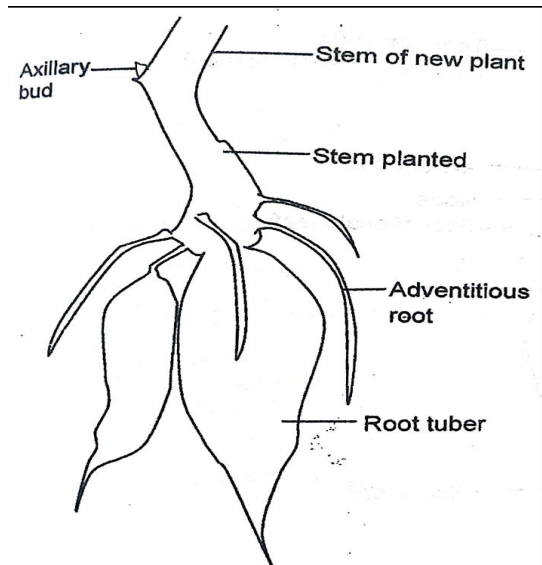


SPECIMEN A - CASSAVA STEM



Name observable features

- Presence of ridged nodes
- Deeply indented leaves
- Leaf stalk (long)
- Palmate leaves
- Leaves with net venation
- Nodes
- Internodes
- Axillary buds
- Terminal buds
- Green stem
- Lenticels

Habitat: school farm, farmland

Biological classification

Division - Angiospermophyta

Reasons:

They produce flowers

Seeds are contained in fruits

Class - Dicotyledoneae

Reasons:

- Presence of leaf stalk (petiole)
- Presence of net venation
- Presence of broad leaves

Type of leaves - Simple digitate

Adaptive features

- a. Leaves for photosynthesis
- b. Nodes for vegetative propagation
- c. Axillary buds develop branches
- d. Terminal bud to increase in length of stem

Name two areas where meristematic tissues are found

Ans:

Axillary buds

Terminal bud

Name two areas where active mitosis occurs

Ans:

Axillary buds

Terminal bud

Observable characteristics of a dicotyledonous Stem

- Presence of leaf stalk
- Presence of broad leaves with net venation

- Presence of nodes and internodes
- Presence of buds

Economic importance of cassava

- Source of food and Beverages
- Starch
- Bio-fuel
- Ethanol
- Source of oxygen through photosynthesis
- Removes carbon dioxide from the environment through photosynthesis
- Source of income
- source of raw material for industries
- source of employment

Position in food chain

Primary producer/ first trophic level

Reason for the trophic level

It manufactures food for herbivores

OBSERVABLE FEATURES

1. stems to support leaves
2. Axillary buds on stem for vegetative propagation
3. Adventitious roots for water and mineral salt absorption as well as anchorage

CLASSIFICATION - root tuber

FOOD CLASS - carbohydrate

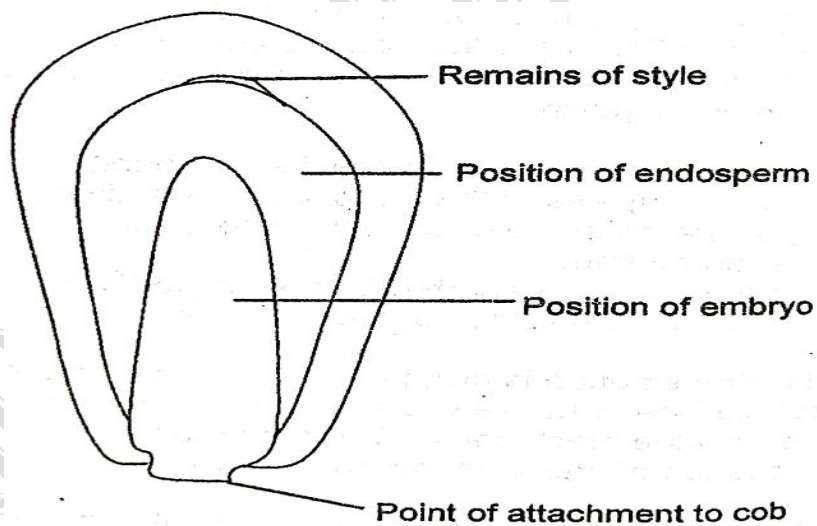
FOOD NUTRIENT - CARBOHYDRATE

EXAMPLE OF CARBOHYDRATE - STARCH

BIOLOGICAL SIGNIFICANCE OF CASSAVA

1. swollen for food
2. food storage organ
3. stem with buds for vegetative propagation
4. leaves serve as food for animals
5. leaves used for medicinal purpose

