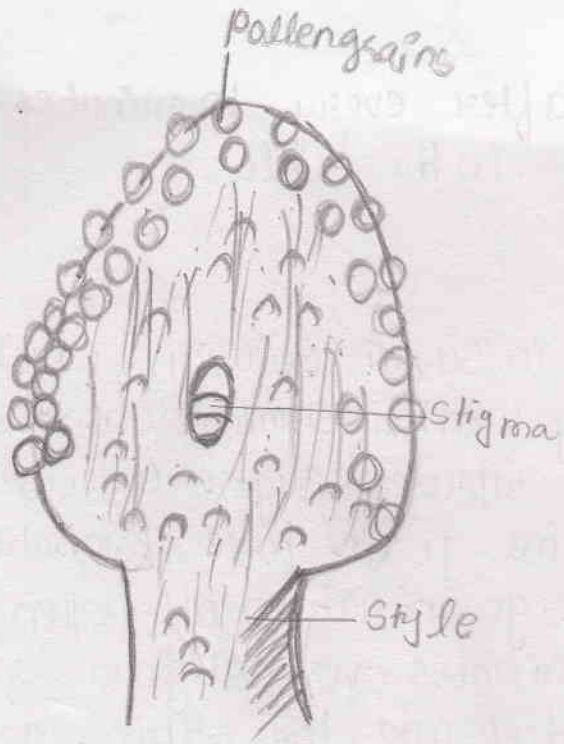
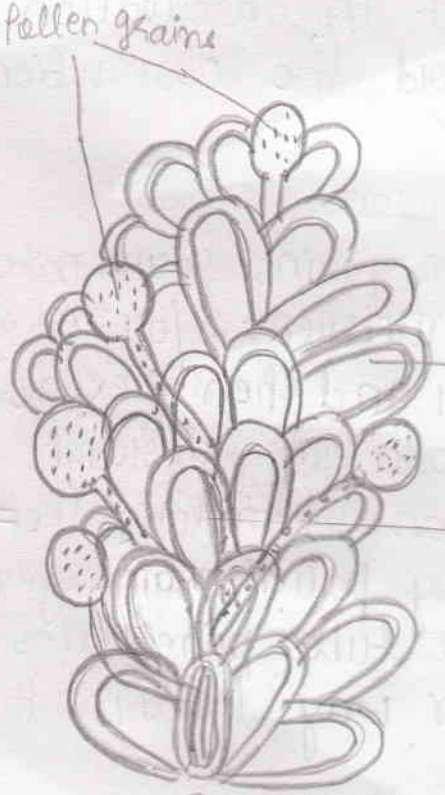
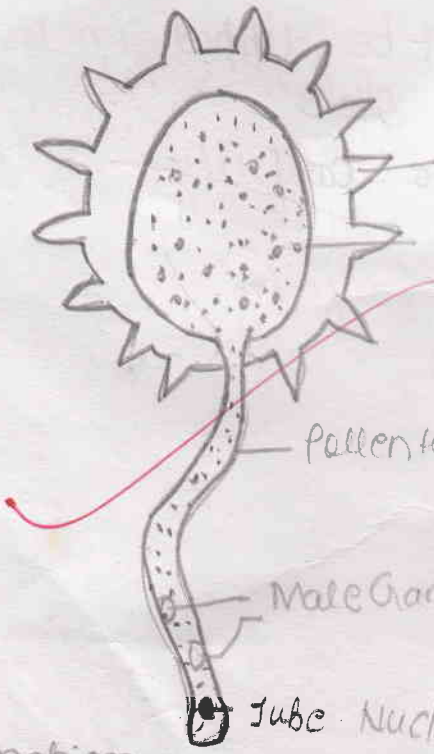


Pollengrains Covering a Stigma



Germination and Growth of pollen grains on stigma of Portulaca Oleracea (After Brown)



Germinating pollen under Compound Microscope

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Experiment-2

Aim → To Study of pollen germination on Stigma through a permanent slide.

Requirements :- An opened mature flower of Portulaca, glass slide, needles, Coverslips, Safranine Stain, dissecting microscopes, Compound microscope, glycerine.

Procedure:-

1. Take out a pistil from a fresh, opened mature, flower of Portulaca.
2. Stain the isolated Stigma with Safranine. Stain
3. Mount the stained stigma in glycerine and place a Coverslip over it.
4. Observe under dissecting microscope.
5. With the help of needles, take out a germinating pollen mount in glycerine and place a Coverslip.
6. Observe the slide under Compound microscope.

Observations

1. Many pollen grains are present over the stigma.
2. Pollen grains absorb water and other substances such as sugars and organic acids secreted by stigma
3. The thin intine protrudes out through a germ pore into a slender pollen tube.
4. The pollen tube acts as a male Gametes/sperms Carrier as well as haustorial Organ.

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5. Pollen tube comprises with its vegetative / tube nucleus at its tip, followed by generative nucleus. The generative nucleus give rise to two male gametes.

Identification points (Permanent Slide):

1. Many pollen grains present on the stigmatic surface.
2. Pollen grains swell up, due to absorption of stigmatic secretions.
3. Intines protrudes out to form thin, slender pollen tube
4. Pollen tube contains tube/vegetative nucleus at its tip. followed by generative nucleus which later divides to form two male Gametes.

Precautions

1. Mounting should be free from air bubbles.
2. Carpel must be taken from a fresh flower.

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Experiment-3

Aim → Study of flowers adaptated to pollination by different agencies (wind, insect, bird)

Requirements → living materials or charts or models of Maize, Ricinus, Sunflower, Salvia, Ficus (Anjir), Notebook Pencil, Rubber etc.

Observations → observe the above experiments one by one and note the various adaptations / modifications which are helpful to the plant for pollination with wind or by insects.

Adaptations of the plants to wind pollination

Theory

1. Anemophily (wind-pollination) - It is a type of cross-pollination involving transfer of pollen grains from the mature anthers to the stigma of another flower through the agency of wind. The adaptations of anemophily are -
   i) The flowers are devoid of showy bracts and other floral structures like Calyx and Corolla.
   ii) Flower Colourless, nectarless and odourless
   iii) Stamens are numerous and exserted (projecting outside Corolla tube)
   iv) Flowers Small in conspicuous.
   v) In Monoecious, male flowers are more abundant.

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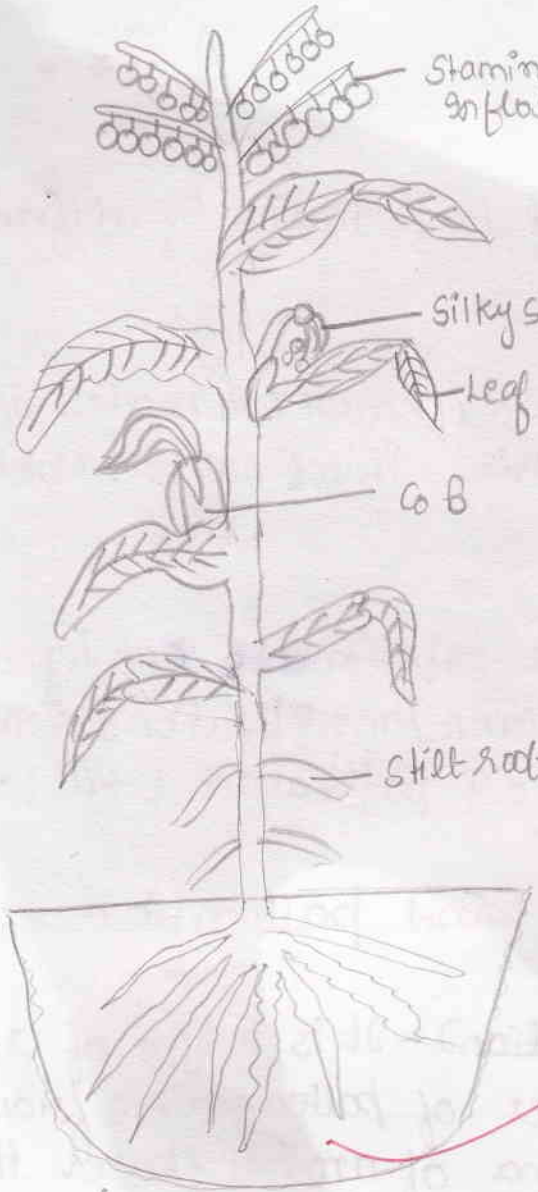
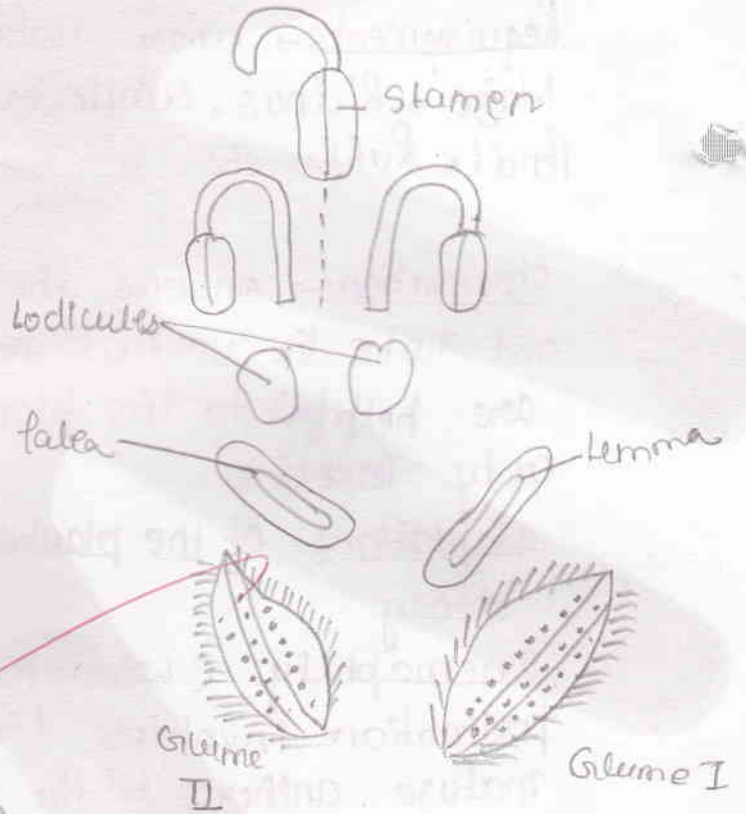
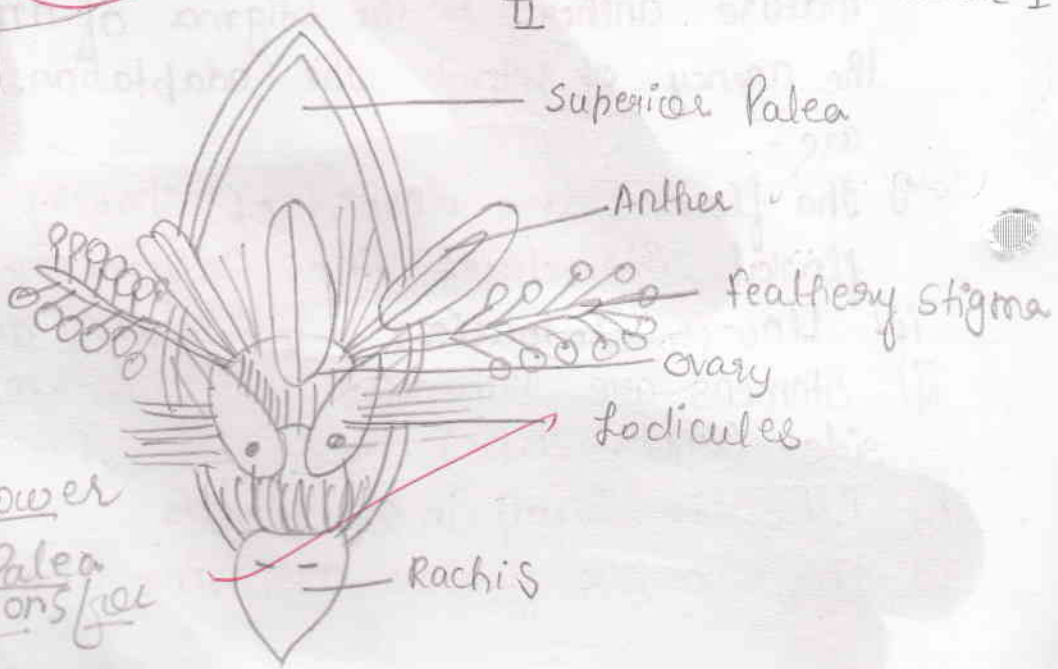


A. (A Plant)
Zea mays

B. An opened Spikelet-
Zea mays (maize)





C.
A Typical-Grass flower without inferior Palea showing adaptations for Anemophily

Avena

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1. Grasses

Grasses mainly belong to families cyperaceae (Cyperus), and Graminae under series Glumaceae.

In Grasses flowers may be unisexual [maize, Carex] or bisexual [Oat-, wheat-, Rice etc]

Zea mays

Zea mays is monoecious, diclinous bears two types of inflorescence.

a) Staminate inflorescence- panicle of spikelet, each spikelet is 2-flowered enclosed by two Gameles

b) Female inflorescence → is called Cob. enclosed by large no. of green bracts or spathes, inflorescence axillary arising in the axils of lower leaves on main stem.

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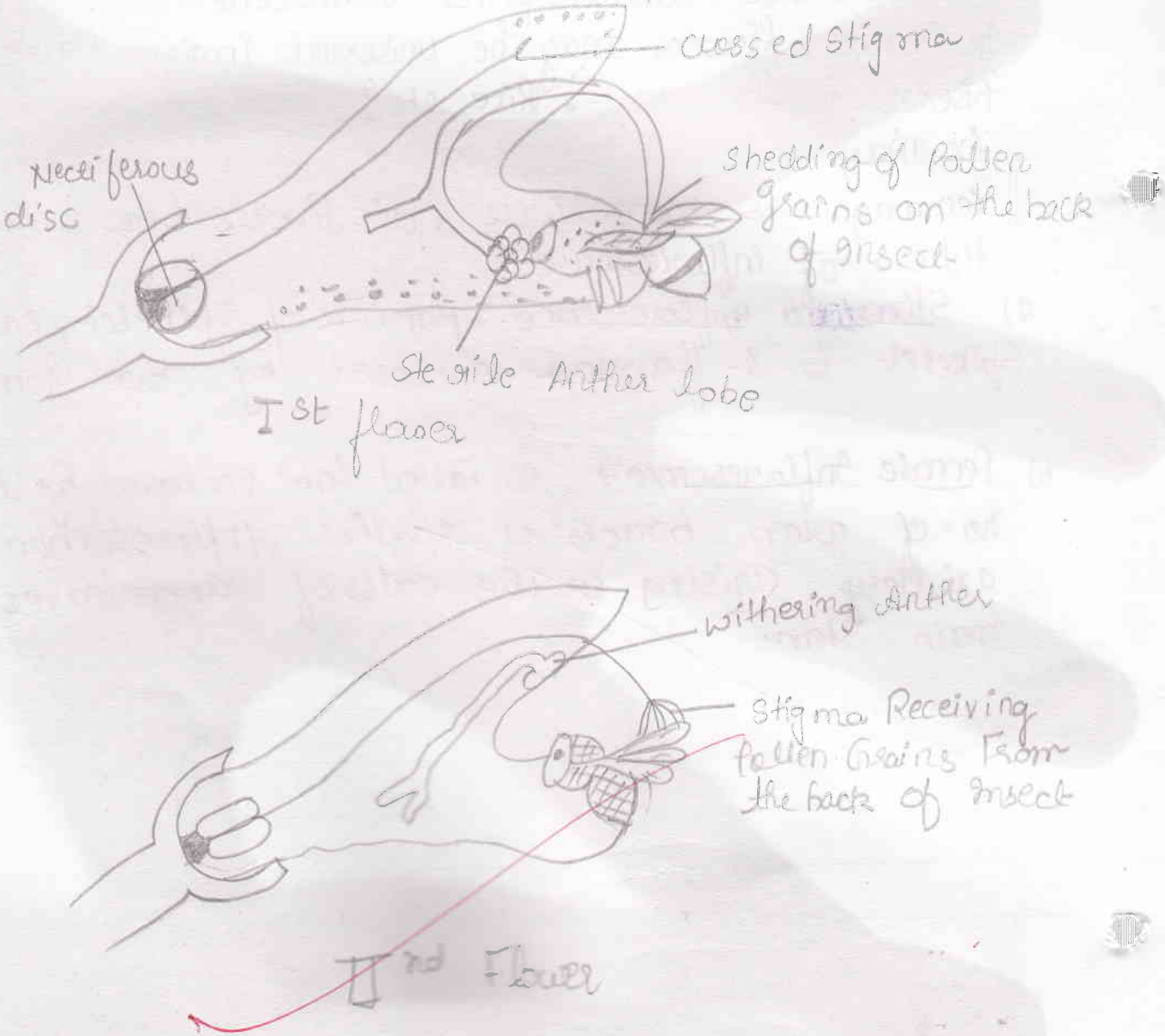

Pollination in Salvia Officinalis

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Adaptations of plants to insect pollination.

i) Small, inconspicuous flowers become prominent by grouping eg. Capitulum, Umbel, Spadix etc
ii) flowers often have pleasant fragrance (odour) and sweet nectar.
iii) Stigmas are inserted and sticky.
iv) Stamens and stigmas are inserted.
v) In some cases pollen is edible an attraction of insects for food e.g rose & poppy etc.

Salvia

It is a cultivated ornamental herbaceous plant belonging to family Labiatae. It shows specialised floral mechanism for bee pollination. The flowers have a bilipped calyx and corolla - a landing platform two protandrous stamen attached to the corolla tube. only one lobe of anther is fertile whereas the lower lobe is sterile anothes plate lies side by side and block the path of insect. Brightly coloured calyx and corolla, lower lip of corolla acts as a landing platform, protandrous stamens with lever mechanism, pollen grains with pollen kit, presence of nectar glands help in pollination by insects.

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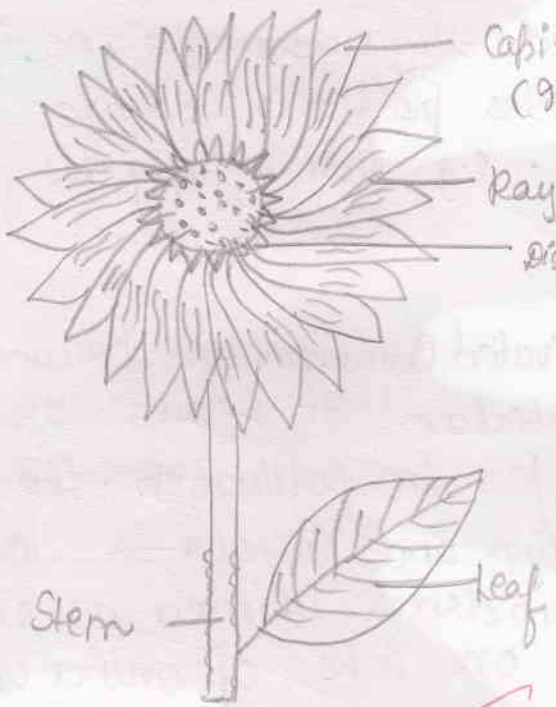

Entire Capitulum of Sunflower

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Sun Flower

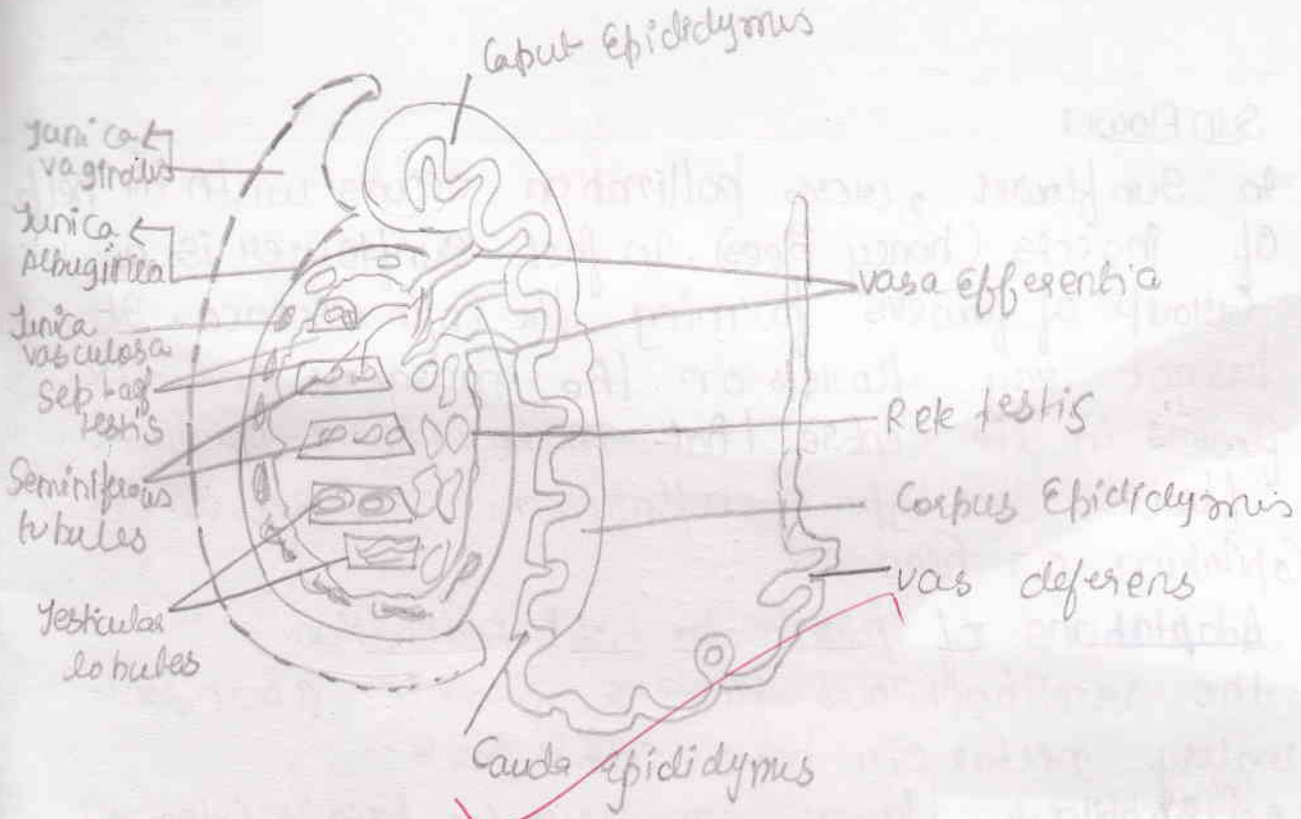
In Sunflower, cross pollination occurs with the help of insects (honey Bees). In fact- sunflower is a Group of flowers forming the inflorescence. It has got ray florets on the margins and disc florets in the centre that- make the individual flowers. This type of inflorescence is known as Capitulum or head.

