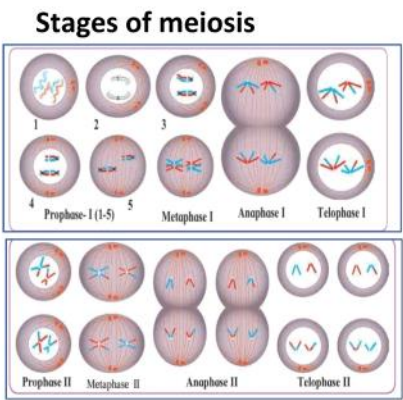
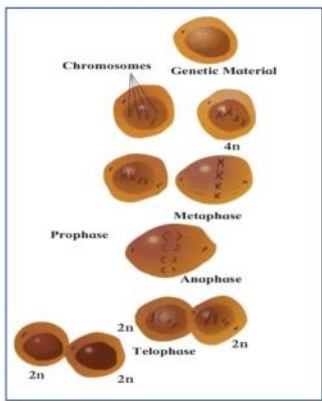


Science &Technology PRACTICAL Part -2
PRACTICAL NO. :1

Title of the Experiments: To study mitosis and meiosis.
Requirements of Experiments : Permanent slides of mitosis and meiosis, Compound microscope .
Diagram of experiment setup :
Stages of mitosis



Observation : Main differences between mitosis and meiosis: -

Mitosis	Meiosis
1. It occurs in somatic cells and stem cells. .	1. It occurs in germ cell .
2. Two new cells are formed (2n)	2.four haploid new cells are formed (4n)
3. Mitosis completed through two steps 1. Karyokinesis (nuclear division) 2. Cytokinesis (cytoplasmic division).	3.Meiosis completed through two stages , meiosis I and Meiosis II
4. karyokinesis completed through steps Prophase, Metaphase, Anaphase, Telophase	4.Meiosis I has Prophase I, Metaphase I, Anaphase I, Telophase I steps, and Meiosis II has Prophase II, Metaphase II, Anaphase II, Telophase II steps

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[To study mitosis and meiosis](#)



Inference / conclusion :

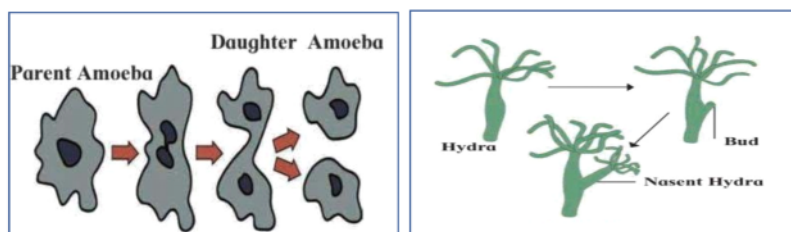
1. Due to mitosis the number of chromosomes in the cell doubles and then reduce to original. therefore , this division occurs in cells.
2. Due to meiosis the number of chromosomes in the cell reduce to half therefore , this division occurs in cells.

Science & Technology PRACTICAL Part -2
PRACTICAL NO. :2

Title of the Experiments: To study binary fission in Amoeba and Budding in Hydra with the help of permanent slides.

Requirements of Experiments : Compound microscope, permanent slides showing binary fission in Amoeba and Budding in Hydra.

Diagram of experiment setup :



Observations:

A: Binary fission in Amoeba :

1. At the beginning , parent cell of amoeba gets elongated.
2. Nucleus gets oval shape.
3. A notch is developed at the site of division.
4. Two small daughter cells of Amoeba are formed.

B: Budding in hydra :

1. A small outgrowth is seen on the body of Hydra.
2. It becomes multicellular due to enough growth.
3. This outgrowth detaches in the form of bud having mouth and tentacles.

Inference/conclusion :

Amoeba and Hydra reproduce by Asexual reproduction method.

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[PRACTICAL - Studying binary fission in Amoeba and budding in Yeast and Hydra with prepared slides.](#)



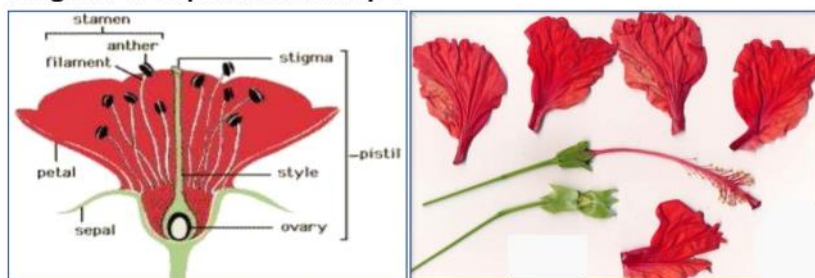
Science & Technology PRACTICAL Part -2

PRACTICAL NO. :3

Title of the Experiments: To study the reproductive system in Hibiscus flower .

Requirements of Experiments : Hibiscus flower, forcep, blade, simple microscope .