SPECIMEN B - MAIZE GRAIN



Drawing of the external structure of maize grain

NOTE:

The maize grain is not a seed but rather a fruit. It is a fruit because its outer wall is formed from the fusion of the testa and fruit wall (pericarp). The maize grain is monocotyledonous and endospermous.

CLASSIFICATION OF FRUIT

True fruit – developed from a fertilized ovary only

Simple fruit – formed from a single flower

Dry fruit – fruit not fleshy at maturity

Dry indehiscent – pericarp does not split open

Type/Class of fruit – *Caryopsis* (one seeded fruit in which a pericarp is dry and fuses with the seed coat)

Type of seed – Monocotyledonous and Endospermous

Agricultural classification – Cereal

Pest of Maize – maize weevil, termite

Treatment of maize/pest control/preservation

- Use of insecticide
- Use of irradiation

Class of food - Carbohydrate (starch), Protein

Food storage tissue

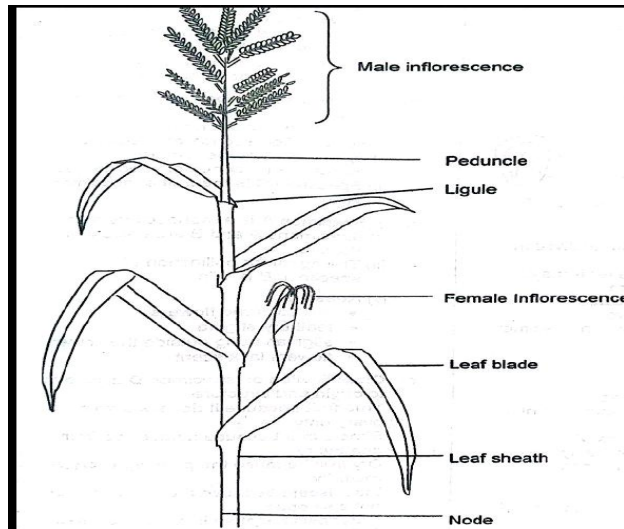
- Endosperm stores starch
- Aleurone stores protein

Level of organization – *Organ*

Observable external features

- Presence Fruit wall
- Position of endosperm
- Remains of style
- Position of embryo
- Point of attachment to cob

SPECIMEN C - MAIZE PLANT



Classification according to life cycle - Annual plant

Agricultural Classification: Food crop

BIOLOGICAL CLASSIFICATION

Division - Angiospermophyta

Reasons

- Produce flowers
- Produce fruits containing seeds

Class - Monocotyledoneae

Observable Reasons

- Presence of leaves with parallel venation
- Presence of narrow leaves
- Leaves lack petiole
- Presence of leaf sheath

- Presence of fibrous roots

Observable characteristics

- Presence of leaves with parallel venation
- Presence of narrow leaves
- Leaves lack petiole
- Presence of leaf sheath
- Presence of fibrous roots

Observable features in general

- Narrow leaves
- Veins
- Parallel venation
- Leaf sheath
- Pointed end of leaves
- Fibrous roots
- Hairs