Adaptations of plants to bird pollination

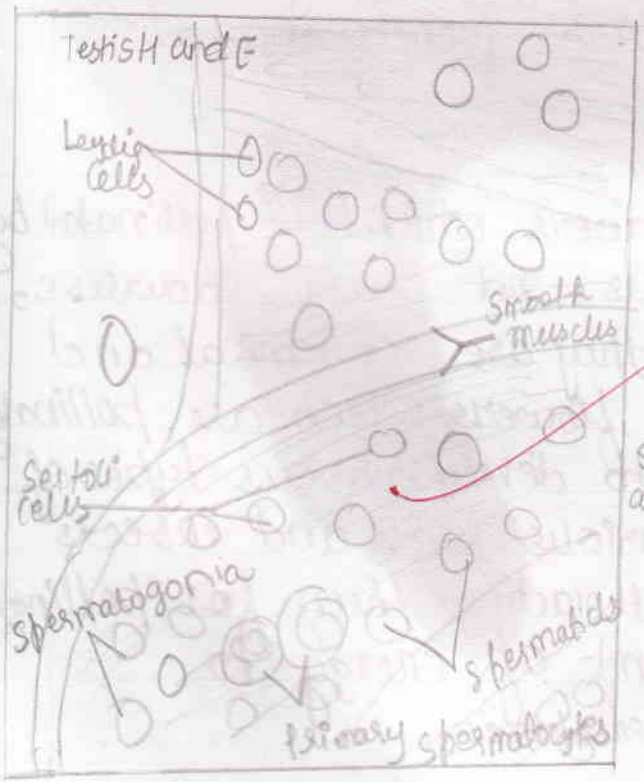
1. The ornithophilous flowers secrete abundant- watery nectar or have edible parts.
2. Ornithophilous flowers are usually bright coloured- red, orange, yellow or blue.
3. The floral parts are commonly leathery.
4. In some cases, the Corolla is funnel- shaped.
5. Scent is often absent-.

Conclusions / Results:- The flowers which ~~have~~ are pollinated by winds are small, inconspicuous, not showy, colourless, nectarless and odourless. They are economical and energy thrift-, while the flowers which are pollinated by birds, insects have to develop various types of adaptations suited to various birds and insects which ~~ha~~ are aid in attracting them for pollination. They spend a large amount of Energy to accomplish these structures.

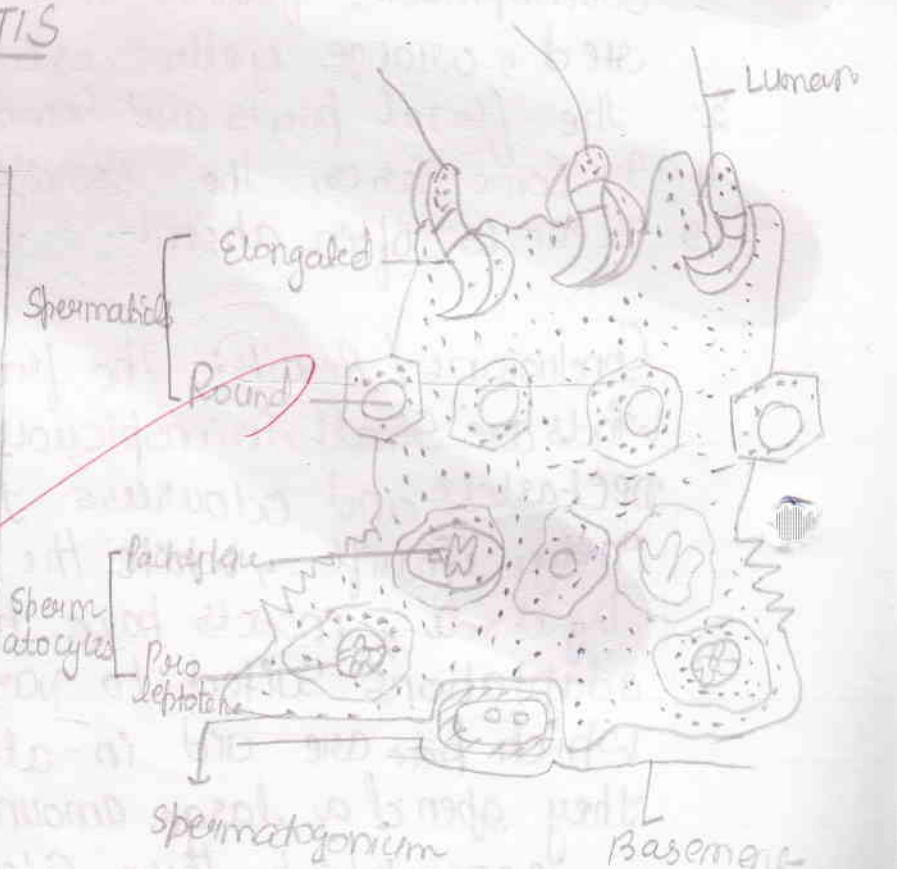
Teacher's Signature



L·S OF TESTIS



T·S TESTIS OF MICE



A PART OF SEMINIFEROUS TUBULE

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Experiment-4

Aim → Study and identify stages of gamete development i.e T.S testis and T.S ovary through permanent slides.

A. T.S testis of a mice [to show the stage of Spermatogenesis]

Reason for Identification

1. A testis shows a large no. of long convoluted seminiferous tubules.
2. Each seminiferous tubule is lined by basement membrane germinal epithelium the cells of which divide mitotically from spermatogonia and sertoli cells.
3. various stages in the development of sperms like primary spermatocytes, secondary spermatocytes, spermatids and spermatozoa are seen.
4. Interstitial cells or leydig cells are present in b/w the tubules that secrete the male sex hormone testosterone.
5. All stages of spermatogenesis can be seen at any time in a seminiferous tubule.

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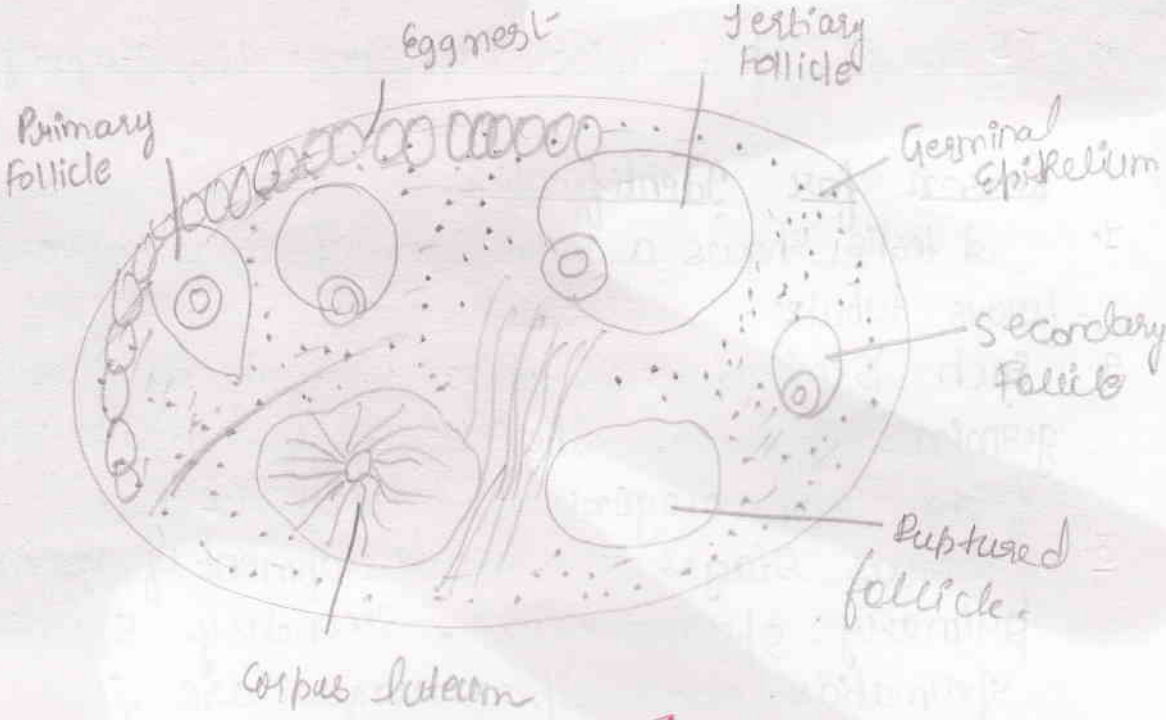


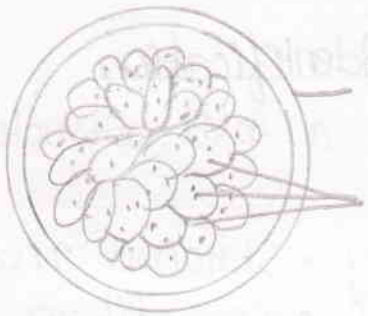
T.S OVARY OF A MICE

B. T.S Ovary of a female mice [to show Stages of Oogenesis]

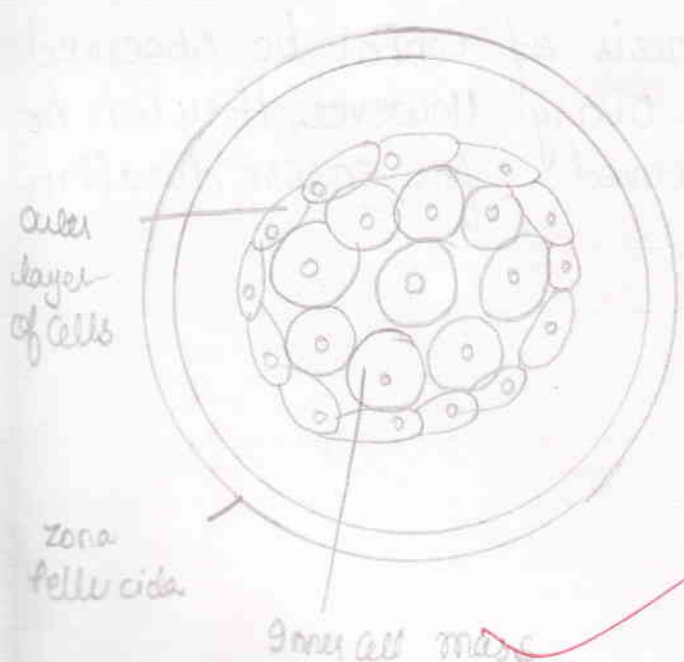
Reasons for Identification.

1. A mice Ovary is a Solid structure bounded by germinal epithelium.
2. Inside the ovary, stroma made-up of Connective tissue blood vessels and nerve fibres are present.
3. A Graafian follicle Consists of an ovum [in the Secondary oocyte Stage] surrounded by a Group of follicular Cells.
4. A mature follicle ruptures and releases the ovum out of the ovary.
5. All the stages of oogenesis of cannot be observed at a time in a mammalian ovary. However, they can be seen when ovary is observed for entire duration of mestrual cycle.

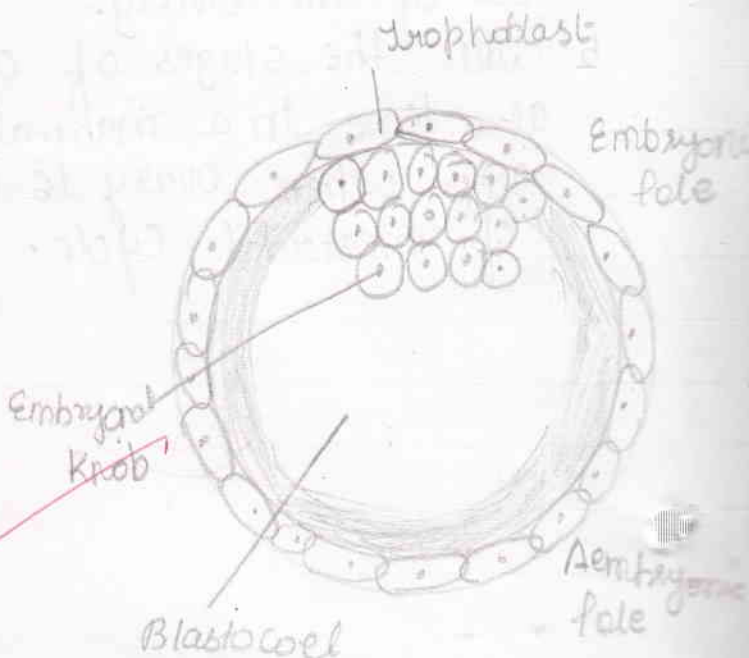
Teacher's Signature .....



A. EARLY MORULA



B)



C)

Early stages of Embryonic Development

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Date: 27/8/20

Experiment-5

Aim → Study of T.S of Blastula through permanent Slides

Requirement:- Permanent slides of different stages of T.S of Blastula.

Observation

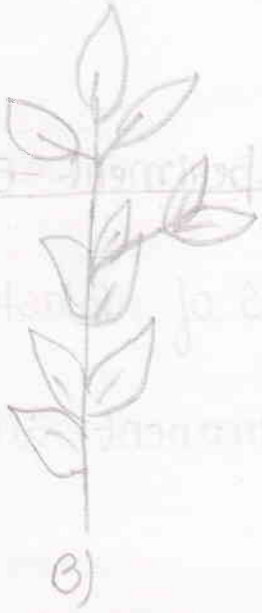
1. Morula develops into trophoblast or trophoectoderm by absorbing the nutritive fluid secreted by the uterine wall through outer cells.
2. The trophoblast consists of blastocoel and inner cell mass. The nutritive fluid collects in the centre.
3. The enlarged young Embryo resembles a cyst and the stage is called Blastocyst.
4. Inner cell mass is responsible for the formation of Embryo proper.
5. Blastocyst forms chorionic villi to obtain nourishment from the uterine wall.

Reason for Identification

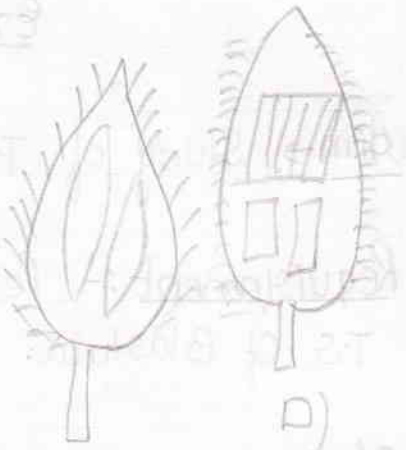
1. Blastocyst is the shape of a cyst.
2. It is about 64-cells.
3. The trophoblast forms extra-Embryonic Coverings - chorion and amnion.
4. Chorion forms villi for implantation of blastocyst.
5. Inner cell mass forms Embryo proper.

Teacher's Signature

A) Rice plant (female parent)

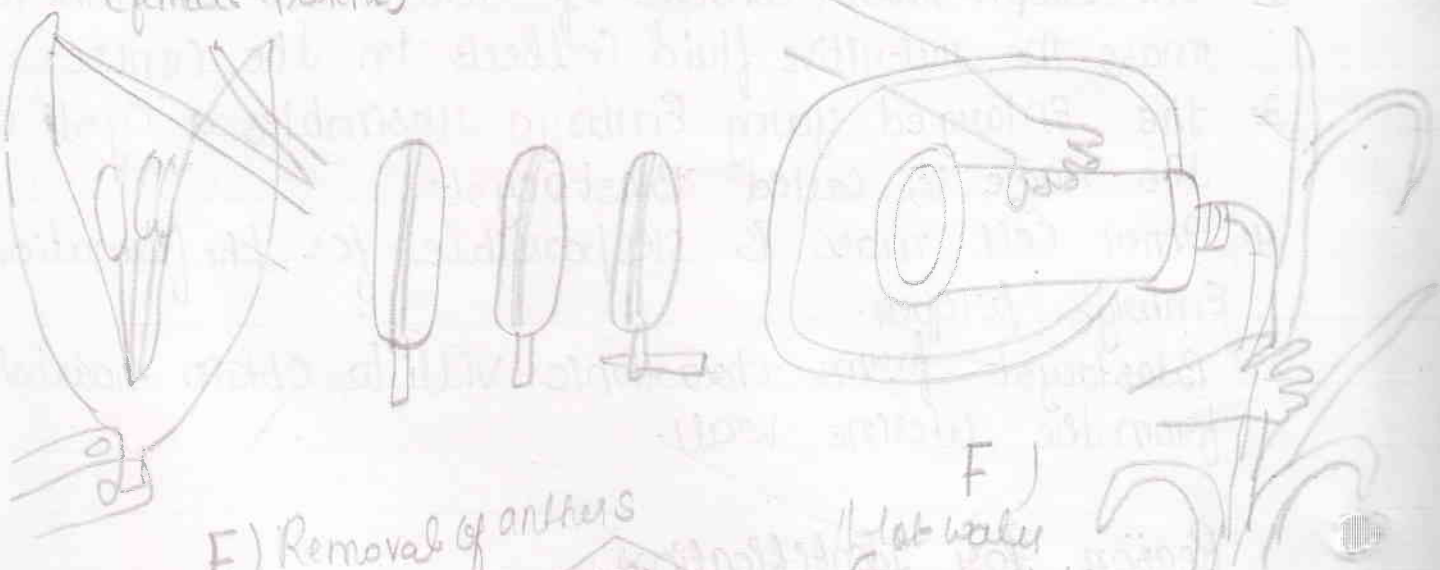


B) Panicle



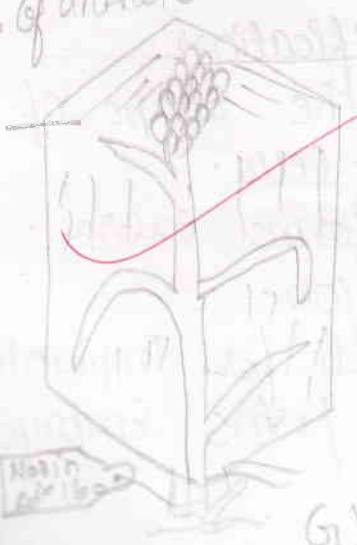
C) A spikelet

D) The same before anthesis



E) Removal of anthers

F) Cut-away emasculation



Bag

Tag

G) A pollinated plant inside a bag

HYBRIDISATION TECHNIQUE

Page No.
Date 27/04/2016

Experiment-6

Aim → Exercises on Controlled pollination- Emasculation tagging and bagging.

Requirements → fine pointed straight or curved scissors two pointed forceps, hand lens, muslin or parchment bags, Camel hair brush, watch glass, needles - pointed or curved, scalpel, thread, alcohol and field record book.

Procedure or Technique :-

The technique of hybridisation mainly comprises of the following steps:-

1. **Selection of parents →** A plant breeder must first be clear about the object of hybridisation. Choice of parents is of great importance. The parents should be vigorous and healthy and weak, old and sick - plants should Be rejected.
In culture pests, diseases and contamination with foreign pollen should be guarded.
The parents should be of true breeding nature.
In Cereals such as rice only 7 or 8 Spikelets are selected and Others are cut off. It is necessary to bag the plants.