Diagram of experiment setup :



Readings in Observations table:

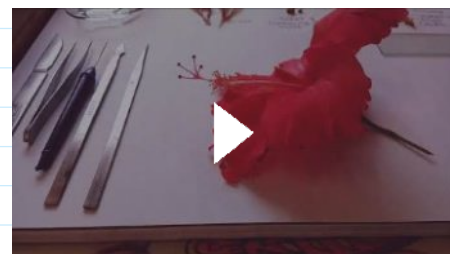
Whorl	Number of component	Structure	function
Calyx	five	Green sepals	Protection in bud form
Corolla	five	Red petals	Attraction of insects
Androecium	Innumerable stamens	Anthers , filaments	To produce pollen grains
Gynoecium	three	Ovary, style, stigma	Fertilization

Inference /conclusion :

1. Androecium from flower is male whorl, while Gynoecium is female whorl.
2. Male gamete from Pollen grains and egg cell from ovule, these two haploid cell unite to form a diploid zygote. Thus the process of seed and fruit formation begins.
3. flower is the Reproductive organ of plants.

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[Dissection of Hibiscus flower](#)



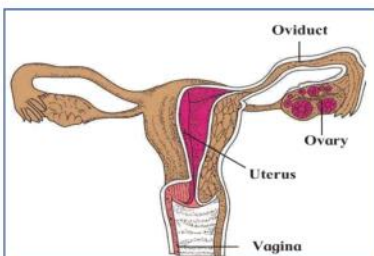
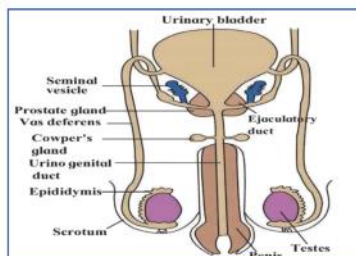
Science & Technology PRACTICAL Part -2

PRACTICAL NO. : 4

Title of the Experiments: To study Human Reproductive System .

Requirements of Experiments : Models of Male reproductive system and Female reproductive system.

Diagram of experiment setup :



Readings in Observations table:

Sr.	Name of the organ in Male reproductive system	function
1	Testes	Produces testosterone , contains numerous seminiferous tubules, Germinal epithelium present in the tubules divide by meiosis to produce sperms.
2	Different tubular structures	Sperms travels from one tubule to next . in this interval they are nourished and made mature for fertilization.
3	Accessory glands	Secretion released in urethra . all secretions along with mature sperms is called semen.
4	Urethra passing through Penis	Penis transfer the semen during intercourse. Urethra is common passage for sperms and urine
Sr.	Name of the organ in Female reproductive system	function
1	Ovaries	Produce ova, secretes female hormones
2	Oviduct	Transport of ovum to ureters .
3	Uteres	Development of foetus , birth process

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[To study human reproductive system](#)



4	Vagina	Passage for intercourse, acts as birth canal, passage for menstrual flow

Inference/conclusion:

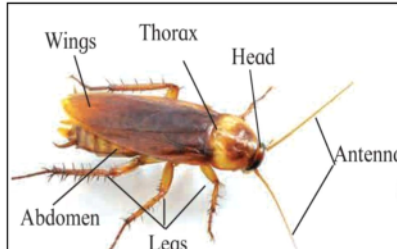
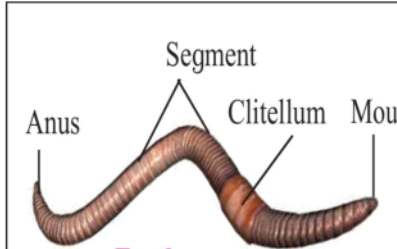
1. Male reproductive system produces haploid gametes called sperms .
2. Ovary Female reproductive system produces haploid gametes called ovum. .
3. Sperm and ovum unite to form a diploid (2n) zygote and afterwards it develops into human embryo.

Science & Technology PRACTICAL Part -2
PRACTICAL NO. : 5

Title of the Experiments: To study the characteristics of non – chordate animals
 (a) Earthworm (b) cockroach

Requirements of Experiments : Preserved specimens of Earthworm and Cockroach.

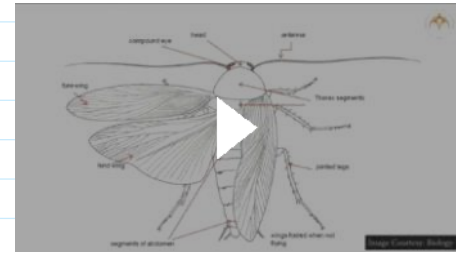
Diagram of experiment setup :



Readings in Observations table:
Earthworm

Kingdom	Animalia
subkingdom	Non-chordata
phylum	Annelida
Example	Earthworm (Scientific Name : PHERETIMA POSTHUMA)
characteristics	1.Long cylindrical and metamerically segmented body covered with cuticle
	2. its called friends of farmer as it dwells the land and makes it loose .