Adaptations to mode of life

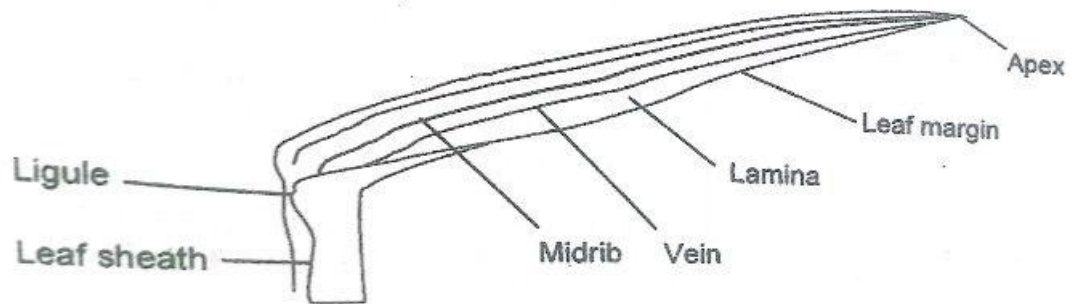
- Narrow leaves reduce excessive transpiration
- Erect leaves to prevent direct effect of sunlight in order to reduce overheating
- Hairs present on leaves and stem to reduce transpiration
- Leaf sheath provides support to the plant to withstand wind

Adaptation to regulation of water loss

- Narrow leaves
- Leaves roll to reduce rate of transpiration

- c. Presence of epidermal Hairs

NB: You may be asked to remove one leaf and draw



Drawing of the leaf of young maize plant x ½

Describe the leaf

- a. Narrow
- b. Elongated
- c. Pointed apex
- d. Parallel venation
- e. Smooth margin
- f. Pointed tip
- g. Leaf sheath
- h. Ligule

Classification of leaf of maize plant

Arrangement: alternate

Type: simple

Shape: linear

Margin: entire/smooth

PARTS OF THE LEAVE AND THEIR FUNCTIONS

Lamina - photosynthesis.

Veins -

- i) Transport of water, mineral salts and manufactured food
- ii) Support

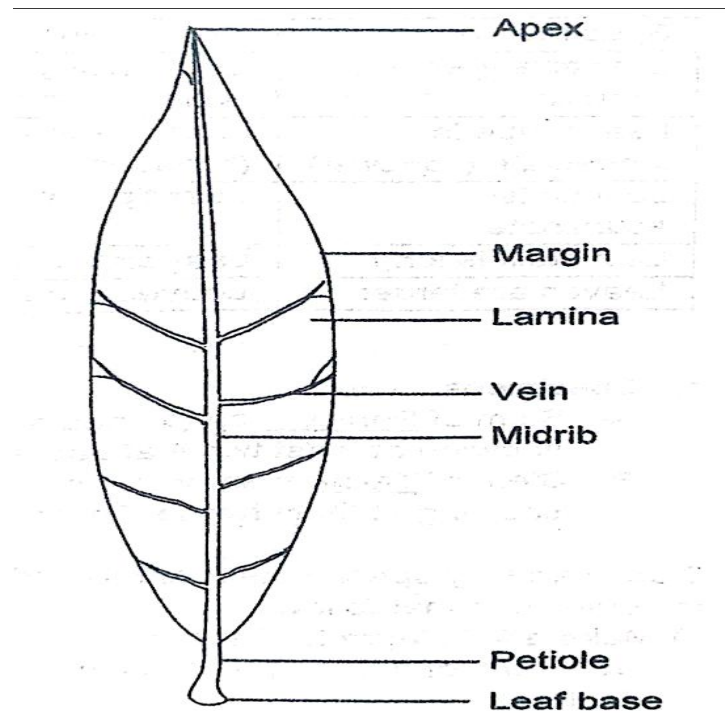
Leaf sheath -

- i) Connects the leaf blade to the leaf base.
- ii) Supports the leaf in position.

Functions of leaves:

- Photosynthesis
- Excretion
- Transpiration
- Gaseous exchange
- Temperature regulation

Specimen D – Leaf of mango plant



Arrangement: Alternate

Type/blade: Simple

Shape: Lanceolate

Margin: Entire

Tip: Acuminate

Base: Acute

Venation: Reticulate

Drawing Details:

Shape - Sword-like/Narrow

Tip - Elongated

QUESTIONS

Specimen D - Leaf of mango

Specimen F - Cassava Leaf

Classify specimen D into its division and class

i) State the type of leaf arrangements shown in specimens D and F ii) Name the leaf shape of specimens D and F

i) What is the type of leaf margin in specimen D ?