2. **Emasculation →** The next step is to ensure that no self - pollination takes place. In bisexual flowers

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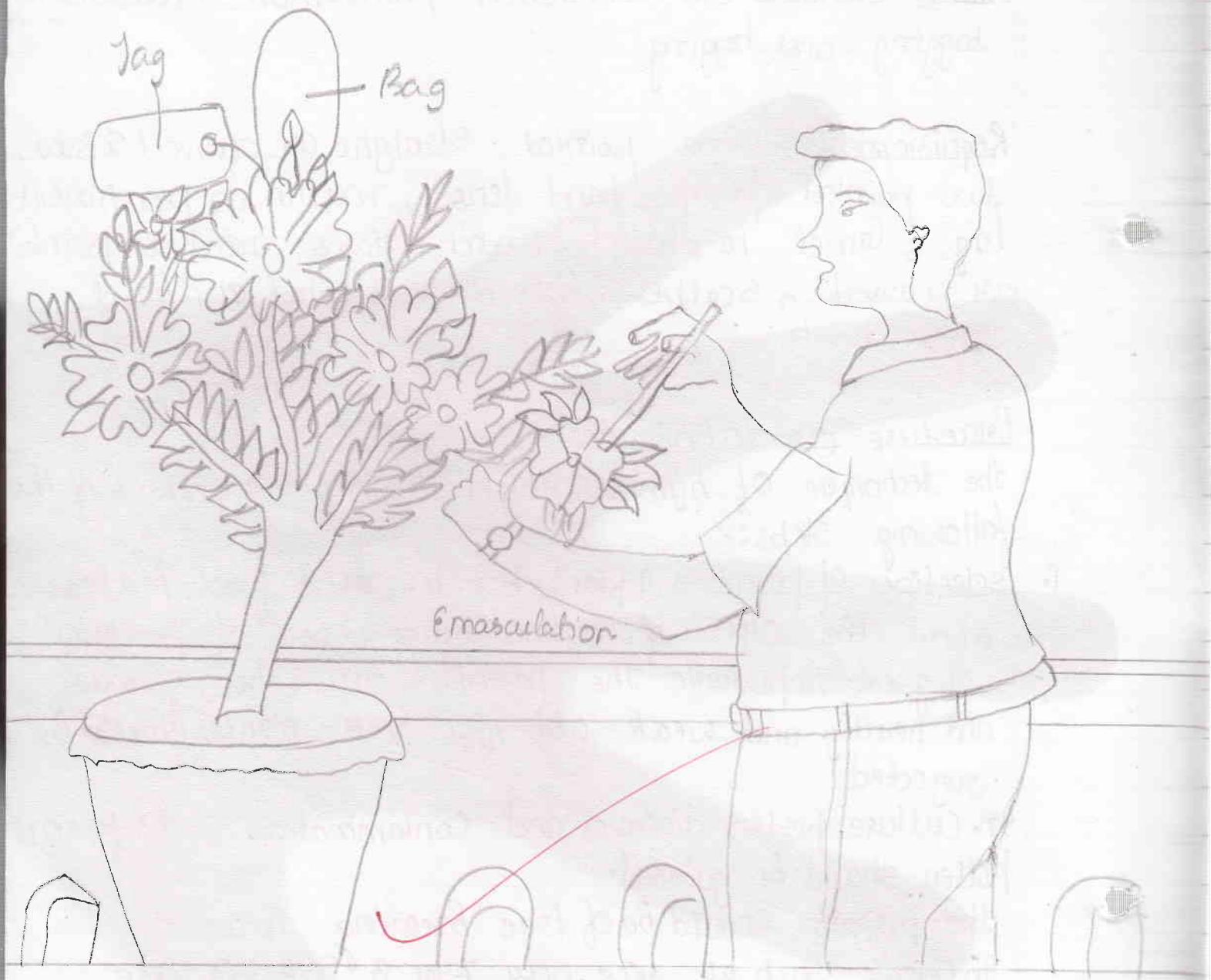

Artificial Pollination (Mechanical)

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this is done by removing the stamens before the anthers dehisce and shed the pollen. which thus becomes virtually a female parent and should be bagged immediately. The process of removing the stamens / anthers from a bisexual flower is called emasculation. It is necessary to open the bud before anthesis and emasculation done without injuring floral parts.

3. Bagging → All the flowers to be used as a female parents are protected by covering with the suitable paper or polythene bag to keep them off the undesired pollen. The flowers of male parent plants are similarly protected, to prevent falling of foreign pollen on them and thus contaminating.

4. Artificial pollination → the next in the process is the collection of pollen from the selected male parents, in paper bags, tubes, vials or dishes, at the time when anther dehisce. The collected pollen is dusted with a fine brush, on the stigma of selected female parent by temporarily removing the bag. After artificial pollination the female flower is safely sealed in a bag, till the time of setting of the fruit or seed begins.

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5) Tagging or labellings:- The artificial pollinated female parent plants are suitable tagged or labelled. The tag should contain the following information.

- Details / note about the male parent.
- Date of Emasculation
- Date of artificial pollination / crossing
- Detail of the female parent
- Serial no. in the record book
- Remarks, if any

Result-

The last step is the collection of hybrid fruits and seeds when they are fully mature. During the next growing season seeds are sown to raise the F_1 (first filial) hybrid generation. The F_1 plants are allowed to self-pollinate and seed are collected in next growing season to raise F_2 generation. and so on. In some cases, the selected F_2 is back crossed with either parent to achieve the same purpose

Precautions

1. A care should be taken, so that floral parts may not get injured at the time of Emasculation.
2. Selected parents should be pure as true breeding.

Hemant
04/05/2016

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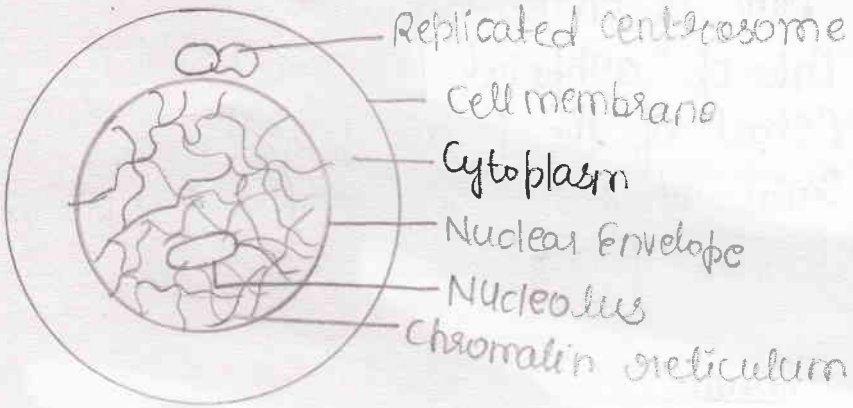
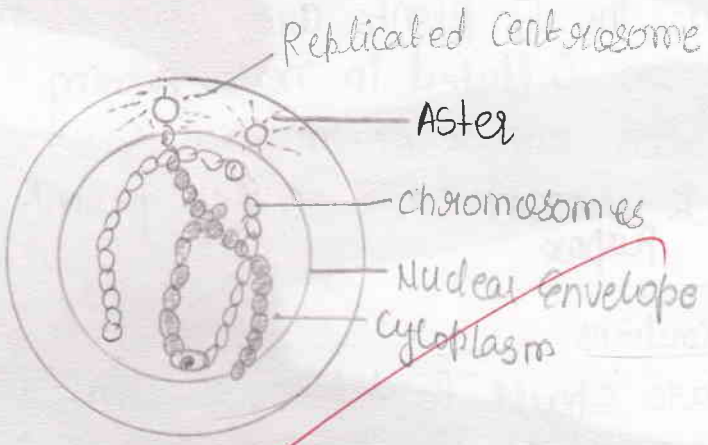


INTERPHASE



1. PROPHASE LEPTOTENE

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Experiment-7

Aim

To study meiosis in onion bud cell or grasshopper through permanent slides.

Requirement:

Permanent stained cytological slides of meiosis in onion bud or testis of grasshoppers.

Observation and Comments:

On observation we can find the following phases of cell division:

Meiosis involves two sequential cycles of nuclear and cell division called Meiosis I and Meiosis II but only a single cycle of DNA replication.

Interphase :- It occurs prior to meiosis. It is similar to interphase of mitosis except S-phase is prolonged. DNA replication occurs. Each chromosome comes to have two chromatids.

A. **Meiosis-I, Heterotypic or reduction division:**

It is divided into four stages:

1. **Prophase I** :- It is more complicated and prolonged. It can be divided in following sub-stages.

a) **Leptotene:**

i) Nucleus enlarges

ii) The chromatin fibres shorten and elongated chromosomes become clear.

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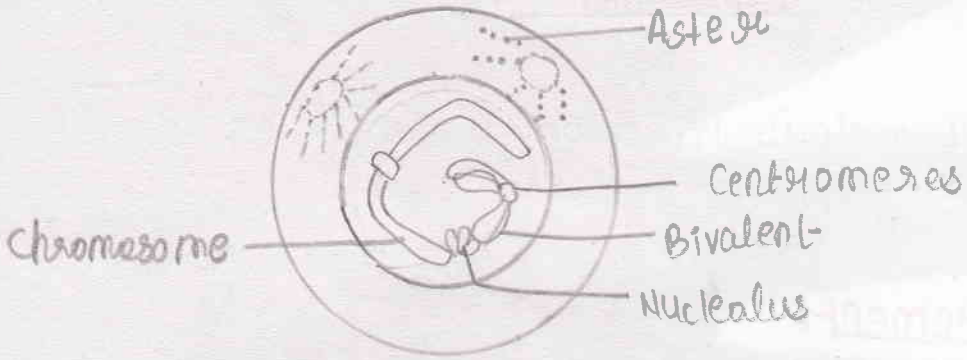
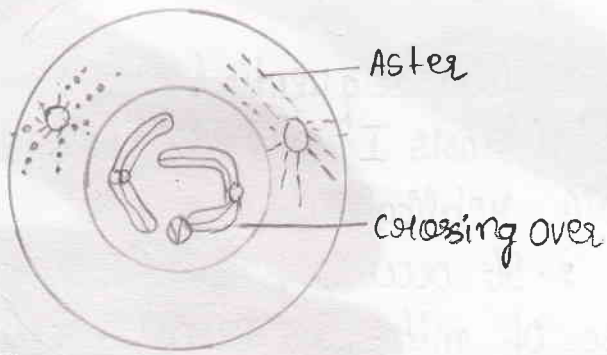
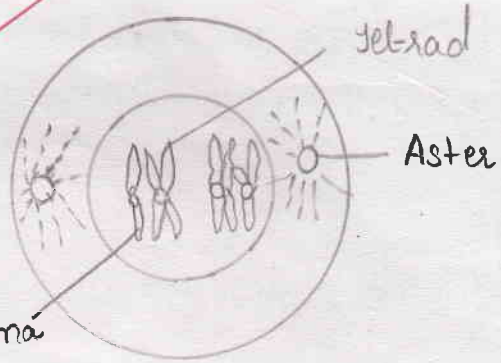


2 PROPHASE ZYGOTENE



3. PROPHASE PACHYTENE



4. PROPHASE DIPLOTENE

iii) The chromosome possess string of swollen areas Called chromosomes.

iv) Both the centrioles Separate and develop astral rays, in animal Cells.

v) Chromatids of the replicated chromosomes are not distinguishable.

b) Zygotene

i) The two homologous chromosomes get attached to each other and the process is Called synapsis.

ii) On account of synapsis, chromosomes form pairs or bivalents.

iii) The no. of bivalents is half the total no. of chromosomes

c) Pachytene

i) The paired chromosomes shorten

ii) The two chromatids of the same chromosome are Called Sister chromatids.

iii) The two chromatids of homologue chromosome of a bivalent are called Non-Sister chromatids.

iv) Crossing Over takes place. It is the exchange of Chromatid segments b/w two homologous chromosomes

v) Cross Over is an enzymatic process.

d) Diplotene

i) The nucleoprotein fusion complex of the Synapsed chromosomes dissolves.

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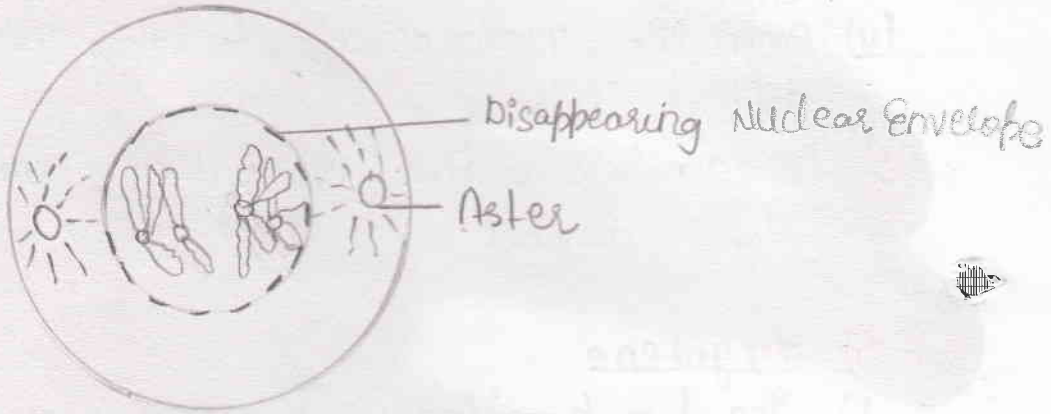
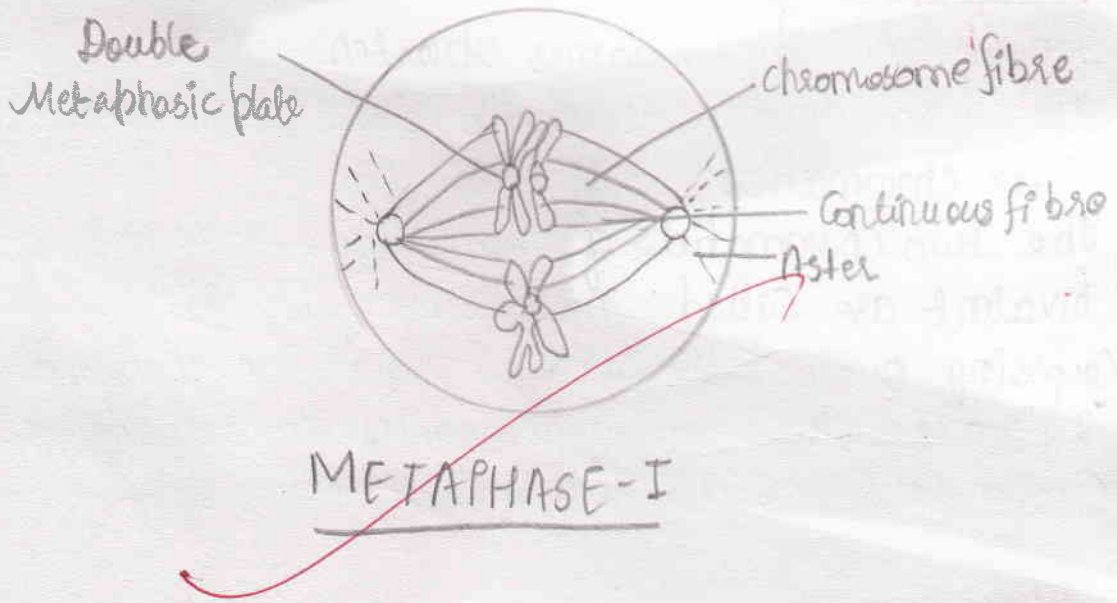


5. PROPHASE DIAKINESIS



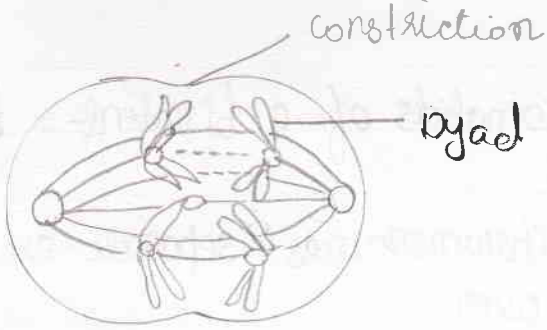
METAPHASE-I

ii) The four chromatids of a bivalent become distinguishable tetrad stage.
iii) Homologous chromosomes separate except in the region of crossing over.
iv) The points of contact are called Chiasmata.
v) The homologous chromosomes appear cross-like, ring like or chain like.

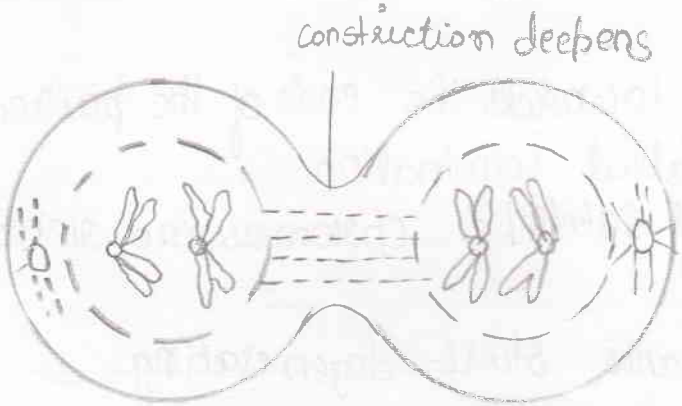
e) Diakinesis:
i) Chiasmata shift towards the ends of the paired chromosomes a process called termination.
ii) The bivalents of satellite chromosome remain united with nucleolus.
iii) Nuclear membranes start degenerating.

2. Metaphase - I
i) The bivalents become arranged across the equatorial plate of the spindle in such a way that each chromosome of a bivalent faces opposite pole of the spindle.
ii) Formation of double metaphasic plate, since there are two centromeres in each bivalent.
iii) The spindle fibres get attached to the centromere of the chromosome by chromosome or tractile fibril.
iv) The distribution of bivalent is at random. The maternal and paternal chromosomes can face any pole

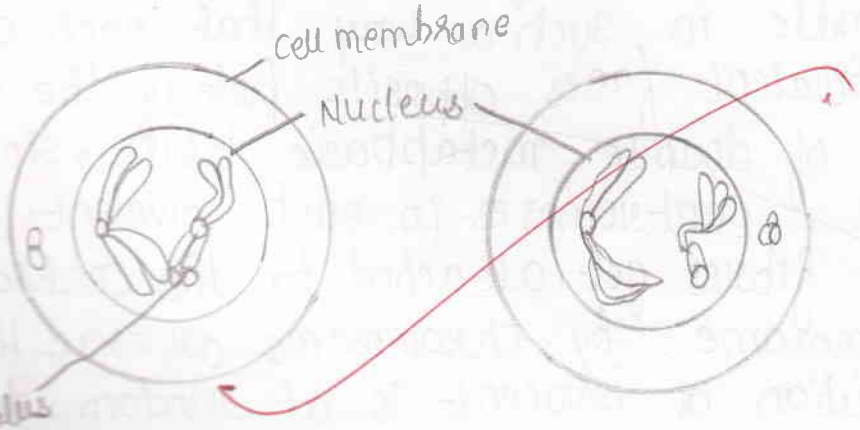
Teacher's Signature



ANAPHASE I



TELOPHASE I



DAUGHTER CELLS

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3. Anaphase-I :

i) The homologous chromosome break their connections and separate out, a process called disjunction.

ii) The separated chromosomes or univalents are also called dyads.

iii) The chromosomes move towards spindle poles along the path of tractile fibril.

iv) At the end of anaphase-I, two Groups of chromosomes with half the no. of chromosomes are present at each spindle pole.

4. Telophase I:

i) The polar Group of chromosomes arrange themselves in two haploid nuclei.

ii) The chromosomes elongate.

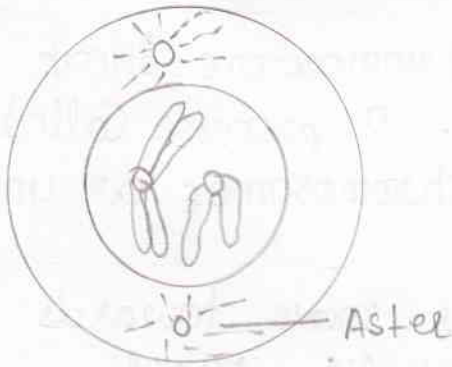
iii) A nucleolus is formed by the satellite chromosomes.

iv) Reappearance of nuclear membrane.

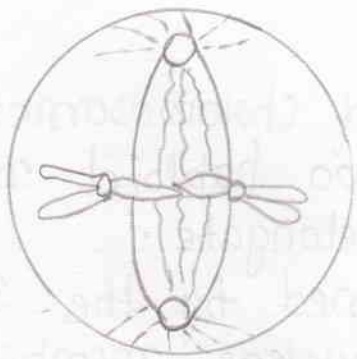
B. Meiosis II

It is shorter than the typical mitotic division. The division maintains the no. of chromosomes produced at the end of Meiosis-I. It is divisible into Prophase II, Metaphase II, Anaphase II, and Telophase II.

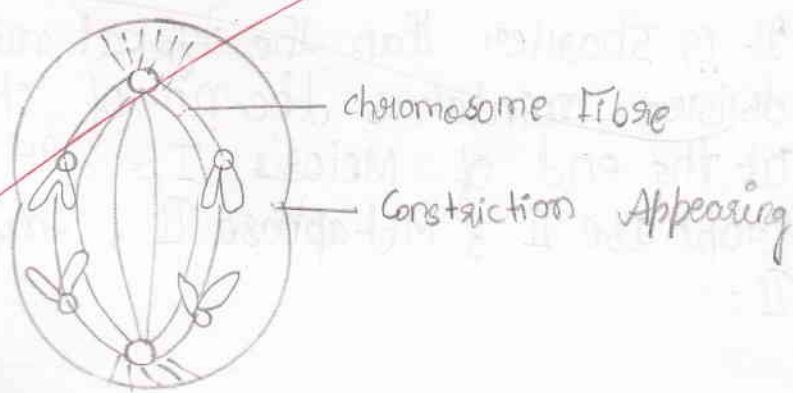
Teacher's Signature



PROPHASE II



METAPHASE II



ANAPHASE II

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Prophase II :

i) This stage of nuclear division is very brief.
ii) The centriole pairs develop asters and move to Opp osites poles.
iii) The chromosomes shorten. Nucleolus and nuclear envelope degenerate.
iv) The chromatids of individual chromosomes are usually divergent.

Metaphase II :

i) Two achromatic bipolar fibrous spindles are formed.
ii) The two spindles are either parallel or at right-angle to one another.
iii) The chromosomes reach the respective spindle and arranged themselves in such a fashion that their centromeres come to lie at equator forming a single metaphasic plate.

Anaphase II :

i) The centromere of each chromosomes divides into two.
ii) Each chromatid has one centromere.
iii) The two chromatids separate completely and are known as daughter chromosomes.
iv) The daughter of chromosome ~~over~~ move towards their respective poles along the path of chromosomal fibres.

