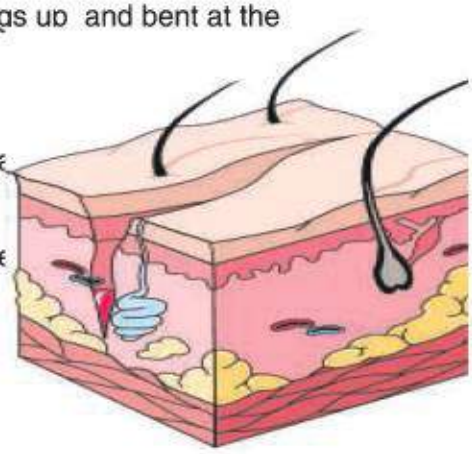
Heart Attack – Usually that happens when one of the coronary arteries is blocked by an obstruction or a spasm.

Signs and symptoms of a heart attack include:

- Pressure in chest, fullness, squeezing, or pain that lasts more than a few minutes or that goes away and comes back.
- Pain spreading to the shoulders, neck, or arms.
- Chest discomfort with lightheadedness, fainting, sweating, nausea, or shortness of breath.

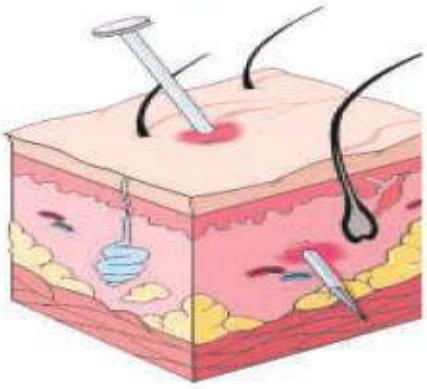
What to Do?

- Call EMS or get to the nearest hospital emergency department with 24-emergency cardiac care.
- Monitor victim's condition.
- Help the victim to the least painful position, usually sitting with legs up and bent at the knees.
- Loosen clothing around the neck and midriff.
- Determine if the victim is known to have coronary heart disease a erin.
- If the victim is unresponsive, check ABCs and start CPR, if neede



Basic First Aid for Wounds

Open Wounds



A break in the skin's surface that results in external bleeding and may allow bacteria to enter the body that can cause infection

- The top layer of skin is removed with little or no blood loss
- A cut skin with jagged, irregular edges and caused by a forceful tearing away of skin tissue

What to Do?

- Wear gloves (if possible) and expose wound
- Clean wounds
- Wash shallow wound gently with soap and water
- Control bleeding
- To prevent infection
- Wash from the center out / Irrigate with water

Wounds Care

- Remove small objects that do not flush out by irrigation with sterile tweezers.
- If bleeding restarts, apply direct pressure.
- Use roller bandages (or tape dressing to the body)
- Keep dressings dry and clean
- Change the dressing daily, or more often if it gets wet or dirty.

Dressings and Bandages

The purpose of a dressing is to:

- Control bleeding
- Absorb blood and fluid drainage
- Prevent infection and contamination
- Protect the wound from further injury

What to Do:

- Always wear gloves (if possible)
- Use a dressing large enough to extend beyond the wound's edges.
- Cover the dressing with bandages.

1 Flex the joint slightly. place the end on the inside of the joint and working away from the body, make two straight turns to hold it place.

2 Make alternate figure of eight turns above and below the joint, pach turn to overlap the provious one by about two thirds.

3 Extend the bandage quite far on much side of the joint. Make a last straight fult turn over the preceding one, told in the end and fix with a safety pin or sticky lape.

Bandaging of an injured joint

SELF CHECK
FIRST AID

A. Key Terms

Shock
Fracture
Choking
Heart attack

B. Review Questions

1. What does ABC mean in emergency?
2. What we have to do during electrical burns?
3. What are the signs of internal bleeding?
4. What we have to do whan a brother is in a shock?
5. Write the how to bandage a wound?

C. True or False

1. Do not move the injured limb in fracture.
2. Remove the chemicals by flushing the area with water in chemical burns.
3. Always stay calm during emergency.
4. Swelling is a sign of fracture.
5. Immerse the burned area in cold water.

D. Fill in the blanks correctly

1. Chemical burns are caused by ....., ..., and .....
2. Pressure point locations are ..... and .....
3. In emergency ask someone to call ..... for help.
4. ..... is used during choking if you are properly trained.
5. ABC means ....., ... and .....

What is the importance of first aid basics?

First aid is essential in emergency cases. Knowing what action needs to be taken to control an emergency can make the difference between life and death. Emergencies occur all around us, in all spheres of life. Someone may be injured at work, school or at home. When this happens, first aid basics will equip anyone around the injured person to reduce the danger posed by the accident.

For example, if a child breaks a limb during play time at school, an attending teacher may perform first aid to help reset the bones and reduce any pain and discomfort the child may be experiencing. In cases where the injury causes profuse bleeding, first aid is necessary to reduce the chances of extensive blood loss. Ambulances hardly arrive immediately, and first aid makes all the difference in the time it takes the ambulance to arrive.

What is included in basic first aid training?

First Aid is a broad subject. Most courses are usually designed to cover basic techniques used in first aid. Some common topics that may be covered in short first aid courses include: making an initial assessment of a victim, how to detect an emergency, how to protect yourself from any infections, effective control of bleeding wounds, dealing with broken bones, head and neck injuries, heart attacks, strokes, heat exhaustion, shortness of breath, and hypothermia.

The most important lesson is when to call emergency services and describing the emergency scene to an emergency operator. The more details they have, the better prepared medical emergency teams are when they arrive on the scene. For example, a description of the victim's wounds, their ability to respond and the extent of damage. First aid training may take a day or a couple of months. The length of classes determines how much information is acquired. Registering for a full first aid course is recommended, since it prepares individuals for any emergency they might encounter.