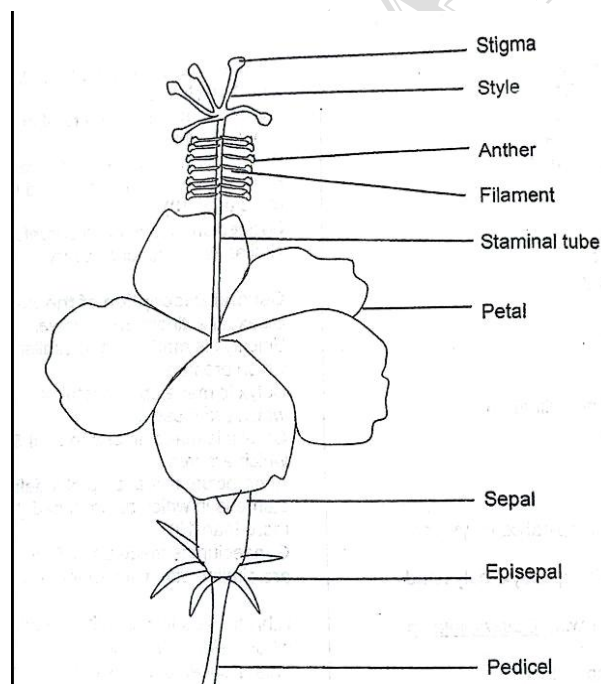
ii) State the type of leaf venation in

specimens D and F

i) List three observable similarities between specimens D and F ii) State four observable differences between specimens D and F

Make a drawing 8 - 10cm long of Specimen D or F

Specimen E – Flower of hibiscus plant



Scientific name: *Hibiscus sp.*

Type of pollination: Cross

Pollinating agent: Insects

Type of flower: Bisexual

Symmetry: Actinomorphic

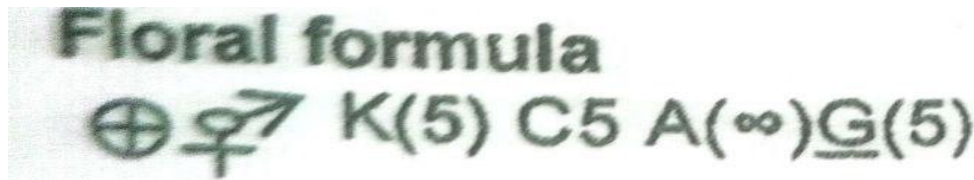
Task

- Classify the flower
- Describe the flower
- State the symmetry
- Type of ovary
- Write floral formula
- Type of pollination
- Agent of pollination
- Example of agent of pollination
- Adaptive features
- Draw full flower
- Draw half flower
- Placentation
- Draw full flower with epicalyx, calyx and corolla removed
- Draw half flower with epicalyx, calyx and corolla removed
- State ecological importance

Classify the flower as far as possible

- i. Complete flower because it has all four floral leaves
- ii. Bisexual because it has both androecium and gynaecium
- iii. Actinomorphic because it is radially symmetrical
- iv. Syncarpous pistil because gynaecium has more than one carpel which are fused

- v. Hypogynous because it has a Superior ovary
- vi. Entomophilous (Insect pollinated) flower because of the presence of coloured petals, nectar, sweet scent and is conspicuous



Description/interpretation of the floral formula in words

Actinomorphic and Bisexual. Calyx is made up of a total of 5 similar sepals which are fused

Corolla is made up of a total of 5 similar petals, which are free

Androecium is made up of indefinite number of stamens in which all are fused (the number is more than 10)

Gynaecium has 5 fused carpels which are similar with a superior ovary

General Description of the flower

Bisexual actinomorphic flower

Epicalyx is made up of 6 similar episepals which are free

Calyx is made up of a total of 5 similar sepals which are fused

Corolla is made up of a total of 5 similar petals, which are free

Androecium is made up of indefinite number of stamens in which all are fused (the number is more than 10)