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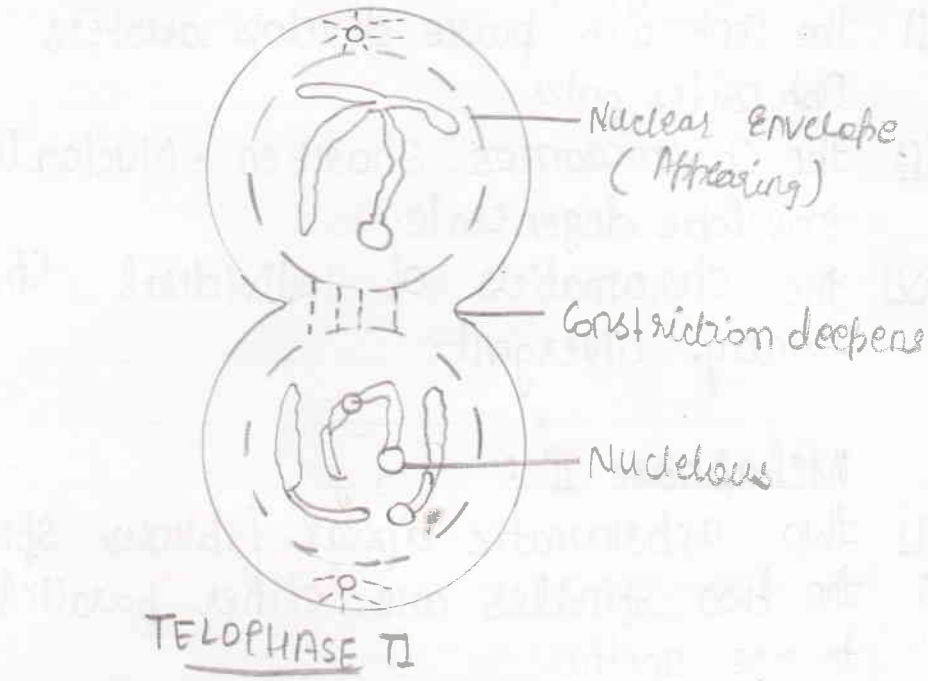
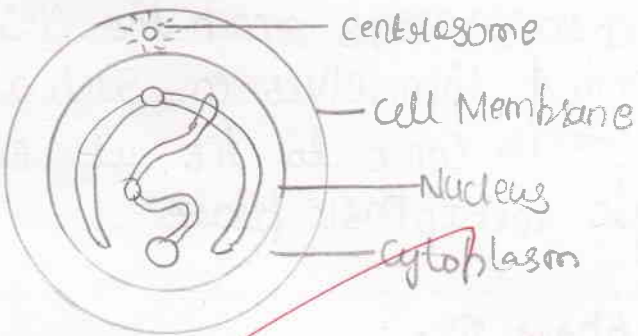
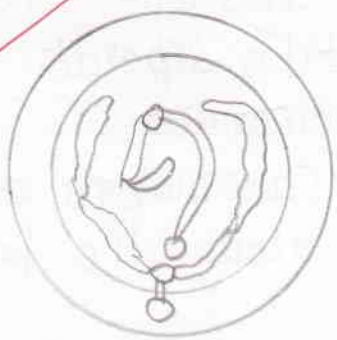


TELOPHASE II





HAPLOID DAUGHTER CELLS

v) At the end of Anaphase - II, four Groups of Chromosomes are produced

Telophase II:

i) Chromosome elongate very much.
ii) A nucleolus reappears
iii) Nuclear membrane develops.
iv) formation of four haploid nuclei

Shamane
06/07/2016

Teacher's Signature

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Date : 06/07/2016

Experiment-8

Aim:-

Study the presence of suspended particulate matter in air at the two widely different sites.

Requirements:-

Cardboard, razor, white tissue-paper, rubber bands, glass slides, Glycerine, microscope, hand kerchief or cotton wool.

Procedure

For studying the presence of particulate matter in air at the two widely different sites, we can choose a public garden and an Industrial area.

a) Take two clean, transparent glass slides, spread/ Coat some Glycerine along with some adhesive substance. Place the glass slides in a Convenient place in the garden and in an industrial area, for two or three hours. Collect the glass slides and Observe them under low power of microscope for the study of particulate matter.

b) Take a cork pad or Cardboard and Cut in the two of pieces 6" x 6" with the help of a sharp razor or knife. Pluck a leaf of a plant growing in the garden and another from the plant growing in the industrial area. Place the leaves between the folds of tissue papers

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on ordinary white paper. Place the above leaves along with the folds of a tissue paper b/w two pieces of cork pad / Cardboard. Put some weight or rubber bands around the cork pieces to make it very tight. The impressions of the particulate matter will come on the white-tissue paper and examine it with the help of a hand-lens.

Observation:

The study of the presence of particulate matter in the air of the garden, shows the presence of pollen, spores of fungi, some bacteria and a few soil dust particles, while the study of particulate matter in the air of the industrial area will show the presence of a large no. of coal particles, soot, dust particles, fibres of various types, iron particles, silica, talc, fine sand, etc and metals - Hg, Cu, Fe and Pb. Lead is also released from exhaust of automobiles.

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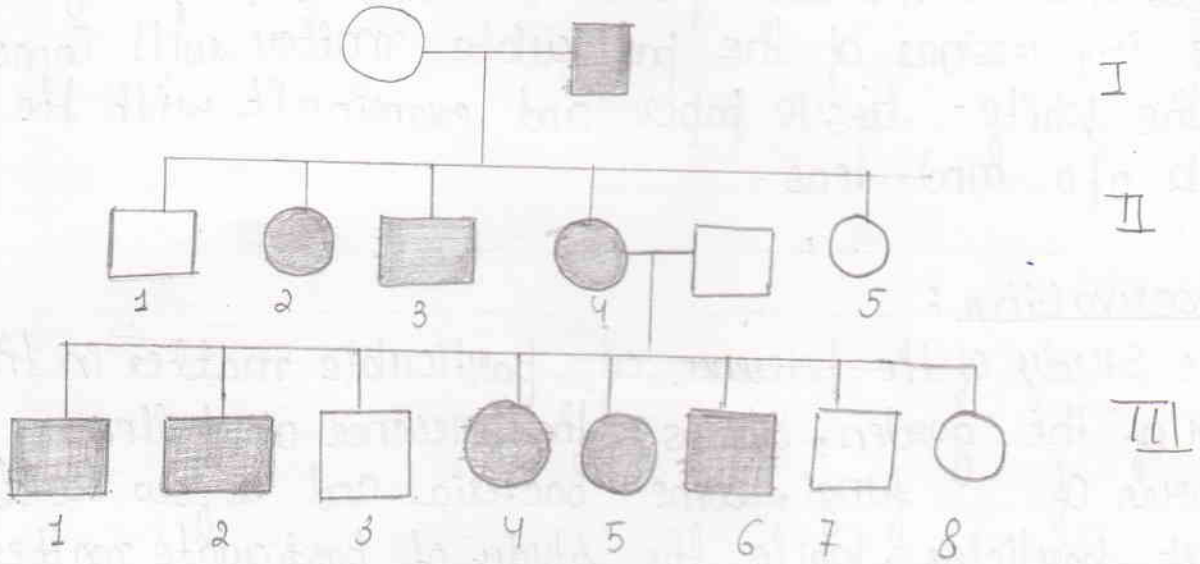

Tongue Rolling

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Date 06/07/2016

Experiment- 9

Aim - To study prepared pedigree charts of any one of the Genetic traits such as rolling of tongue, blood Groups, ear lobes, widow's peak and Colour blindness.

Procedure

Before analysing a pedigree chart, we must know some symbols of pedigree analysis.

i) **Tongue Rolling**

Human beings can be divided into two categories, depending upon their ability to roll or unroll the tongue i.e Roller and Non- Roller. The ability to roll the tongue into U-shape is controlled by a dominating gene (R), while the non- rolling is due to a recessive allele (r).

Case: The female is a non- roller and the couple had 5 children, 3 daughters and 2 sons of whom, a son and a daughter are non- roller. One of the roller daughter is married to a non- rolling man. Their couple had 6 children, 5 sons and 3 daughters, of whom 2 sons and a daughter are non- rollers.

Based on the data, we can construct a pedigree chart to show inheritance pattern of non- roller allele in the family.

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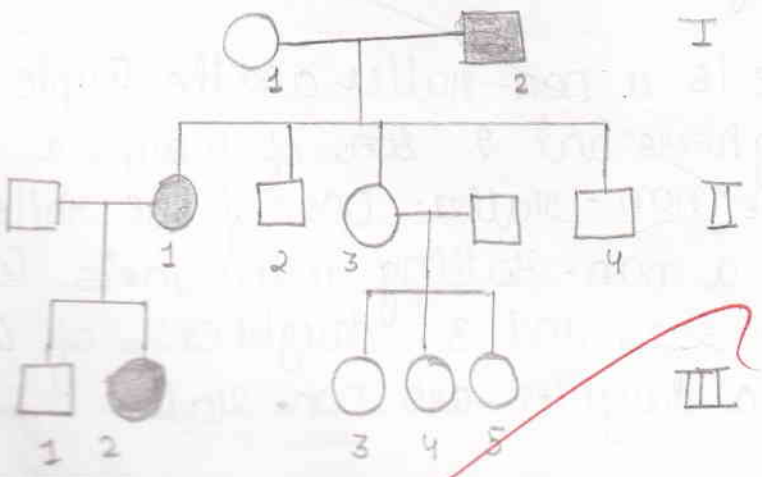

Blood Groups

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Description

Assuming the trait is dominant one and the father is homozygous for it (RR), then the mother will be homozygous recessive (rr). All the children of this couple, then would necessarily be rollers and heterozygous (Rr). However, this is not the case here. Assuming the father is heterozygous dominant, then half their children would be non-rollers and the other half rollers. More or less this appears to be the case in the pedigree cited. The II-4 female, a roller is married to a non-roller. Assuming she is also heterozygous dominant, then half of the children would be non-rollers and the other half rollers. The data suggests that this is not so in the III Generation. The autosomal dominant trait i) appears in all Generations. ii) Heterozygous married to normal individual produces normal offspring to affected one into ratio of 1:1 iii) trait is equally distributed in both the ~~cases~~ sexes.

ii) Blood Groups

In human beings, there are phenotypically four types of blood Groups. A, B, AB and O. These Blood Grps are determined by 3 alleles I^A, I^B and I^O. Alleles I^A and I^B are dominant over I^O and I^A and I^B are Co-dominant over each other.

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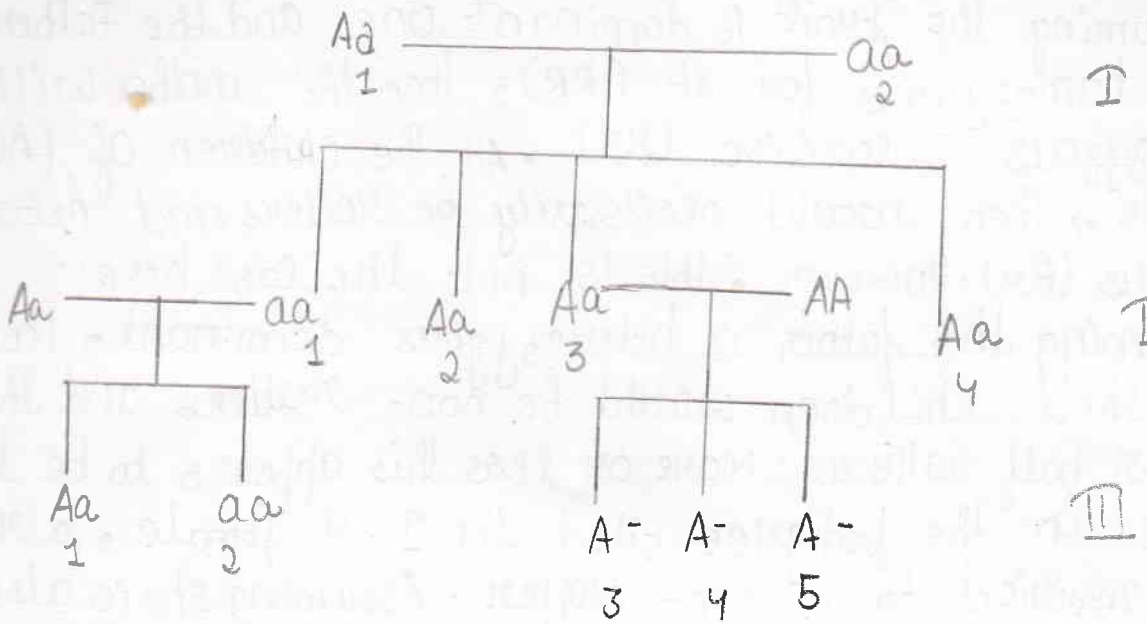

Blood Group

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Case :- A woman with blood Gp A marries a man and the Couple had 4 children, 2 sons and 2 daughters, one of the daughter had the blood Group similar to the father, while the rest had the blood Gp similar to the mother. One of the daughter II-3 marries a man and had 3 daughters with the blood Gps similar to Grandmother. The II-1 daughter marries a man and have a son with blood Gp similar to her husband.

Description

The trait is present in the father due to presence of two recessive genes (1-2 = aa) the trait can appear in the progeny only when it becomes homozygous recessive. Since only one of the progeny carries the trait, the mother parent must be heterozygous (test cross - Aa x aa = 50% heterozygous, 50% recessive) i.e I-1 = Aa, II-1 is aa. II-2, II-3, II-4 are heterozygous, and therefore Aa. The cross b/w II-1 and her husband also produces one double recessive [III-2 = aa). This is possible only if her husband is heterozygous (Aa). Naturally II-1 is also homozygous (aa).

II-3 daughter is heterozygous (Aa). Her husband can be either heterozygous [Aa x Aa = AA, 2 Aa, aa) or homozygous dominant - [Aa x AA = 2AA, 2 Aa] since none of the progeny is with recessive blood Gp O, the possibility is that her husband in the pedigree is homozygous dominant - (AA). III-3, III-4, III-5

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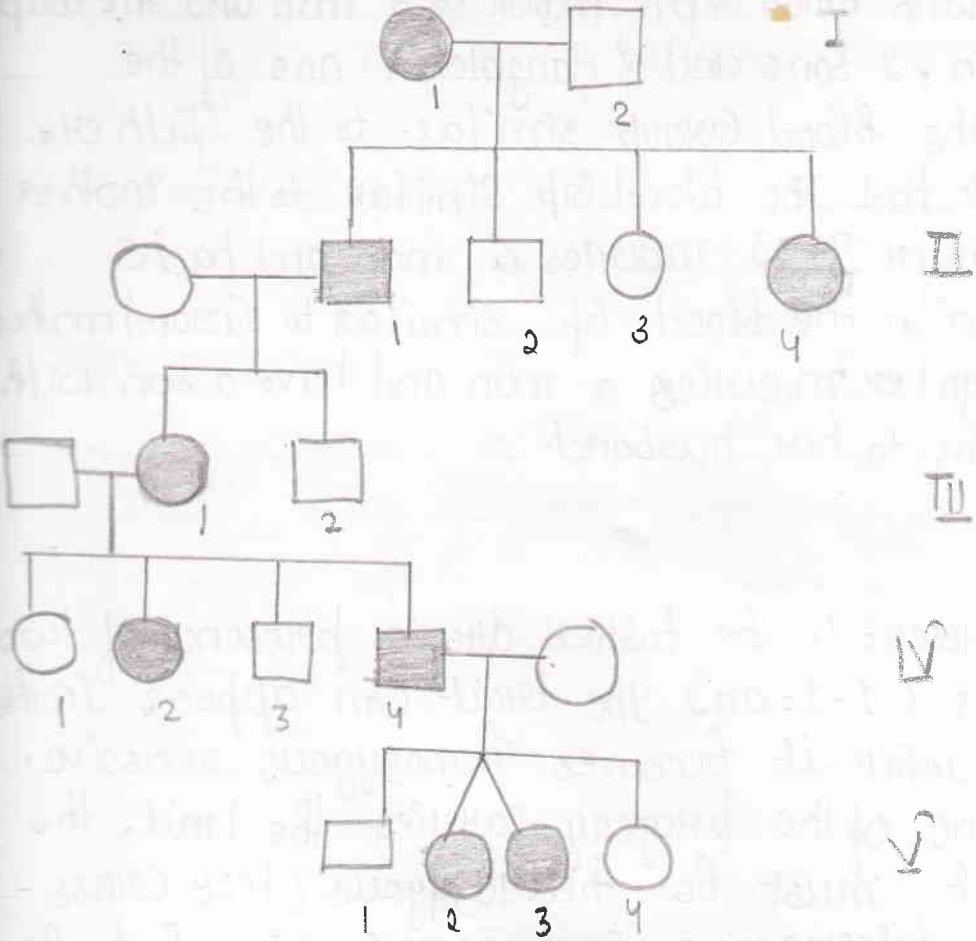

Widow's Peak

are either AA or Aa.

iii) Widow's Peak

A hair line that forms a distinct peak as it crosses the forehead is due to a dominant gene (W) and the straight line is due to the recessive Gene (w)

Case: A man with a normal straight line marries a woman and have 2 sons and 2 daughters. One son and one daughter had widow's peak. The II-1 son marries a woman and had one daughter with widow's peak and one son with a normal straight-line. The III-4 daughter marries a man and had 2 sons and 2 daughters, with one son and other daughter have widow's peak. The IV-4 son with widow's peak marries a woman and have 4 children, one son and one daughter with straight line and a identical twin daughter with widow's peak.

iv) Colour Blindness

It is a recessive sex-linked trait in which a person fails to distinguish red-green colour. The Gene for normal vision is dominant. The gene and its recessive allele is present on the X-Chromosome. No gene for colour vision is present on Y-Chromosomes. It shows criss-cross inheritance.

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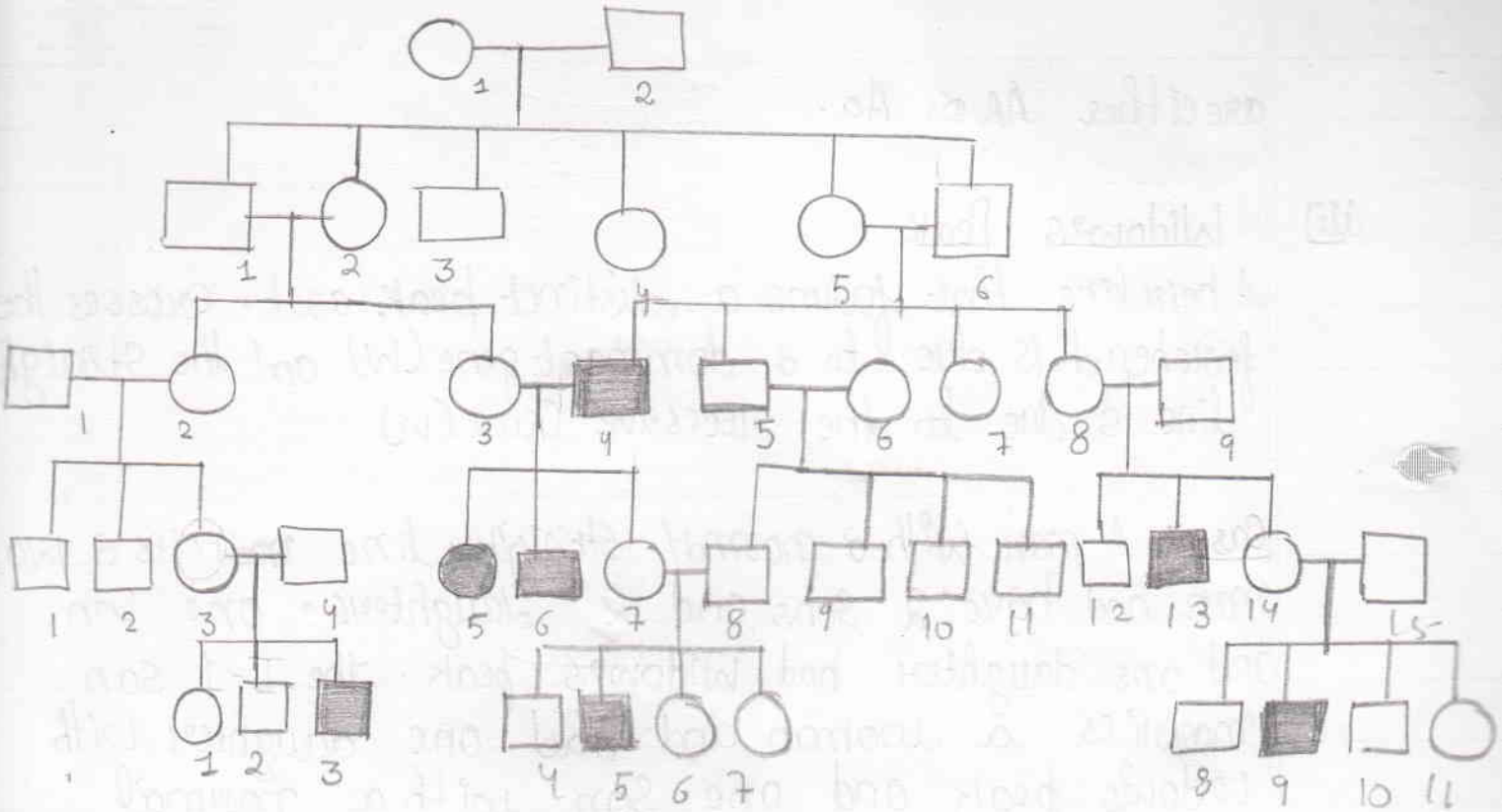
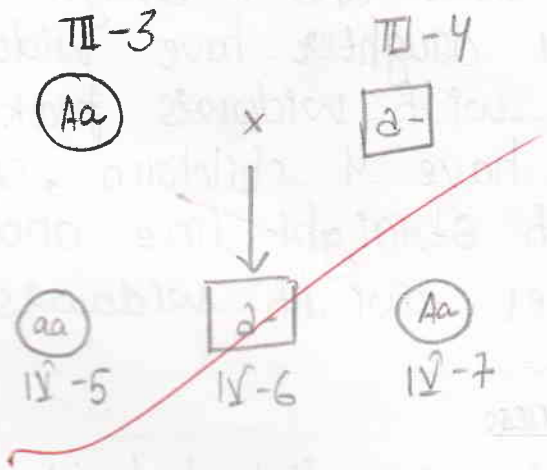


Colour blindness



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The sex linked recessive traits express more in males since they carry one X- chromosome. females (XX^c) are carriers of recessive allele are heterozygous because of alleled brothers, fathers or maternal uncles. Male receive sex- linked trait from mothes. females possess the trait when homozygous [X^cX^c]. All the sons of a affected female are affected and 50% daughters are carriers. Nearly 50% sons of the carrier female would be affected.