[To study Characteristics of non-chordate animals](#)



Cockroach

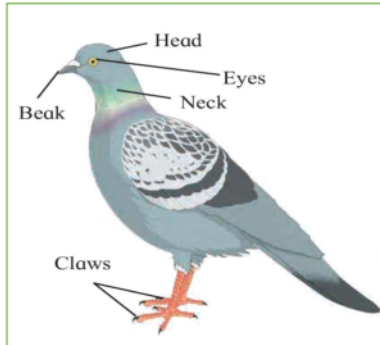
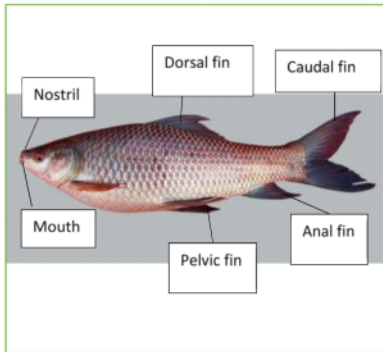
Kingdom	Animalia
subkingdom	Non chordata
phylum	Arthropoda
Example	Cockroach (Scientific Name : PERIPLANETA AMERICANA))
Chracteristics	1. Cockroach is a terrestrial and nocturnal insects.
	2. Head ,thorax and abdomen are the three main body parts . cockroach has three pairs of jointed legs and two pairs of wings.

Science & Technology PRACTICAL Part -2
PRACTICAL NO. : 6

Title of the Experiments: To study the characteristics of chordate animals a. Fish, B. Pigeon .

Requirements of Experiments : live or preserved specimens of Fish and Pigeon.

Diagram of experiment setup :



Readings in Observations table:

Fish

Kingdom	Animalia
Phylum	Chordata
subphylum	vertebata
class	Pisces
Example	Rohu fish (Scientific Name : LABEO ROHITA)
Chracteristics	1.fish is cold blooded animal with a spindle shaped body to minimize water resiatance . 2.Fish braeaths with gills.

[To study the characteristics of chordate animals](#)



Pigeon

Kingdom	Animalia
Phylum	Chordata
subphylum	vertebata
class	Aves
Example	Pigeon (Scientific Name : COLUMBA LIVIA)
characteristics	1. pigeon body is covered with feathers . forelimbs are modified into wings. Heart has four compartments. 2.pigeon has hallow bones and air bags inside the body . thus is aerial adaptation.

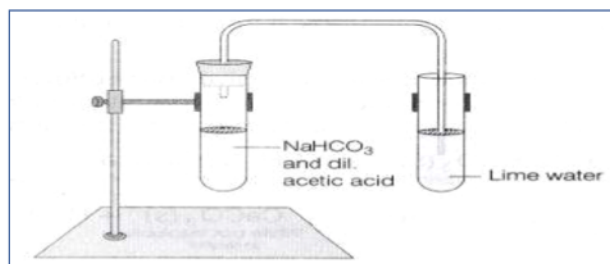
Science & Technology PRACTICAL Part -2
PRACTICAL NO. : 7

Title of the Experiments: To study the physical and chemical properties of Acetic (Ethanoic) acid.

Requirements of Experiments : test tube , test tube stand.

Chemicals: Acetic acid, red and blue litmus solutions , sodium bicarbonate.

Diagram of experiment setup :



Readings in Observations table:

Sr.no.	Test	Observations	Inference
1	Odour	Odour like vinegar	Acetic acid has vinegar like odour.
2	Solubility of water	Acetic acid soluble in water.	Soluble or miscible in water.
3	Blue litmus solution	Blue colour of litmus change to red	Acetic acid is acidic in nature.
	Red litmus solution	Does not change in colour	
4	a. Reaction with sodium bicarbonate	Colourless and odourless gas bubbled evolved.	Carbon dioxide gas is evolved when Acetic acid reacts with sodium bicarbonate.
	b. Pass this gas through lime water.	At first time turns milky , but if the gas is allowed to pass for some more time, the lime water becomes colourless again	

[To study the physical and chemical properties of acetic acid](#)



Science & Technology PRACTICAL Part -2
PRACTICAL NO. : 8

Title of the Experiments: to study the characteristics of microbes that are industrially useful .

Requirements of Experiments : compound microscope ,and permanent slides of streptococcus thermophilis, lactobacillus acidophillus , saccharomyces cerevisiae , acetobacter.

Diagram of experiment setup :



streptococcus thermophilis



lactobacillus acidophillus



saccharomyces cerevisiae



acetobacter

Readings in Observations table:

Sr.no.	Name of the microbe	Type	characteristics
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[To study of the characteristics of microbes that are industrially useful](#)



1	Streptococcus thermophilis	Lactic acid bacterium	It is found in fermented milk products. It is generally used in production of yogurt, mozzarella cheese. It turns sugar lactose into lactic acid.
2	Lactobacillus Acidophilus	Probiotic in nature	It occurs in the human and animal gastrointestinal tract and mouth. Commercially used in dairy products.
3	saccharomyces cerevisiae	Species of yeast (fungus)	It is source of vitamins and minerals. They also aid in breaking down fats, protein and carbohydrates for quick supply of energy.
4	Acetobacter	Acetic acid Bacteria	It has ability to convert ethanol to acetic acid. It lives wherever sugar fermentation occurs . it is used for action on wines and ciders.

Inference / Conclusion: Industrial uses of microbes when microbiology is used for commercial purposes as well as economic, social and environmental related processes , then it is called industrial microbiology. By research on various microbes , various product are produced on large scale by industrial microbiology.