Gynaecium is made up of 5 fused carpels which are similar with a superior ovary

NB

Hibiscus is a flower with an additional floral whorl below the calyx

This is called epicalyx made up of 6 episepals

Features of interest

Stigma receives pollen grains

Fused styles support stigmas

Filament supports anther

Anther produces pollen grains

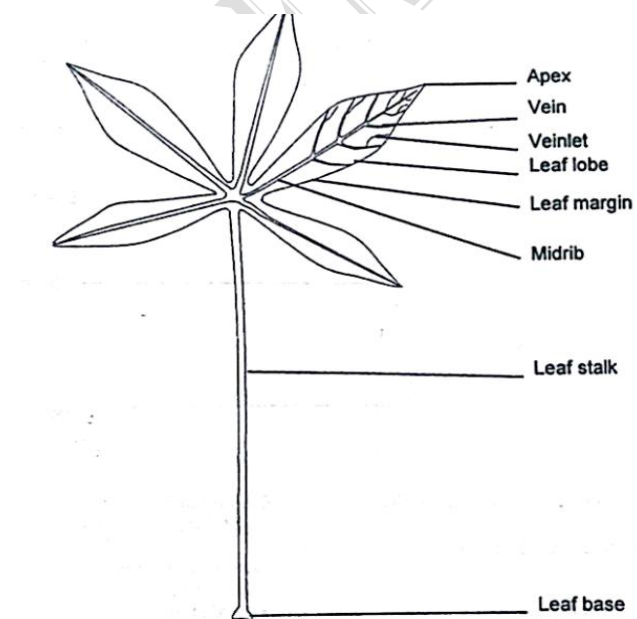
ADAPTATION FOR INSECT POLLINATION

- i. Large and conspicuous to attract insects
- ii. Brightly coloured and sweet scented petals
- iii. Nectaries present at the base of petals
- iv. Anthers are small and firmly attached to the filaments
- v. Pollen grains are large, heavy and sticky

ANIMALS THAT POLLINATE SPECIMEN E

1. Honey Bee
2. Butterfly
3. Moth
4. Sunbird

Specimen F – Cassava leaves



Classification of cassava leaf

Arrangement on stem: Alternate

Type: Simple

Leaf blade: Palmate

Margin: Deeply indented/digitate

Petiole: Peltate

Lobes: Oblanceolate to narrowly elliptic

Compare cassava leaf with a simple leaf

Hint:

Length of stalk, Shape, Leaf margin, Venation, Size

Class of food in cassava leaf

Vitamin

Type of Vitamin

Vitamin K

Nutritional Benefits

- i. Source of Vitamin K
- ii. Roughage

Specimen G – Gauva fruit/Garden egg

Observable features

- Succulent mesocarp
- Fleshy/juicy endocarp
- Hard testa of seed

Placentation – *Axile*

SYMMETRY – *Radial*

TYPE OF FRUIT – *Simple*

CLASS OF SIMPLE FRUIT – *Berry*

Agents of dispersal

- Humans
- Monkeys
- Birds
- Bats
- Rodents

Features of biological importance

- Succulent/fleshy mesocarp edible to animals which cause dispersal of the seeds
- Hard seed coat to protect seed during dispersal
- Sweet smell to attract agents of dispersal

Classes of food in specimen *G*

- Carbohydrates
- Vitamins
- Water
- Protein

Nutrients in specimen *G*

- Carbohydrates
- Vitamins
- Mineral salts
- Protein

Economic importance of specimen *G*

- It serves as source of food to humans and other animals

- Sales of specimen G serves as source of income
- Farming of Specimen S serves as source of employment
- Serves as raw material for industries

Nutritional importance/value of specimen G

- Serves as Source of carbohydrate
- Serves as Source of source of vitamins
- Serves as source of protein
- Specimen G contains fibre which prevent constipation