In case of sex linked recessive blindness, the no. of males affected are always more than the females. This is essentially due to the fact that males receive only one X- chromosome and that is received from the mother. We can observe that III-3, a normal female married to III-4 an affected male gives birth to 3 ~~dau~~ children, 2 daughters and 1 son. Since the son is affected, it is obvious that the mother is the carrier of the recessive allele and has passed the trait to his son. Similarly II-8, IV-3, and IV-14 are heterozygous who have passed the trait to their son.

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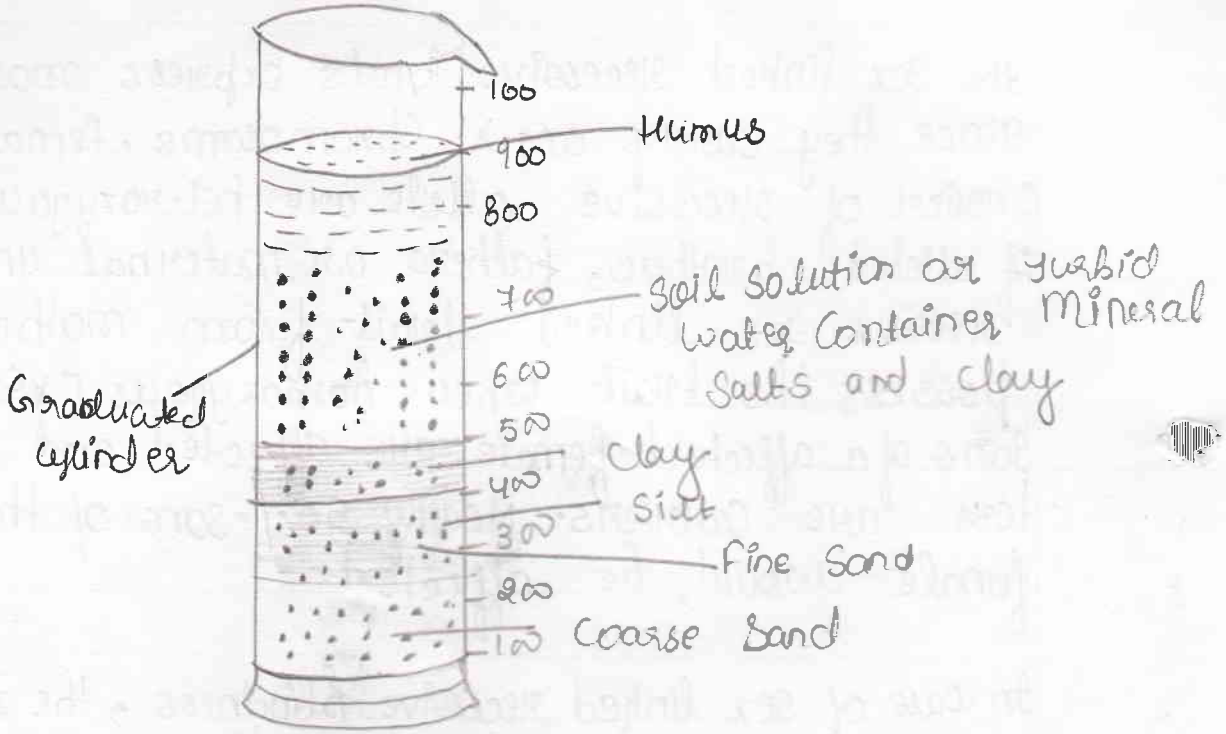

Composition of Garden Soil

OBSERVATION:

Type of layer	Size of the particles	Name of the particles	Height in mm (thickness)
1. Coarse Sand	- 2.00mm and above - 2.00 to 0.2mm	Gravel Coarse Sand	-
2. Fine Sand	- 0.2 to 0.02 mm	Sand	-
3. Silt particles	- 0.02 to 0.002mm	Silt	-
4. Clay particles	- less than .002 mm	Clay	-

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Experiment - No - 11

Aim :- To identify common disease causing organism like Ascaris, Entamoeba, Plasmodium, Ring Worm through permanent slides or specimens.

Requirements: Preserved Specimens or Charts or permanent slides of Ascaris, Entaamoeba, Plasmodium and Ringworm.

1) **Ascaris (The Giant Intestinal Worm):** Ascaris lumbricoides is an endo parasites of small intestine of human beings, more common in Children. It makes its entry through eating soil infected with eggs of Ascaris. The worm ingests semi-digested food of the host with the help of suctorial pharynx. It respires anaerobically (20-40 cm in female and 15-30 cm in long in males).

Symptoms :- Ascaris cause the disease called Ascaria-sis. The major Symptoms of the disease are-

i) Abdominal discomfort, colic pain, caused by the obstruction of intestinal passage by large number of adult worms.

ii) The patient may also suffer from impaired digestion, diarrhoea and vomiting due to the toxins produced by the parasite.

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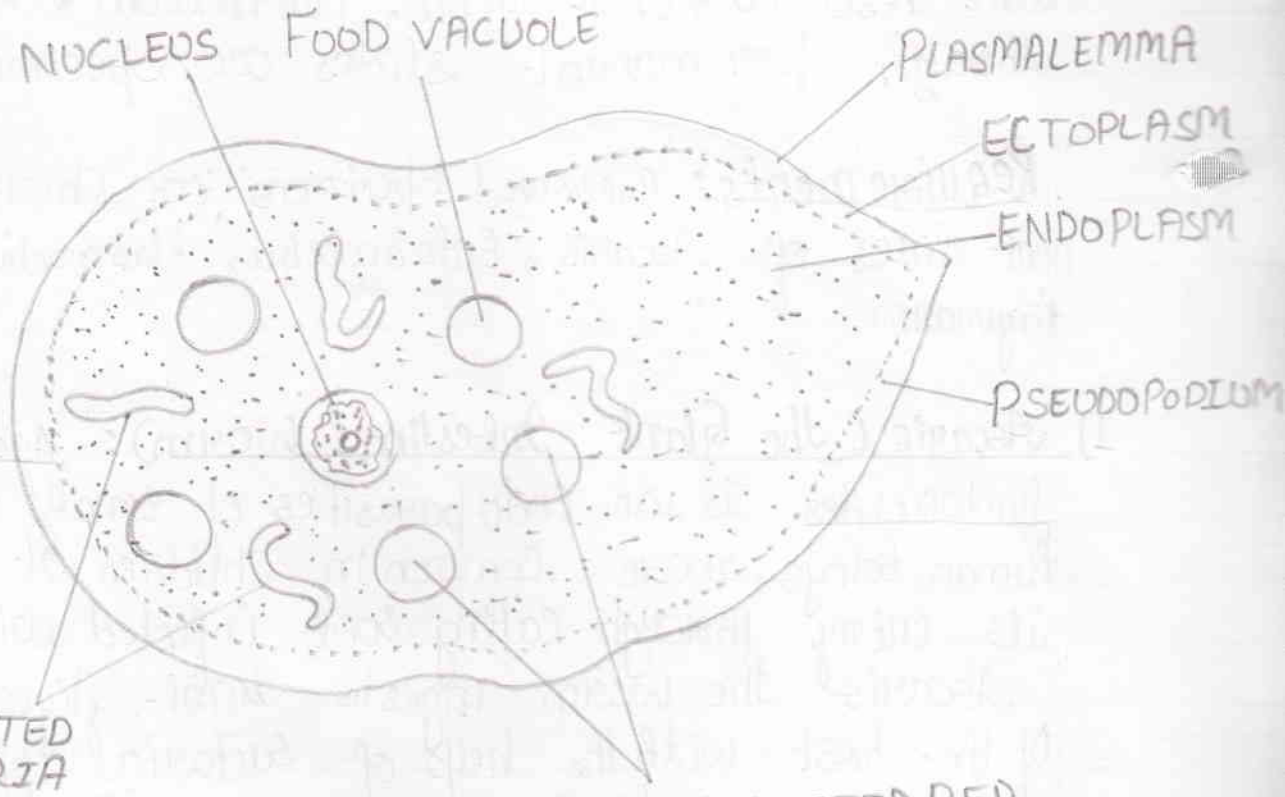
NUCLEUS
FOOD VACUOLE
PLASMALEMMA
ECTOPLASM
ENDOPLASM
PSEUDOPODIUM
INGESTED BACTERIA
INGESTED RED BLOOD CELLS

Entaamoeba

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(vii) Body growth is retarded and mental efficiency is affected in cases by children
In short symptoms include.
Irregular bowels, occassional vomitting and anaemia

Control :

1) Disposal of human faeces by underground sewage system
ii) Washing of fruits & vegetables by potassium permanganate
iii) Washing hands before meals is a good preventive measure
iv) Protection of food articles from dust and flies.
v) Parents should be extra cautious that their children do not take to the habit of eating soil.

2) Entamoeba [Entamoeba histolytica]
Entamoeba histolytica lives in the large intestine and lower part of small intestine of human beings. The microscopic parasite is 18-25μm. It is covered by semipermeable plasmalemma. It possesses a single nucleus surrounded by a clear area or halo. There are no. of food vacoules. & cytoplasm is differentiated into Ectoplasm and Endoplasm.

Symptoms : In amoebiasis :

- The patient passes out loose, mucous and blood with the watery stools.
- The patient feels severe gripping pain in the abdomen and spams, fever, nausea and exhaustion & nervousness

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- In chronic cases, large tumour-like lesions are formed in the sub-mucosa of large intestines.
- In the extra-intestinal amoebiasis, several lesions and abscesses are formed in the liver, lungs and brain.
- The patient may have a slightly enlarged liver with pain and tenderness in right upper portion of abdomen.

Control:

1) Purification of water. Water can be disinfected by boiling.
2) Elimination of source of faecal contaminations.
3) Washing of vegetables and fruits before using.
4) Protection of food and drinks from dust, flies etc
5) Avoid taking salad and fruits from vendors or fruit-seller as some of them may be carriers and may place the general public at risk.

3) Plasmodium [Malarial-Parasite]

It is a digenetic, Obligate, intracellular parasite which completes its life history on two hosts- Man and Female Anopheles. Man is the intermediate or secondary host - female anopheles is the definitive or primary host

~~Life Cycle of Plasmodium in Man:-~~

When a mosquito bites a man it releases minute sporozites in the blood stream.

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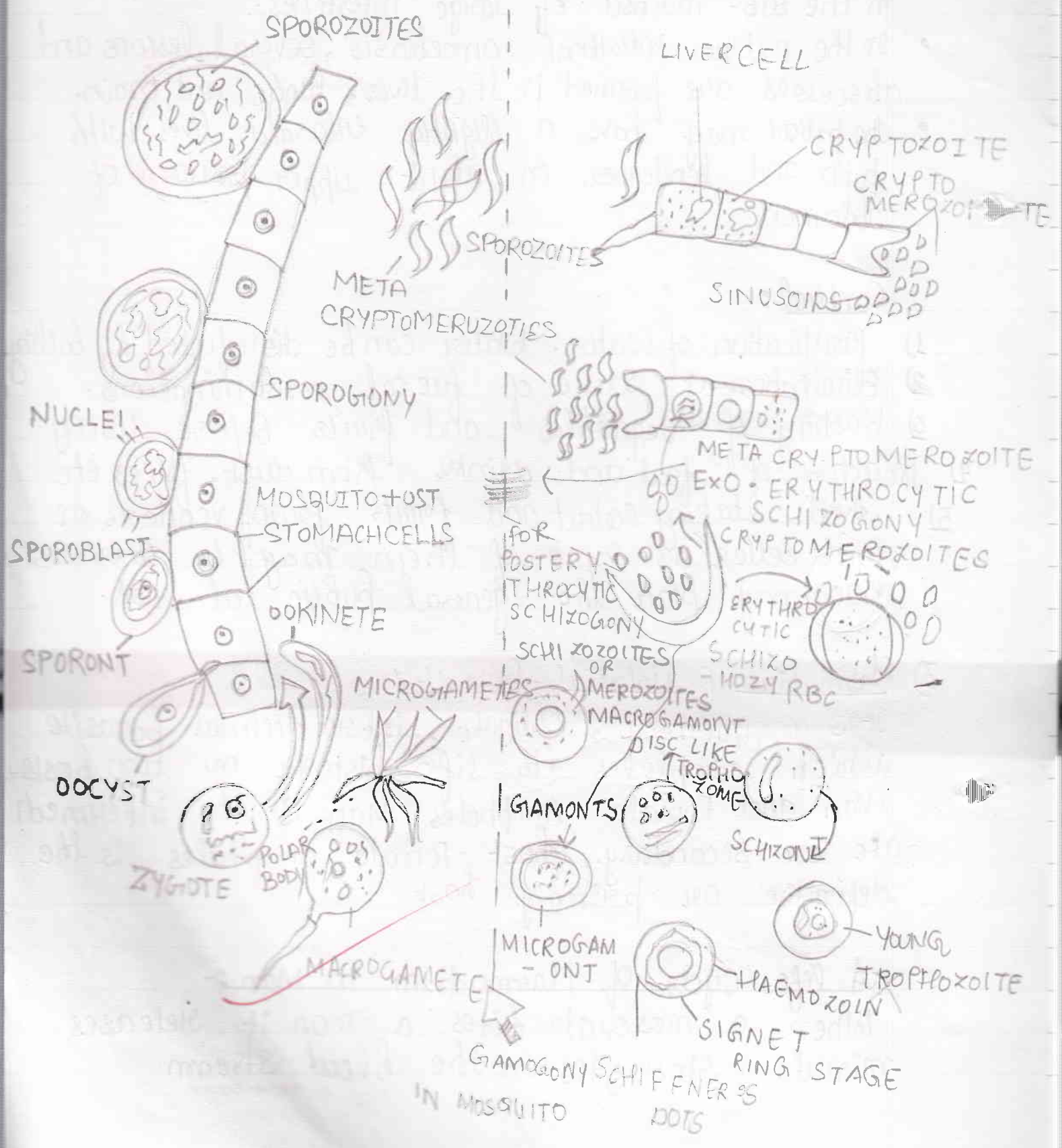
life cycle of plasmodium



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From blood, sporozites enter liver cells, here it becomes rounded and forms cryptomerozoites. The liver cells rupture to release cryptomerozoites they enter the RBCs and some of them enter new liver cells. In the RBC's the parasite grows, becomes rounded and is known as trophozoite. A vacoule develops, push nucleus to one side and is called Signet Ring stage. The vacoule disappears and the parasite becomes irregular called as Amoeboid Stage, Haemo-globin gets decomposed into yellowish brown pigment haematin. The nucleus of parasite undergoes fission and forms merozoites. This stage is called Rosette stage. The weakene RBCs burst and the merozoites with residual cytoplasm containing haematin and toxins are released in the plasma.

Life cycle of Plasmodium in Female Anopheles

After several Generation of Erythrocytic Schizogony, some merozoites become differentiated into microgametocytes and macrogametocytes when the mosquito bites the infected man, they enter its mouth and reach the gut along with blood meal. The microgametocytes give rise to eight active sperm like microgametes or male gametes. The macrogametes directly

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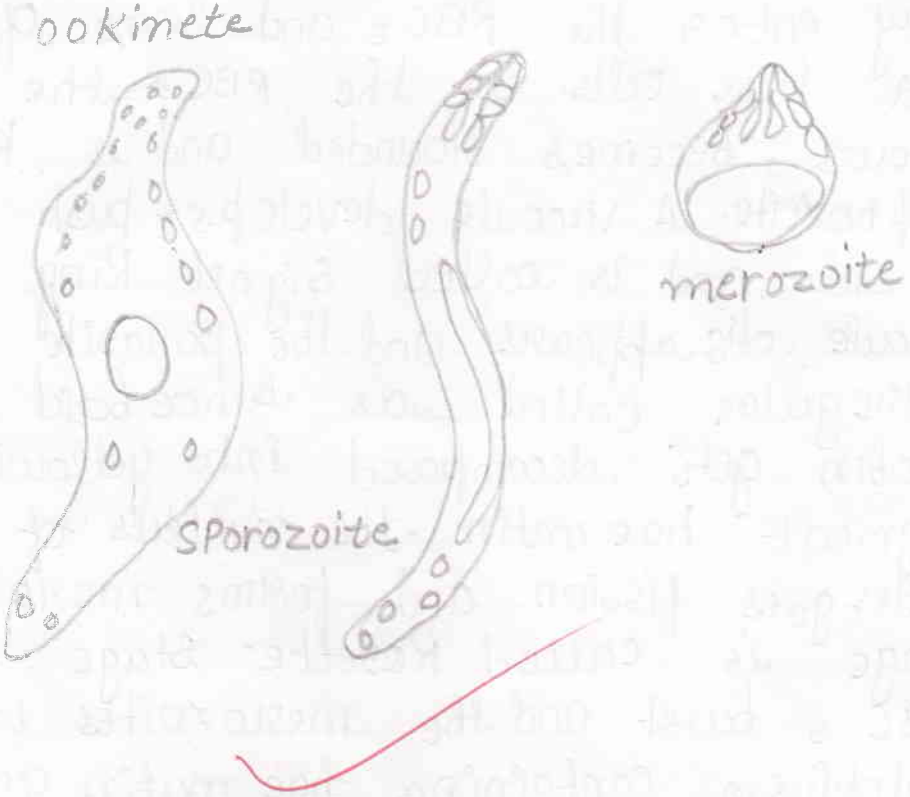
ookinete
merozoite
sporozoite

forms macrogamete gamete. After fertilization, the zygote grows into diploid vermiform ookinete, which penetrates the Gut-wall, becomes spherical and encysted, the stage called oocyst.

X **Oocyst**: The diploid oocyst enters the asexual stage. It undergoes meiosis followed by many ~~it~~ mitotic divisions to form large no. of haploid daughter nuclei, which transform into minute slender Sporozoites. Each cyst produces 10,000 sporozoites. They are motile and many of them are able to reach Salivary Glands. The mosquito is now infective and when it bites a healthy person a large no. of Sporozoites are injected. A new cycle starts again.

X **Symptoms of Malaria**

1. The attack of Malaria is preceded by restlessness, yawning, tiredness, headache, less appetide and massive pain
2. Before fever, the patient feels chilliness or cold at extremities. It is followed by rise in the body temperature.
3. There is a feeling of warmth, headache and vomiting
4. The pulse is fast. It lasts for about 4 hours
5. The temp. may reach 106°f at the height of fever. Soon the patient profuse sweating with a feeling of relief.

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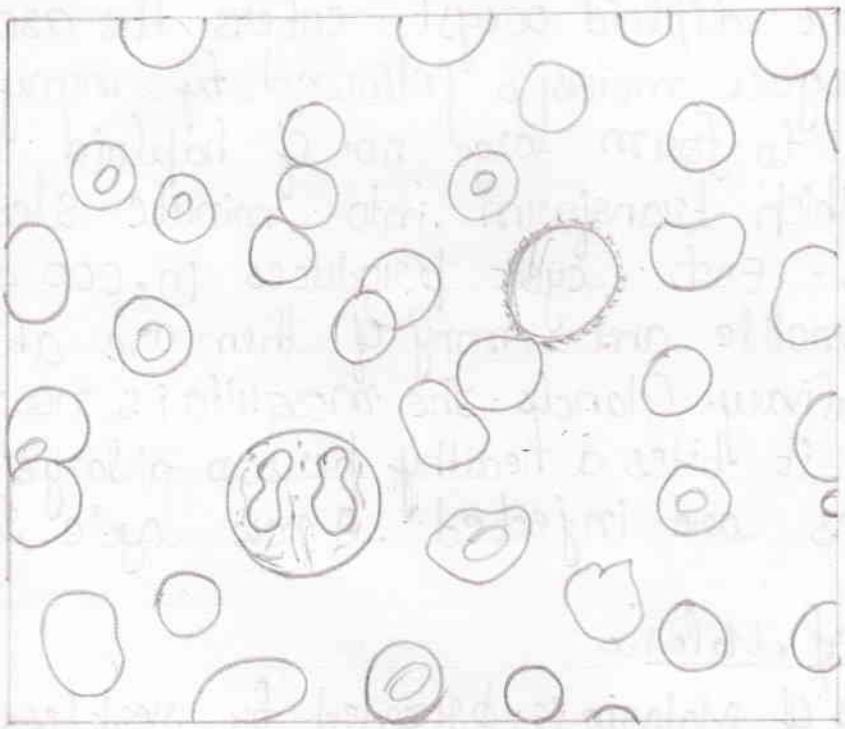

A photomicrograph of a blood smear showing red blood cells that contains developing P. Vivax parasites magnified 1000 times.

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Diagnosis : 1) Microscopic examination of thin film of blood stained with Leishmans or Giemsa stain for detecting the stage of malarial parasite.

Appearance of Malarial Parasites :
Malarial parasites are found in the red blood Corpuscles they show following characteristics :-

A. Trophozoite
i) 'Signet Ring' (ring of Cytoplasm) stage is stained blue
ii) A clear vacuole in the centre of cytoplasm (not stained).

B. Gametocyte
cytoplasm stains blue. A mass of undivided nuclear chromatin is stained red.
Both specific and non-specific serological tests are used.

Control of Malaria
the control measures can the divided into 3 types
1. Treatment of Patient :- It can be treated with the help of drugs like chloroquine phosphate and Primaquine.
2. Prophylaxis - (Prevention of Infection) - It can be affected in 3 ways.
a) Use of mosquito nets, external application of mosquito repellant creams such as Odomos oils, etc give protection against mosquito bites

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b) Use of small regular doses of prophylactic drugs by the person living in malaria infected regions, such as quinine, daraprim etc.

c) Maintenance of healthy environmental Condition proper nourishment and proper health lessen the chances of the disease.

3) Destruction of vectors -

a) Fill up all ditches, ponds and pools with earth Sothat mosquito may not find water to breed.

b) Cover the drains or make underground drains to eliminate breeding and ground of mosquito.

4) Ringworm

It is a Group of fungal diseases Caused to the skin, nails and hair etc. by different species of three genera feeding on keratin of skin of human beings namely Microsporum, Epidermophyton and Trichophyton, Collectively Called as Dermatophytes.

Control measures:

1) Personal cleanliness is most important.
2) Washing of hands with germicidal Soaps.
3) A daily bath regularly keeps the skin clean and
4) Hair should be kept clean by frequent washing.
5) Use of disinfectants for killing the various pathogenic microbes which may otherwise find their entry in the body e.g Phenol, Lysol, Cresol etc.

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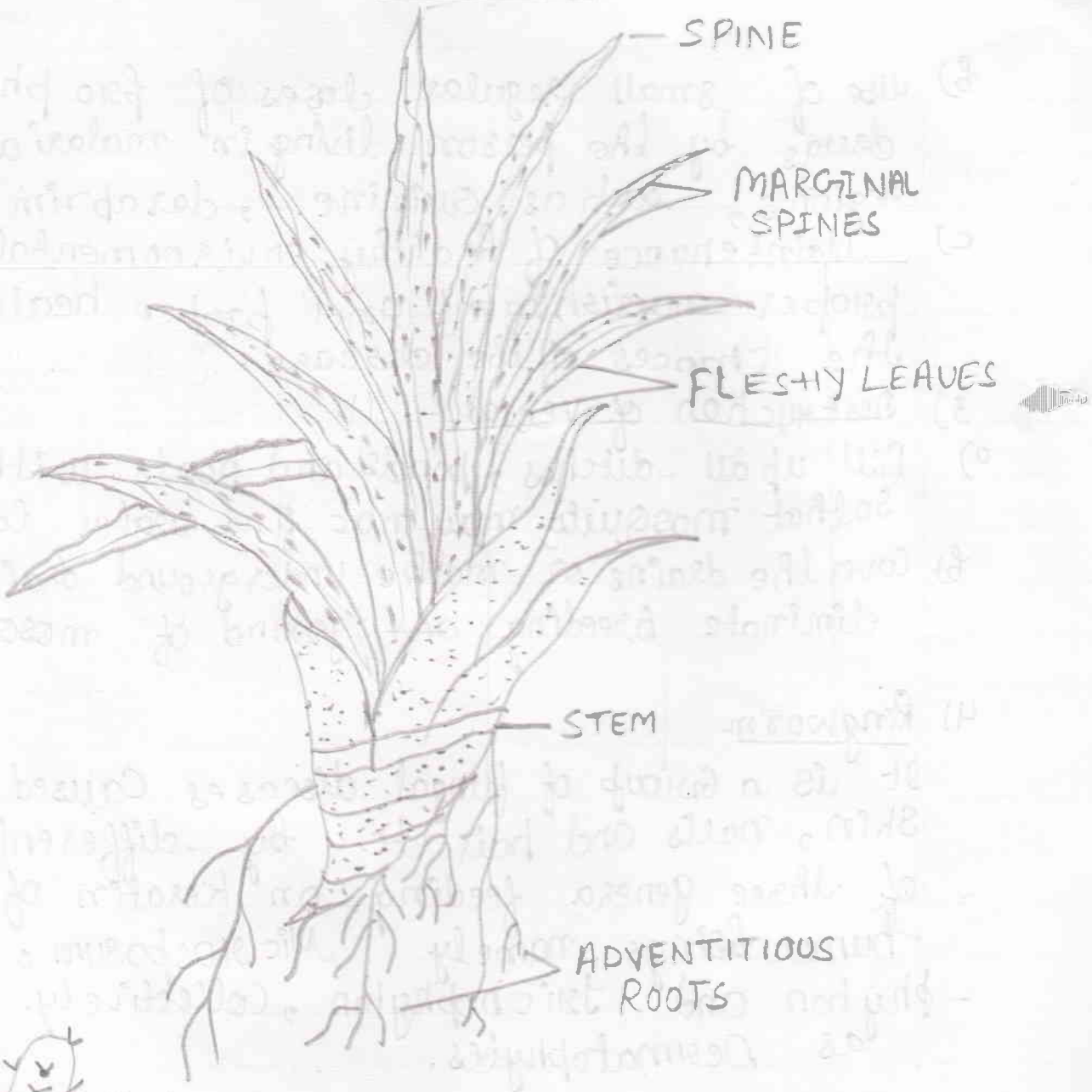
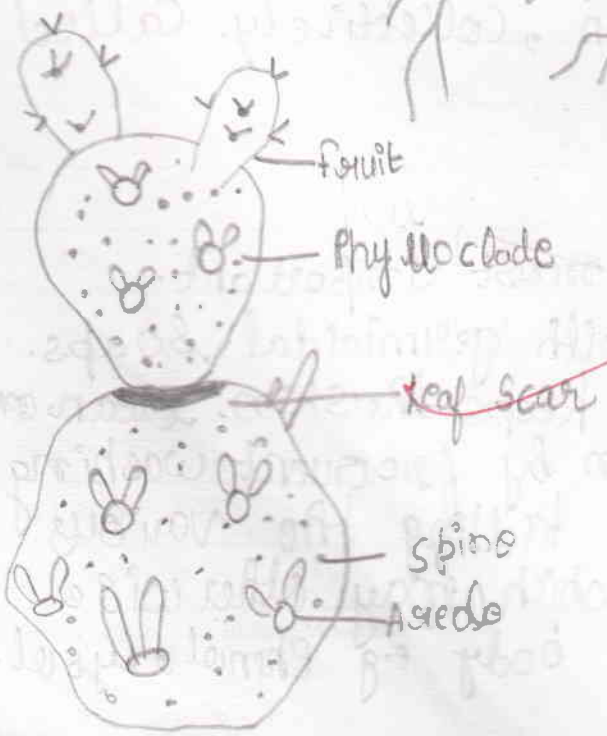
Aloe barbadensis





Opuntia showing phylloclades

Topic _____ Date Aug 19, 2016

Experiment No-12

Aim:- To study two plants and two animals found in Xeric condition. Comment upon their morphological adaptations.

A) To study the morphological adaptations in Xerophytic plants.

Requirements

Living or preserved specimen or charts of Aloe, Opuntia, Calotropis, Acacia, Zizyphus.

Observations

1. Aloe:
   i) It is a wild or Cultivated Shrub.
   ii) Stem is underground, rhizome
   iii) Leaves are thick, succulent and arise in rosette.
   iv) Leaf-Surface is smooth and shining.
   v) Presence of Mucilage in leaves.

2. Opuntia
   i) It is wild and cultivated shrub.
   ii) Stem is flat, branched and Succulent.
   iii) Extensive surface-feeder root System.
   iv) Leaves are small, fleshy, caducous appears in spine
   v) Presence of bristles or hardened hair.

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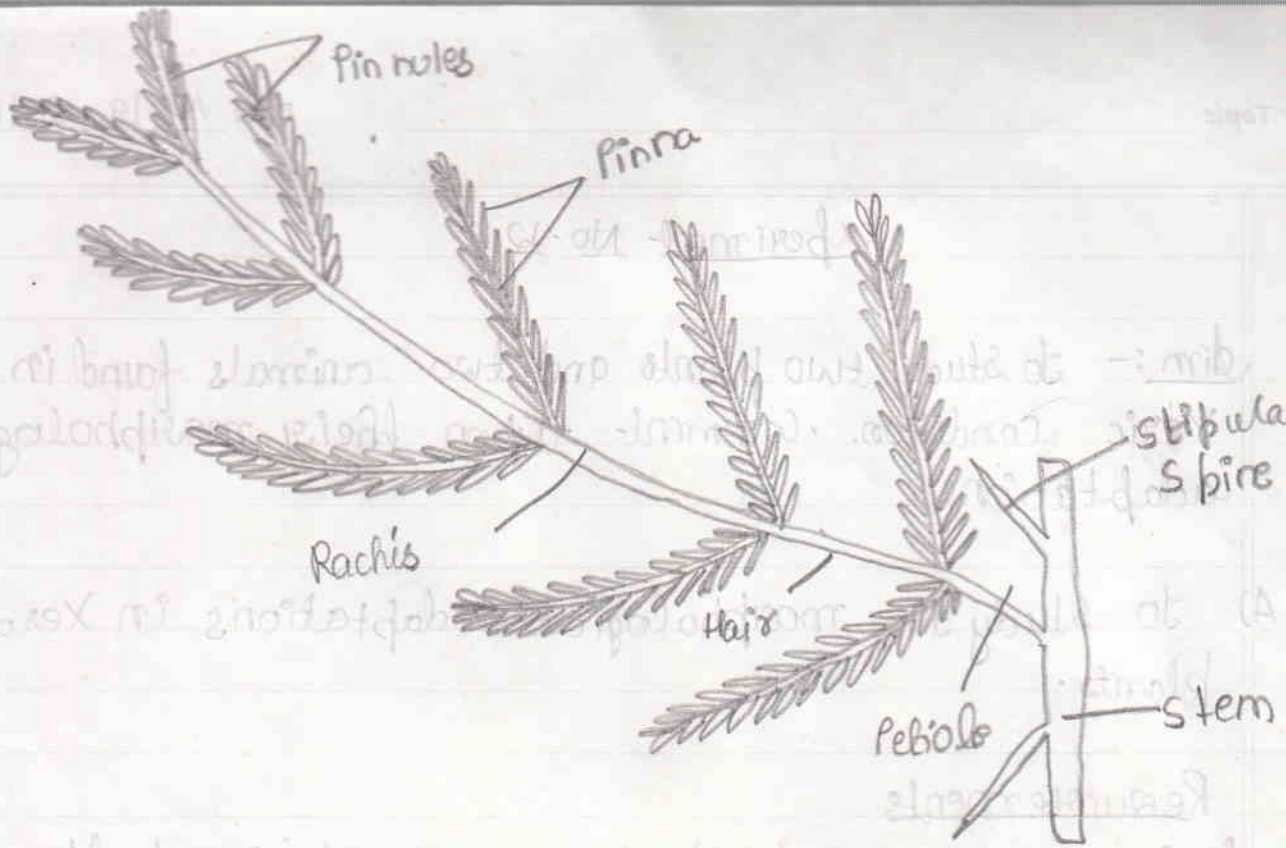

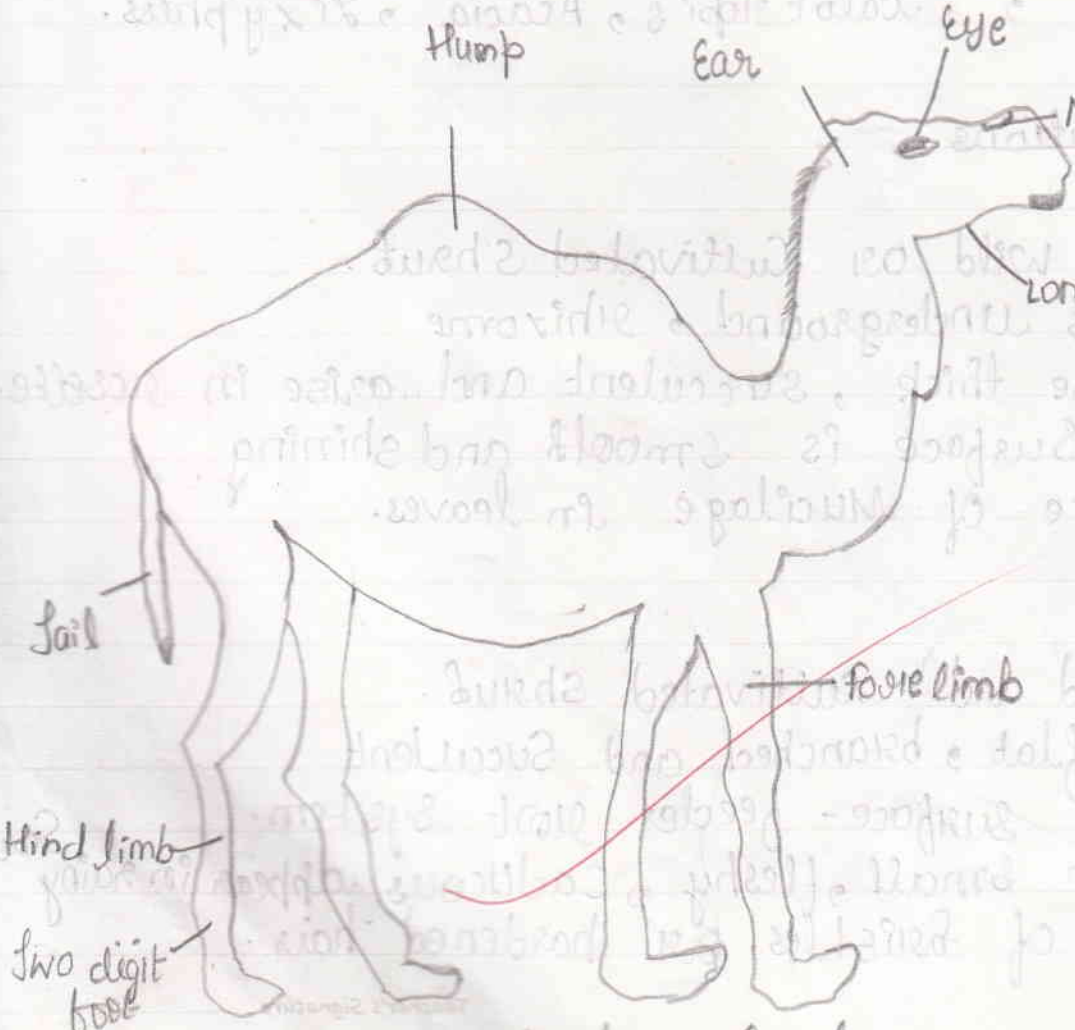

Arabian Camel

Topic _____ Date _____

3. Acacia [kikar]

i) It is draught enduring tree of arid areas.
ii) old stem covered with thick brown corky bark
iii) Deep-feeder extensive root system
iv) Young-stem grey, partially covered with hair
v) stipules are modified in ~~ste~~ spines.

B) To study the morphological adaptations in Animals in Xeric conditions.

Requirements

Charts or models of Camel, Python, Hedgehog and Scaly-Anteater.

OBSERVATIONS

I. Camel

i) It is a prominent animal of Sandy deserts.
ii) The hump of camel is contains reserve in the form of fat, which is metabalised to produce water and heat.
iii) Limbs are didactyl [only two digits in each limb] with large pads.
iv) Eyes and nostrils bear heavy fringe of hairs to protect them from sand particles.
v) To conserve water very less water is lost through urine.

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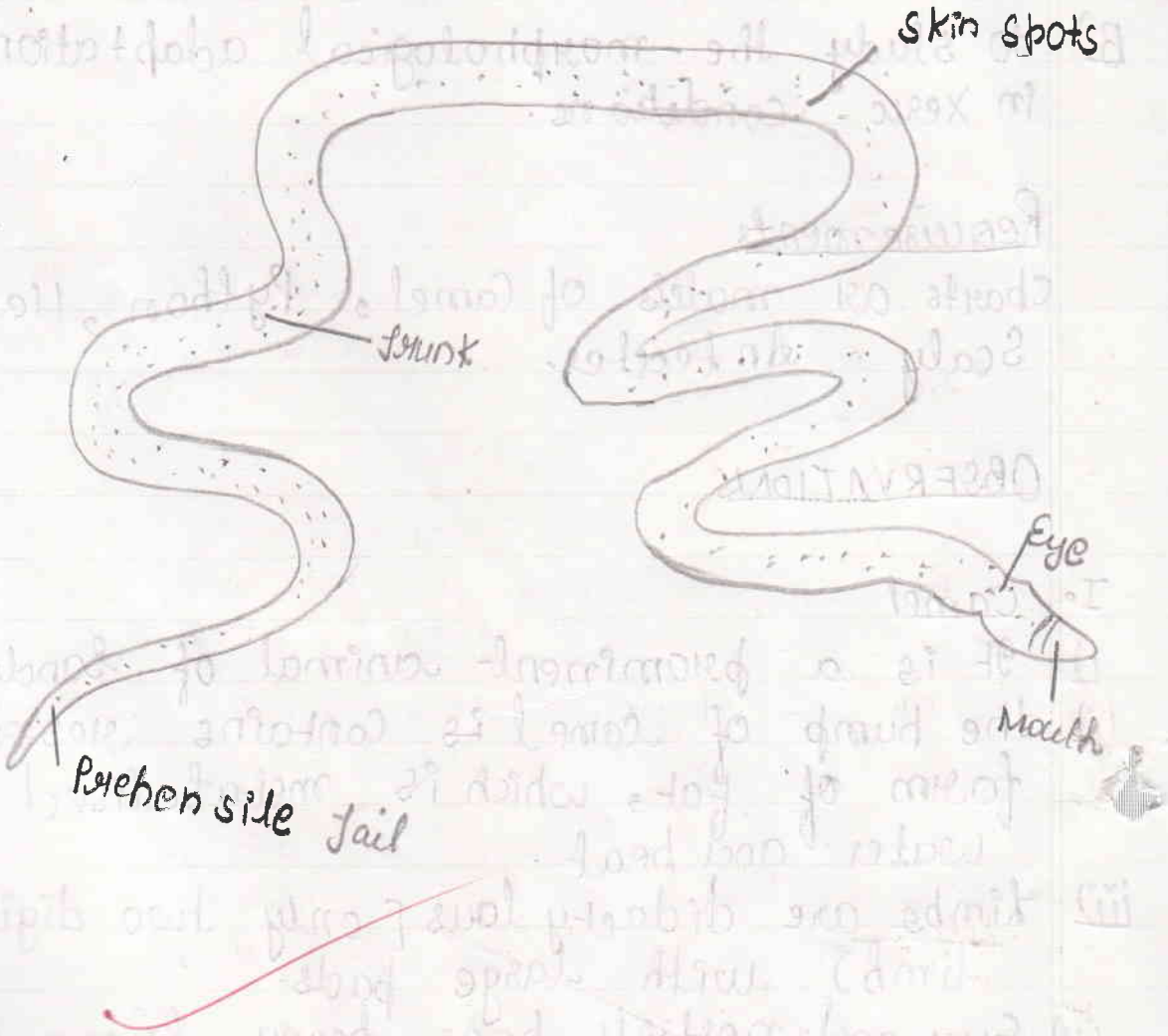
Python (Anaconda)



Topic _____ Date _____

II. Python (Ajgar)

i) It is found in wild, dry sandy, rocky areas, or inside burrows or hanging from trees.

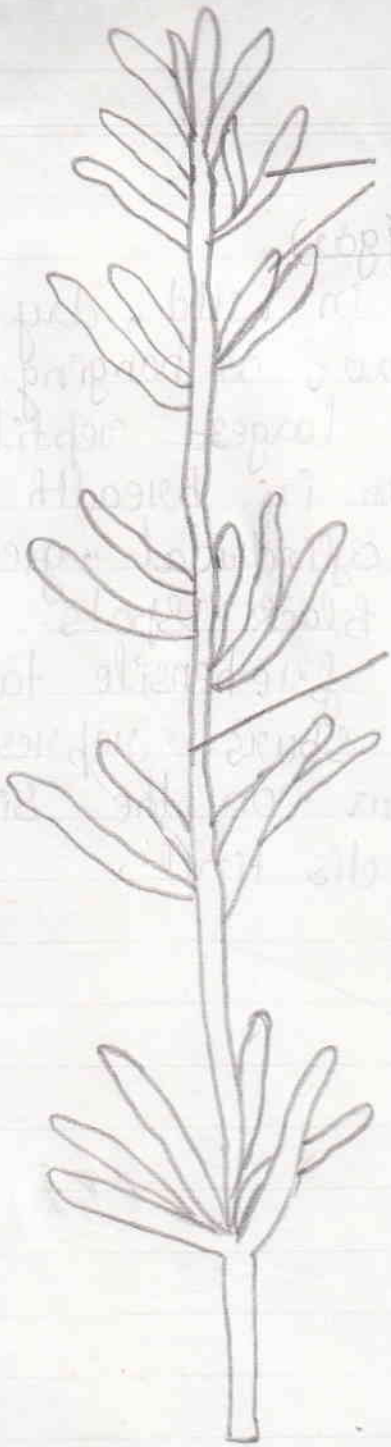
ii) It is the largest reptile, 8-10m in length and 15-20cm in breadth.

iii) Body is cylindrical, grey-brown in colour with red and black spots.

iv) Presence of prehensile tail.

v) claw like spurs representing vestigial hind limbs occur on the side of cloaca.

vi) Head is distinct.



Hydrilla Verticillata

Topic _____ Date Aug 31, 2016

Experiment No- 13

Aim:- To study plants and animals found in aquatic Condition comment upon their morphological adaptations

A) To study the morphological adaptations in aquatic plants.