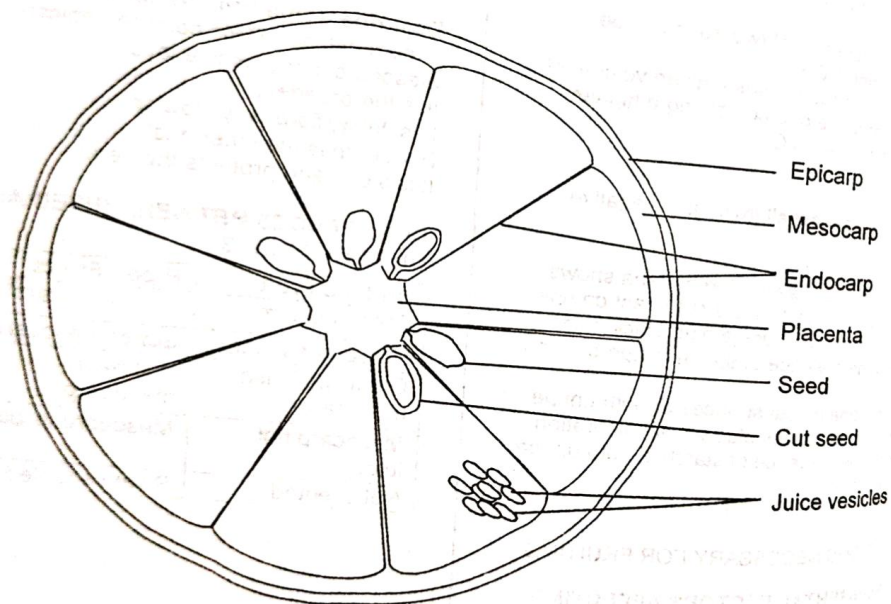
Classification in terms of food nutrient – *Fruit Vegetable*

Agricultural classification – *Fruit crop/Cash crop*

ADAPTATIONS FOR DISPERSAL

- Succulent/fleshy mesocarp edible to animals which cause dispersal of the seeds
- Brightly coloured epicarp attracts animals to cause dispersal
- Hard seed coat to resist digestion when swallowed
- Sweet smell to attract agents of dispersal
- Seeds are sticky to stick to beaks of larger birds

SPECIMEN H – TRANSVERSE SECTION OF A ORANGE FRUIT



Drawing of the T. S. of orange fruit x1

Observable features

- Yellow epicarp
- Succulent mesocarp
- Fleshy/juicy endocarp
- Hard testa of seed

Placentation – *Axile*

SYMMETRY – *Radial*

TYPE OF FRUIT – *Simple*

CLASS OF SIMPLE FRUIT – *Berry*

Agents of dispersal

- Humans
- Monkeys
- Birds
- Bats

Features of biological importance

- Succulent/fleshy mesocarp edible to animals which cause dispersal of the seeds
- Brightly coloured epicarp attracts animals to cause dispersal
- Hard seed coat to protect seed during dispersal
- Sweet smell to attract agents of dispersal

Classes of food in specimen S

- Carbohydrates
- Vitamins
- Water

Nutrients in specimen S

- Carbohydrates
- Vitamins
- Mineral salts

Economic importance of specimen S

- It serves as source of food/Vitamin C to humans and other animals
- Sales of specimen S serves as source of income
- Farming of Specimen S serves as source of employment
- Serves as raw material for industries

Nutritional importance/value of specimen S

- Serves as Source of sugar/carbohydrate
- Serves as Source of source of vitamins
- Specimen S contains fibre which prevent constipation

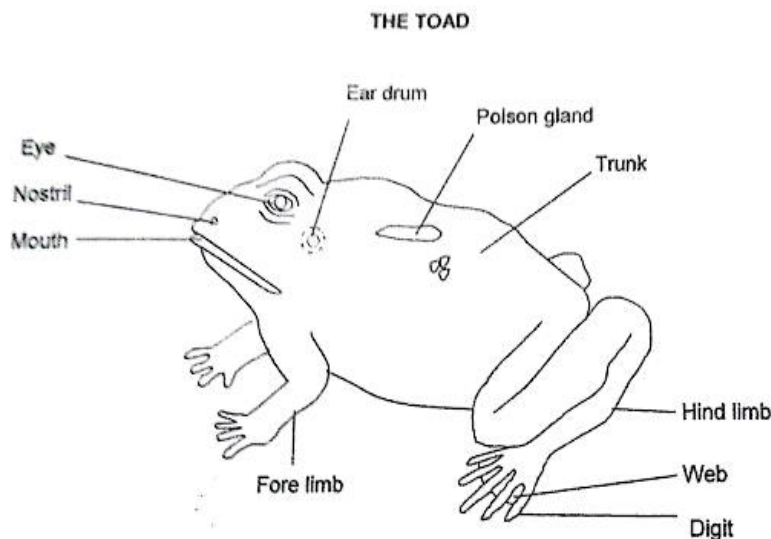
Classification in terms of food nutrient – *Citrus fruit*

Agricultural classification – *Fruit crop/Cash crop*

ADAPTATIONS FOR DISPERSAL

- Succulent/fleshy mesocarp edible to animals which cause dispersal of the seeds
- Brightly coloured epicarp attracts animals to cause dispersal
- Hard seed coat to resist digestion when swallowed
- Sweet smell to attract agents of dispersal
- Seeds are sticky to stick to beaks of larger birds

Specimen J – Toad



Drawing of the lateral view of the toad. X1

Habitat: under stones / logs / under litter/ pond/ hole

Reasons for habitat:

- i. Streamlined shape for swimming in water
- ii. Webbed digits in hind limbs for paddling in water

Mode of Reproduction

Sexual reproduction with oviparity

Type of Fertilization: External fertilization

Life Cycle: Complete metamorphosis

Biological Classification

Phylum - Chordata

Reasons:

- i. Presence of notochord
- ii. Presence of Dorsal nerve cord
- iii. Presence of Pharyngeal cleft

Class - Amphibia

Reasons:

- i. Scaleless skin
- ii. Two pairs of limbs
- iii. Moist loose skin
- iv. Gills at larval stage and lung at adult stage

Order - Anura

Reasons:

- i. Absence of a distinct neck
- ii. Webbed feet
- iii. Absence of tail

Observable features

- i. Nictitating membrane
- ii. Tympanic membranes
- iii. Two pairs of limbs
- iv. Light ventral surface
- v. Brown/dark dorsal surface
- vi. Glands in the skin
- vii. Wide mouth
- viii. Sticky tongue
- ix. A pair of large eyes
- x. A pair of long muscular hind limbs
- xi. Loose moist warty scaleless skin

Adaptive features

- i. Absence of tail enables hopping / leaping

- ii. Position of eye and nostril is useful when floating in water
- iii. Absence of neck (streamlined shape) for movement in water
- iv. Tympanic membrane detects vibration
- v. Prominent eyes for vision
- vi. Skin - sensitive to chemicals
- vii. Poisonous glands in skin for defence against predation
- viii. Skin for camouflage against predation
- ix. Moist vascularised skin for respirations in water
- x. Vascularised buccal cavity for respiration
- xi. Hind Limbs, muscular and webbed to enable jumping on land and propulsion in water
- xii. Fore limbs short and stout for landing when leaping on land and also for steering in water
- xiii. Lower eyelid has nictitating membrane to clean and moisten the eye

Description of the skin

- i. Moist
- ii. Loose
- iii. Warty
- iv. Scaleless

Types of movement

- Swimming in water
- Hopping/leaping on land
- Crawling on land

Functions of the skin

- a. Respiration/gaseous exchange
- b. Protection against mechanical injury
- c. Poisonous glands for defence

d. Camouflage for defence

Functions of forelimbs

1. Landing when leaping
2. Steering in water
3. Crawling

Functions of hind limbs

Lifting when jumping

Propulsion/swimming (Paddle) in water Crawling

Differentiate between fore and hind limbs

Sense organs

Skin: Sensitive to chemicals

Eyes: sensitive to light

Nose: detects smell

Tympanum: detects vibration

Excretory organs

1. Skin
2. Lungs
3. Kidneys

Gaseous exchange structures

1. Skin
2. Lungs
3. Buccal cavity

Describe the features for movement

Movement in Water:

Streamlined shape provides reduced resistance for swimming in water

Webbed digits in hind limbs for swimming

Movement on Land:

Large muscular and powerful hind limbs for line the body/hopping/jumping

Short and stout forelimbs for landing during hopping

Adaptation to life in water

- Streamlined shape/absence of neck
- Position of nostril and eye (protruding eyes and nostrils to allow vision and smell when partially submerged)
- Webbed hind limbs for propulsion
- Dark dorsal surface and light ventral surface reduces detection when swimming
- Vascularised skin for gaseous exchange.
- Nictitating membrane protects the eye in water

Adaptation to life on land

Moist skin to prevent desiccation. Webbed hind limbs for hopping/leaping.