Requirements:
living or preserved specimens of Hydrilla, Eichhornia Ceratophyllum and Nelumbo

Observations:-
Some of the Common examples of hydrophytes are-

1. Hydrilla
- It is common submerged hydrophytes with poorly developed adventitious fibrous roots and later get detached to ~~it~~ become suspended.
- It is found in shallow freshwater of ponds, pools, lakes, tanks etc.
- It is spongy and flexible.
- leaves arise in whorls from each node.
- It produces vegetatively and by seeds.
- Plants parts covered with mucilage.
-

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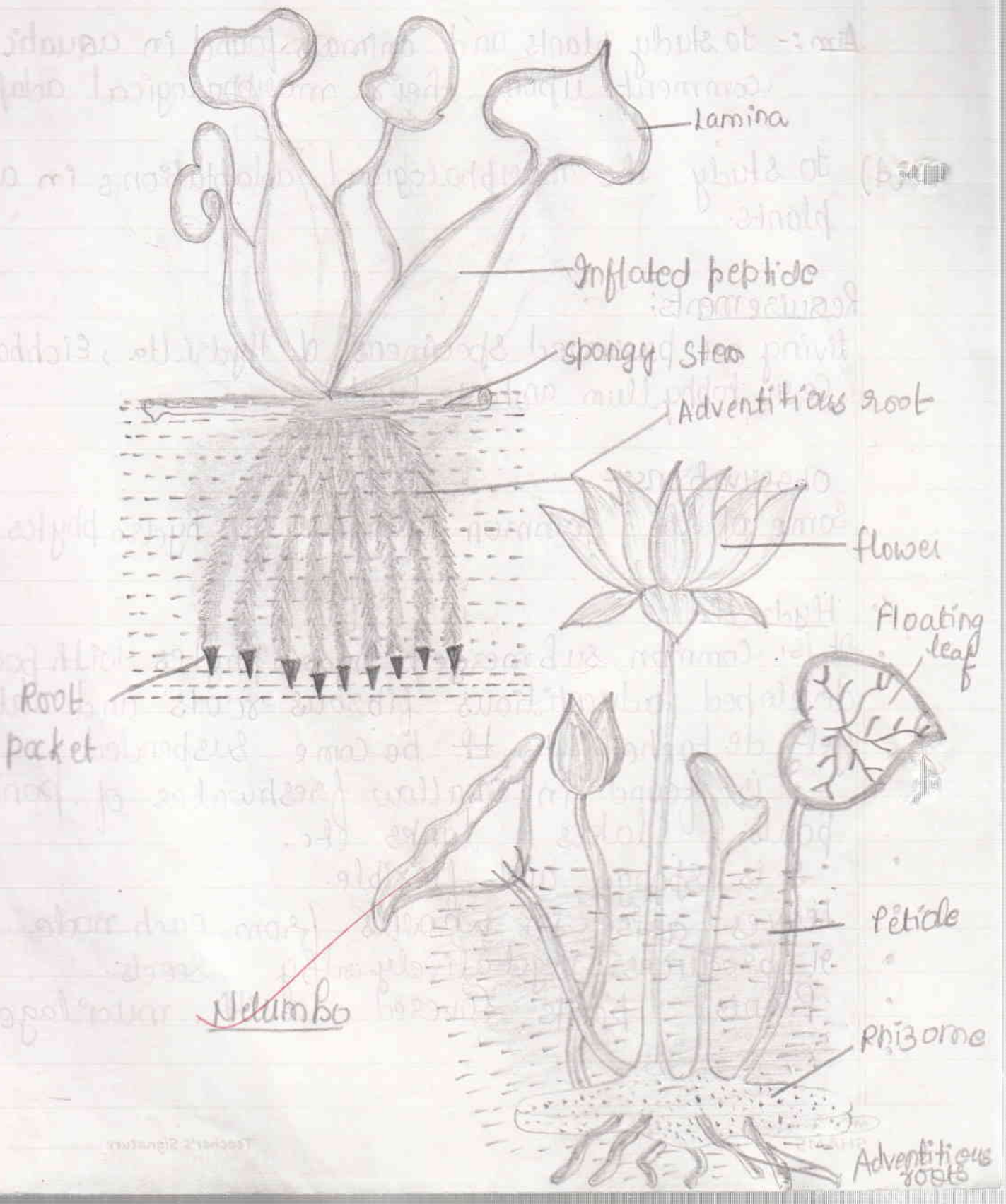
EICHHORNIA [WATER-HYACINTH]



Topic _____ Date _____

2. Eichhornia [water-hyacinth]

- Plants are free floating, herbaceous, aquatic weeds, occur abundantly in ponds, lakes and ditches, blocking water channels.
- Plant grow by means of spongy offsets (stems) which show nodes and internodes
- Cluster of brown adventitious roots arise from each node. The roots acts as balancers.
- The root caps are absent. They are replaced by apical root pockets.
- Rosette of large, showy, aerial leaves arise from each node.

3. Nelumbo (Lotus):-

- The plants are perennial, anchored hydrophytes which usually grow in shallow waters.
- The roots are adventitious and slender.
- Air spaces in petiole and lamina.
- Some of the mature leaves come out of water.
- The upper surface of leaves possesses cuticle and stomata.
- The fruits consist of fleshy thalamus with embedded achenes, are dispersed by waters.
- The leaves are large and floating.

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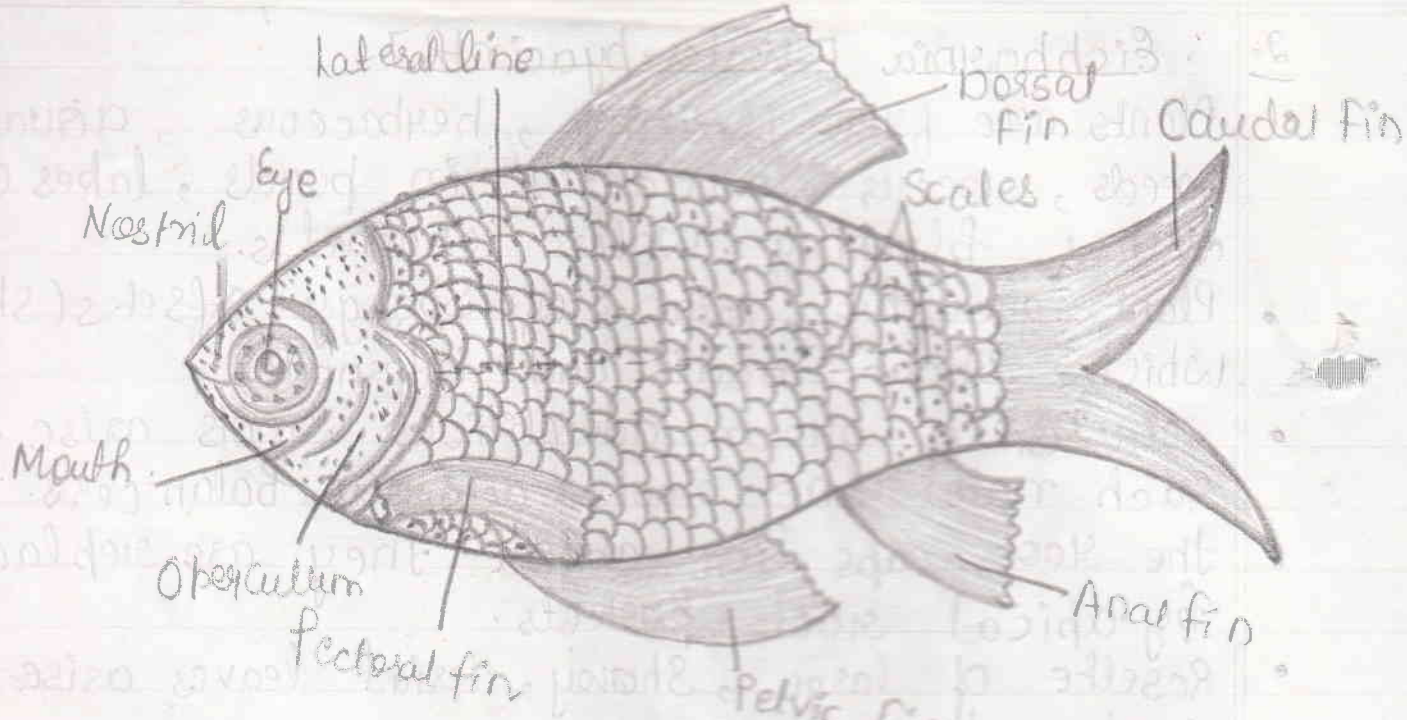
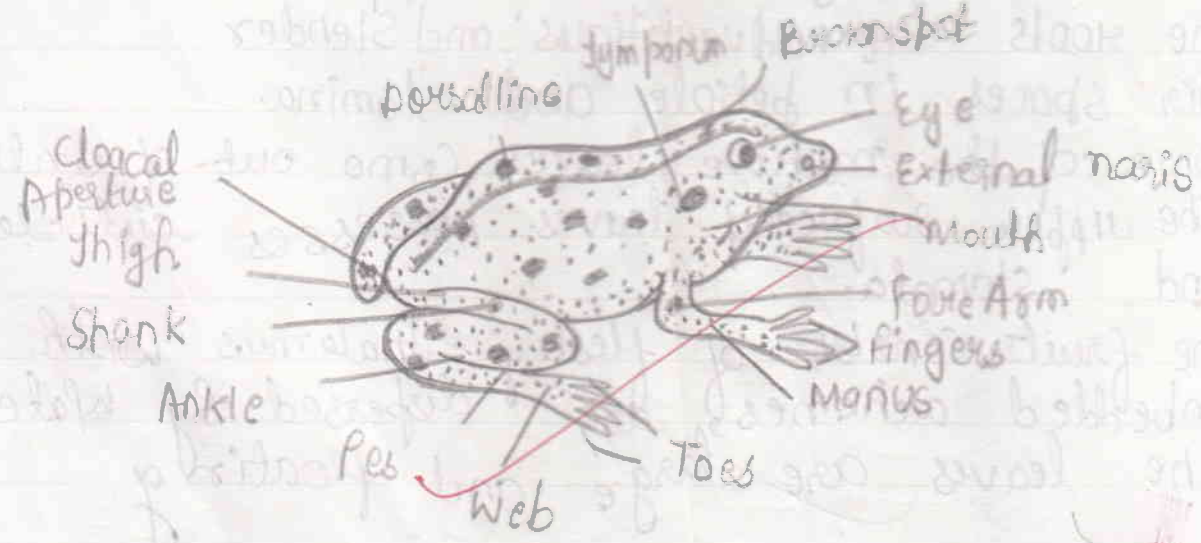


Carp (Labeo Rohita)



Rana tigrina

Topic _____ Date _____

B) To study the morphological adaptations in aquatic animals.

1. Labeo rohita [Carp]:-
- It is a fresh water bony fish and is Commonly known as Carp in English and Rohu in hindi.
- It is about 1 metre in length and weighs 4 kg.
- It is Covered with overlapping cycloid scales.
- Presence of gills, allow them to exchange respiratory gases in water.
- Presence of long, air filled sac - the swim or air bladder
- The sense of smell is particularly acute.
- The eyes are also well developed.

2. Frog [Rana - tigrina]
- It is amphibious freshwater animal found on pools, lakes
- It is Cold blooded
- The skin is smooth, having glands which keep it moist.
- In eye, presence of nictitating membrane helps in vision while swimming
- It respires through lungs, skin and buccopharyngeal Cavity an adaptation to Aquatic Conditions
- They show protective Colouration.
- The fore limbs have four fingers and hind limbs have five toes with well developed web which is helpful in swimming.
- They undergo hibernation and aestivation.

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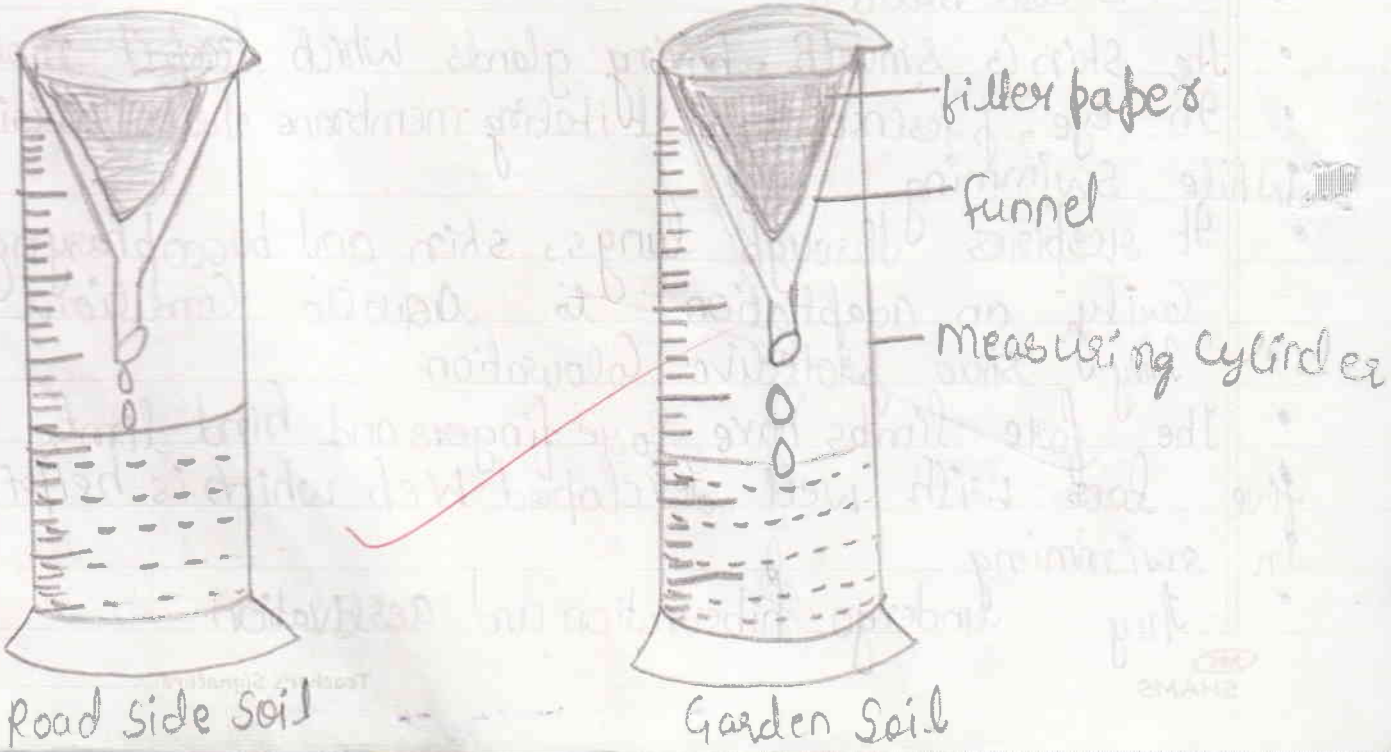
S.NO	Soil types	Weight of Soil (X)	Volume Of water pour (Y)	Volume of water Collecting in measuring flask (Z)	volume of water retained in the Soil (Y-Z)	Water holding capacity of the Soil in (%) $\left(\frac{Y-Z}{X}\right) \times 100$
1.	Garden	50gm	50mL	18 mL	32 mL	$\frac{50-18}{50} \times 100 = 64\%$
2.	Road Side	50gm	50mL	23 mL	27 mL	$\frac{50-23}{50} \times 100 = 54\%$



Topic _____ Date 31 Aug, 2016

Experiment-15

Aim:- to prepare a temporary mount of onion root tip to study mitosis.

Requirements :-
onion bulbs, conical flasks / Glass bottles, corked vial / tube, petri dishes, scissors, forceps, needles, methyl alcohol, acetic acid, hydrochloric acid acetic acid, acetocarmine, distilled water, Spirit lamp, microscope, slides, Coverslips, blotting paper etc.

Observations:
Under the low power of microscope, rectangular cells with pink nucleus are seen scattered. Under the high power of microscope following stages become distinct:-

1. **Interphase**
   i) It is a non-dividing phase of the cell cycle between two successive cell divisions.
   ii) Nuclear envelope and nucleolus are distinct.
   iii) Chromatin fibres appear forming network within the nucleus and are not distinguished into chromosom

2. **Prophase**
   i) Chromatin material shortens and condenses into thread like structure called chromosomes.

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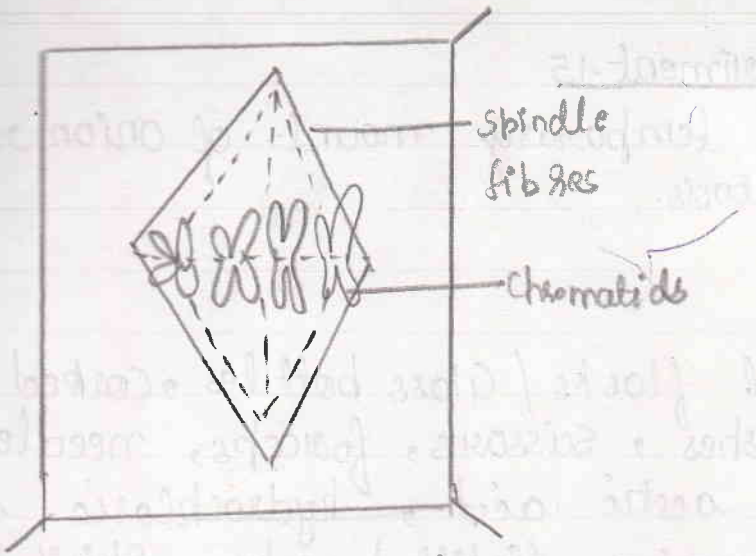
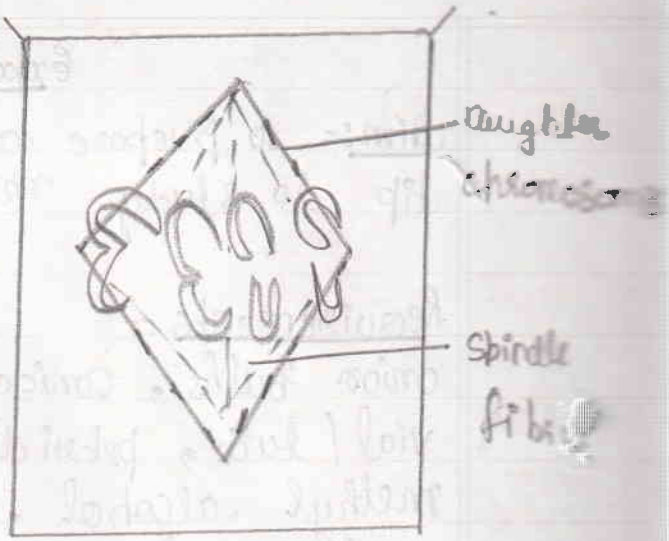
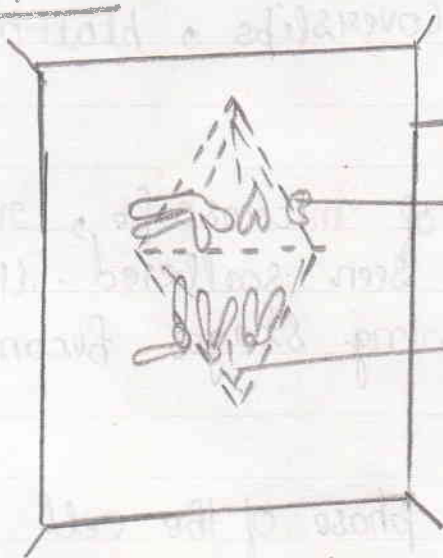


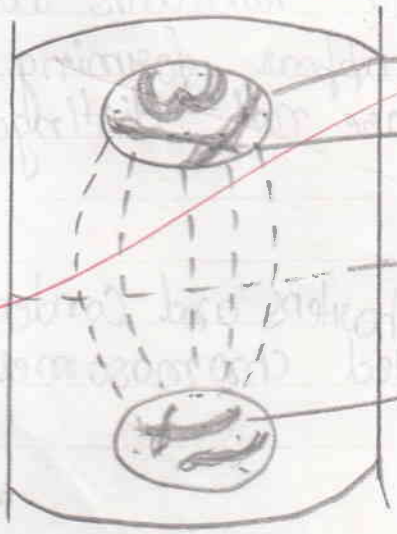
METAPHASE STAGE



EARLY ANAPHASE



LATE ANAPHASE



TELOPHASE STAGE

Topic _____ Date _____

ii) Each chromosome Consist of two chromatids joined at a point called centromere.

iii) At the end of the prophase, the nucleolus and nuclear membrane disappear. The cellular Contents Condense into a spindle.

3. Metaphase

i) A bipolar spindle develops in the cell.

ii) The chromosomes appear short and thick having two chromatids.

iii) The chromatids become clear and get attached to the spindle fibres at their centromeres.

iv) chromosomes become arranged at the equator of the spindle

4. Anaphase

i) The Centromeres split into two and the fibre pull the daughter centromere to the opposite poles.

ii) The daughter chromosomes (separated chromatids) appear, V, J, L and I shaped depending upon the position of Centromere.

5. Telophase

i) The chromosomes reach the poles of the Cell, uncoil, lengthen and lose the ability to be seen clearly.

ii) The spindle fibre disintegrate.

iii) Nuclear membrane and nucleolus reappear and two daughter nuclei appear at opposite poles

Topic _____ Date _____

6. Cytokinesis:

i) The cell plate formation takes place between the two daughter nuclei.

ii) Two daughter cells are formed.

Precautions:

1. The base of the onion bulb should be in contact of water while growing the roots.
2. Root tips should be fixed in the morning between 8 to 10 A.M.
3. The root tips should be washed thoroughly after boiling with dil HCl, Otherwise the cells do not get stained.
4. The slide should be warmed gently touch above the flame of the spirit lamp.
5. The root tips should not dry up during warming and staining.
6. There should be no air bubble in the slide.

Topic _____ Date 15/Nov/16

Experiment No - 18

Aim → To study the plants population density by Quadrant method.

Requirements → Metre Scale, String or Cord, nails paper, pencil, digger, tape etc.

Result →

Density → It is the numerical strength of an species per unit area. It is calculated as -

1. Population density of a plant species in the given field.

= ~~total no. of all the individuals of species~~

= ~~total no. of individuals of a species in all the quadrants~~ / No. of quadrants

2. % of the individuals of a particular species

= Total no. of all the individual plants x 100 / No. of individual plants of one species

Precautions

1. Count the no. of plants carefully.
2. Thickness of the String should be normal neither very thick nor very thin.

S.NO.	Name of species	No. of individual in each quadrat			Total no. of individual of a species	Total no. of quadrats in which species occured (B)	Total no. of quadrats Studied (A)	% age frequency $F = \frac{B}{A} \times 100$
		1	2	3				
1	A	2	–	–	2	1	3	$\frac{1}{3} \times 100 =$ 33.33
2	B	1	–	–	1	1	3	$\frac{1}{3} \times 100 =$ 33.33%
3	C	2	–	–	2	1	3	$\frac{1}{3} \times 100 =$ 33.33%
4	D	23	37	–	60	2	3	$\frac{2}{3} \times 100 =$ 66.66%
5	E	1	–	–	1	1	3	$\frac{1}{3} \times 100 =$ 33.33%
6	F	6	3	–	9	2	3	$\frac{2}{3} \times 100 =$ 66.66%
7	G	5	–	–	5	1	3	$\frac{1}{3} \times 100 =$ 33.33%
8	H	1	–	–	1	1	3	$\frac{1}{3} \times 100 =$ 33.33%
9	I	–	4	2	6	2	3	$\frac{2}{3} \times 100 =$ 66.66%
10	J	–	4	1	5	2	3	$\frac{2}{3} \times 100 =$ 66.66%
11	K	–	2	1	3	2	3	$\frac{2}{3} \times 100 =$ 66.66%
12	L	–	2	–	2	1	3	$\frac{1}{3} \times 100 =$ 33.33%
13	M	–	–	2	2	1	3	$\frac{1}{3} \times 100 =$ 33.33%
14	N	–	27	–	27	1	3	$\frac{1}{3} \times 100 =$ 33.33%
15	O	–	–	1	1	1	3	$\frac{1}{3} \times 100 =$ 33.33%
16	P	–	7	–	7	1	3	$\frac{1}{3} \times 100 =$ 33.33%

Topic _____ Date 17/Nov/16

Experiment No - 19

Aim- Study of plant population frequency by quadrant method

Requirements

4 pegs, 1 metre Scale, Sking 50 m, work book, bag for plants Collection, wooden Quadrant of definite size

Observations

Write down the name of the species, total no. of species to Calculate the frequency in your practical notebook in a tabular form.

Result

Population Frequency. It is the degree dispersion in terms of % occurence. It is calculated as follows -

$$\text{Population frequency} = \frac{\text{No. of Quadrates in which species occurd} \times 100}{\text{Total no. of Quadrates studied}}$$

Precautions

- Count the no. of plants Carefully
- Thickness of the sking should be normal neither very thick nor very thin.

Shamana
29/11/2016

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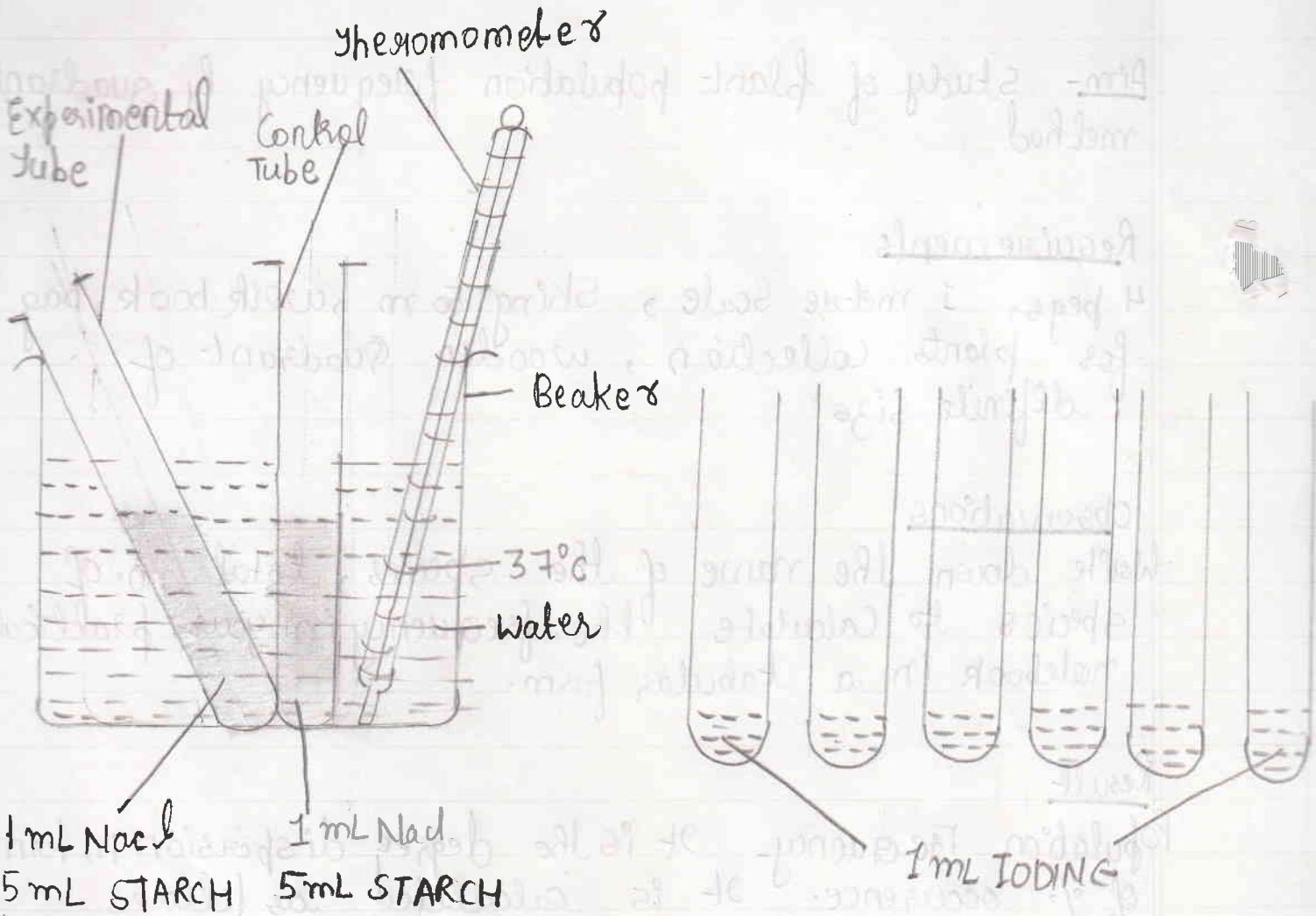

Experimental set up to show the action of Salivary amylase on starch.

Topic _____ Date 16 Jan 19

Experiment No-20 (A)

Aim:- To Study the action of Salivary amylase on Starch

Requirements:-

Test tubes, test tube stands, measuring cylinder, beakers, funnel, Spirit lamp, pipettes, Water-bath, thermometer, cotton, starch, iodine, potassium iodide, Sodium chloride, paraffin wax, marker etc.

Preparation of Reagents

1. 1% Nacl Solution: Dissolve 1 g Nacl in 100 mL water.
2. 1% Starch Solution: To 10 mL of water add 1 g of Soluble Starch. Heat 90 mL of water to about 98°C and add to it 10 mL of Starch gradually by stirring. Boil and leave overnight. Filter to get 1% Starch Solution.
3. Lugol's iodine Solution: Take iodine 1 g, potassium iodide 2 g and 100 mL distilled water mix and allow to Stand. Keep this Solution in amber bottle.

Theory:

Enzyme Salivary amylase does not act under extreme Conditions or in presence of alcohol as

OBSERVATION TABLE

Show time required to get the end point in digesting 5mL of 1% Starch at 37°C by the diluted enzyme.

SNO.	Time (min)	Time taken to reach achromatic point in experimental tube	Control tube
1.	0 min	Blue Colour	Blue colour
2.	2 min	Blue Colour	"
3.	4 min	Blue Colour	"
4.	6 min	Blue colour	"
5.	8 min	Light Blue	"
6.	10 min	Very Light Blue	"
7.	12 min	Disappear	Blue colour

Topic _____ Date _____

it denatures the enzyme. Salivary amylase ~~does not act~~ is proteinaceous and when gets denatured it doesnot not act. Saliva is an enzyme containing juice produced by salivary glands to digest food. Salivary amylase is active only at optimum conditions i.e 37°C and 6.8 pH. Its activity can be changed by changing conditions of enzyme action.

Principle

Starch give blue-black colouration with Iodine Solution. When Saliva is added to Starch Solution, enzyme present in Saliva (Salivary amylase) starts digesting the starch so that after few minutes no starch is present to give blue-black Colouration. This is known as achromatic point.

Result and Conclusion:- It takes ____ min for 1 mL of diluted enzyme (1:20 dilution) to digest Completely 5 mL of 1% Starch Solution to the end point (achromatic point).

Precautions

1. All the glass wares used should be thoroughly cleaned and dried
2. Maintain the temp. i.e 37°C throughout the experiment
3. While measuring the Saliva, there should be no air bubble.

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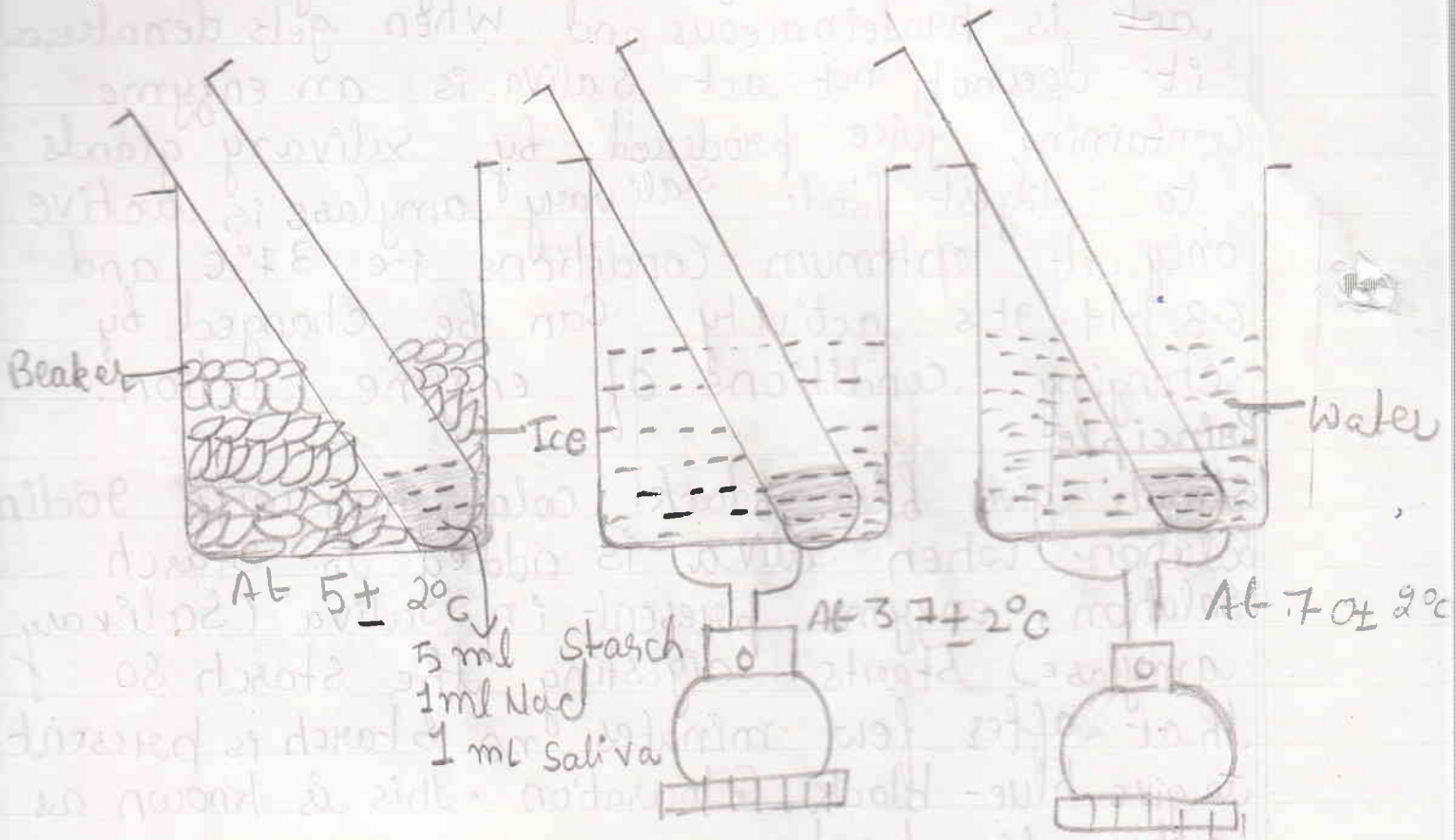
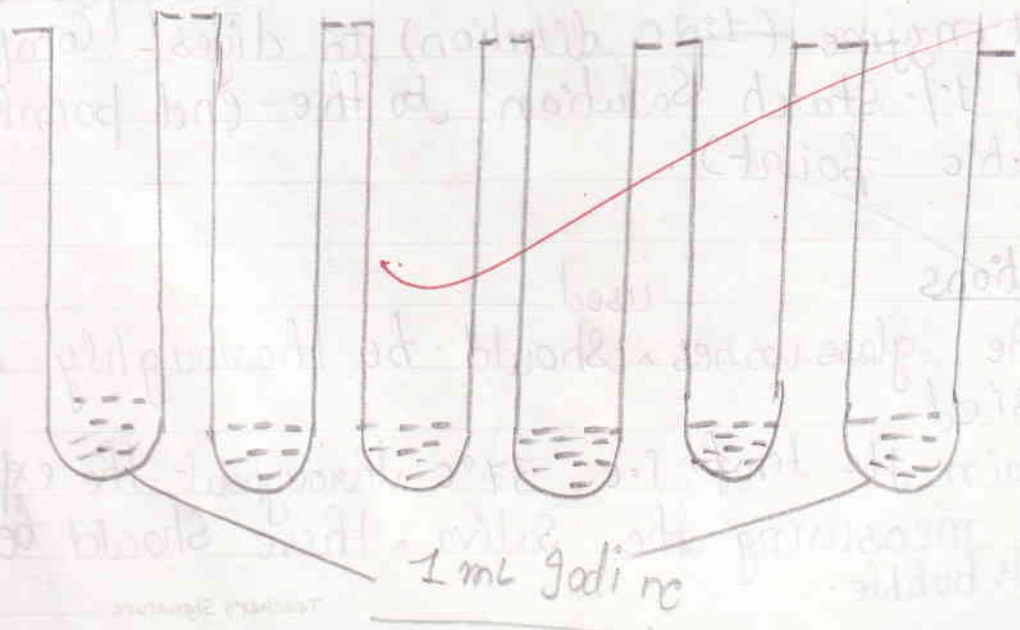
Experimental set-up to show the effect of temperature on the activity of salivary amylase on starch.





Topic _____ Date 16/Jan/17

Experiment - No - 8

Aim:

To study the effect of different temperature on the action of salivary amylase on starch.

Requirements:

Ice, test tubes, test tube stands, measuring cylinder, beakers, funnel, spirit lamp, pipettes, water bath, thermometer, cotton, starch, iodine, potassium iodide, sodium chloride, paraffin wax, marker, etc.

Conclusion:

It is seen that time required to reach achromatic point at 5°C and 70°C is more. For the enzyme Salivary amylase, the Optimum temperature is 37°C. Therefore, the starch digestion is the fastest at 37°C. Whereas at higher temperature, the enzymes are denatured and therefore, their activity is reduced. At low temperature too, the enzymes are deactivated so, their activity is reduced.

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OBSERVATION TABLE

Time required to reach the end point in digesting 5 mL of 1% starch at different temperatures by the diluted enzymes.

Temperature	Time taken to reach achromatic point	Remarks
5 ± 2°C	More than 20 min	At low temp enzyme became inactive
37 ± 2°C	1 min	At 37°C enzyme show optimum activity.
70 ± 2°C	More than 10 min	At high temp the enzyme get denature.

Topic _____ Date _____

Precautions

- All the glassware used should be thoroughly cleaned and dried.
- Always filter the saliva through a wet cotton film and not through a filter paper.
- While measuring the saliva, there should be no air bubble.
- All solutions should be made accurately.
- Iodine solution should be freshly prepared.

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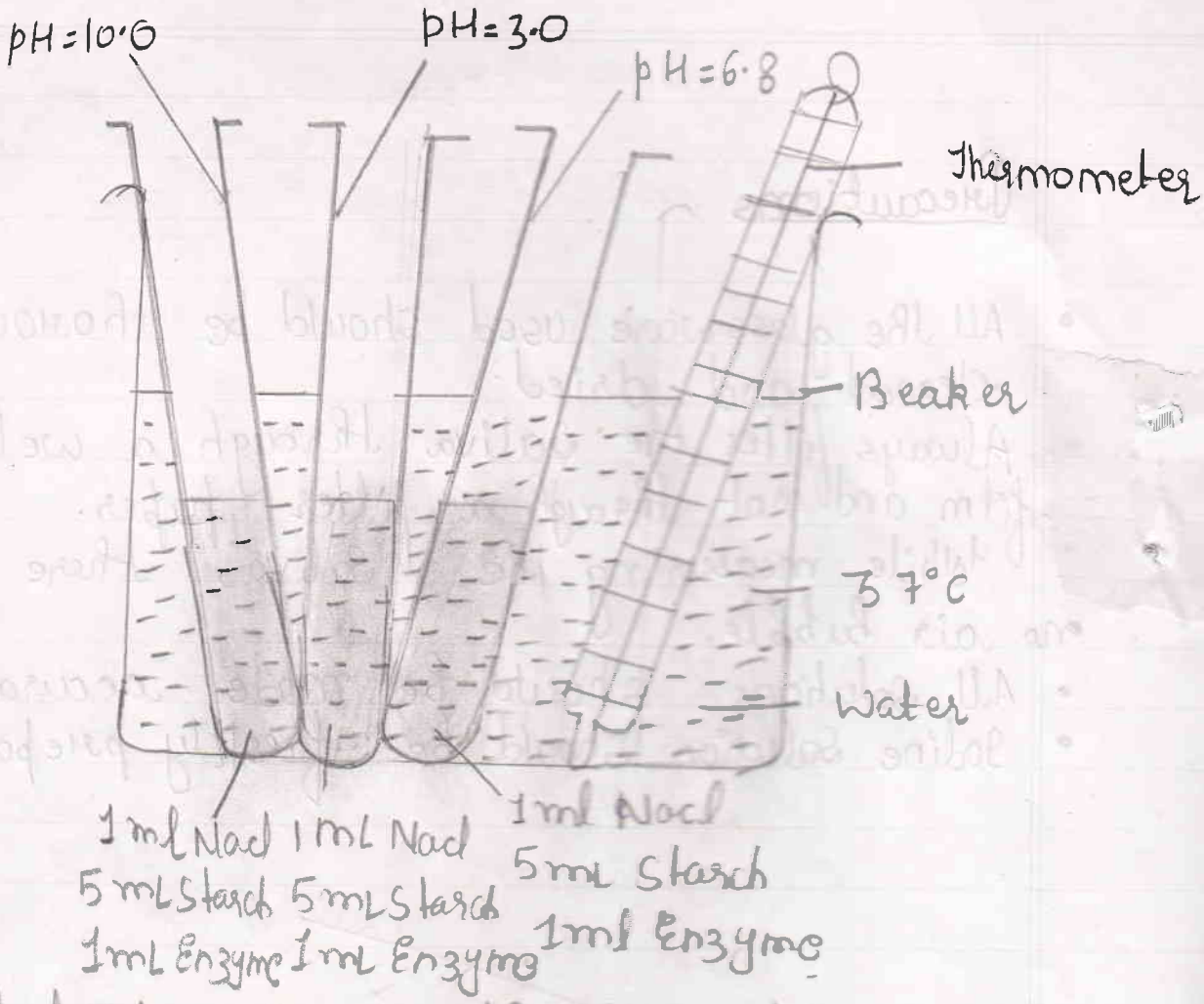

Experimental Set-up to show the effect of pH on the activity of Salivary amylase on starch

Observation Table:—

pH	Time taken (min) to reach the achromatic point.
3·0	acidic 12 min
6·8	neutral approx 2 min
10·0	basic more than 15 min

Topic _____ Date 16 | Jan | 17

Experiment - No :- C

Aim :- To study the effect of three different pH on the activity of salivary amylase on starch.

Requirements :- Test tubes, test tube stands, beakers, pipettes, funnels, measuring cylinders, cotton, starch, Iodine, potassium iodide, Sodium chloride, different pH tablets etc.

Observation Table :- Time required to reach the achromatic point in digesting 5 ml of 1% starch at different pH by the diluted enzyme.

Results and Explanation :-
In all the test tubes, achromatic point is reached i.e a stage when starch is completely digested and hence, no blue colour with Iodine. However, the time taken to reach the achromatic point in these test tubes is different. This shows that pH has got an effect on the activity of Salivary amylase.

Precautions :-

1) While measuring the Saliva, there should be no air bubble
2) All solutions should be made accurately.
3) Iodine solution should be freshly prepared.

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