Absence of tail for hopping. Camouflaged skin to prevent predation

Lungs for respiration.

Mode of nutrition: Holozoic

Method of feeding: Carnivorous

Diet: Insects

Trophic level/position in food chain: Third trophic level/secondary consumer

Adaptation to feeding

- Wide mouth to capture insects
- Long sticky tongue for capturing insects
- Large eyes when pulled inward help in swallowing food
- Nostril for smelling/detecting food

Relation with other specimens in a food chain

Feeds on insects

Fed on by snakes

General Adaptations to escape predation

- Poisonous and mucous glands in skin prevents being preyed upon
- Prominent eyes to see
- Olfactory organs in nose to detect smell
- Tympanum/Ear to detect vibrations
- Dark dorsal surface and light ventral surface (countershading) reduces detection when in water.
- Can change colour on land to blend with environment

Economic importance of toad

- Tadpole decreases the population of algae
- Tadpole is food for fish
- Both tadpole and its adult feed on mosquito larvae
- Source of food to other animals
- Toad is carnivore that reduces (serves the purpose of biological control of pests of man and crops such as insects) Large hind limbs to hop (escape)

Similarities between toad/frog and lizard

- ✧ Wide mouth
- ✧ Nostril above mouth
- ✧ Protruding eyes
- ✧ Tympanum present
- ✧ Two pairs of limbs

Differences between toad and lizard

SPECIMEN J - TOAD	SPECIMEN K - LIZARD
Webbed digits present	Webbed digits absent
Digits not clawed	Digits clawed

Scaleless skin	Scaled skin
No tail	Tail present
Nuchal crest and gular fold absent	Nuchal crest and gular fold present

Similarities between Toad and Tilapia/bony fish

- Presence of prominent eyes
- Presence of mouth
- Presence of cloacal opening
- Presence of darker dorsal surface and light ventral surface to escape predation

Differences between toad and Tilapia

SPECIMEN J - TOAD	Specimen M - Tilapia
Absence of gills	Presence of gills
Presence of legs for movement	Presence of fin for movement
Absence of tail	Presence of tail
Operculum present	Operculum absent
Absence of lateral line	Presence of lateral line
Presence of lungs for gaseous exchange	Presence of gills for gaseous exchange
Presence of poison gland	Absence of poison gland

Similarities between Specimen J - Toad and Specimen M - Cockroach

- ◆ Presence of Prominent eyes
- ◆ Presence of legs
- ◆ Presence of mouth

Differences between toad and Cockroach

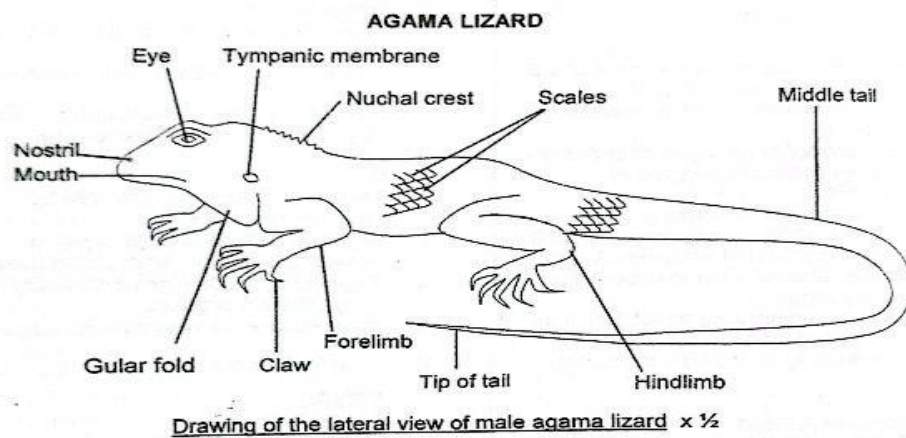
Hint:

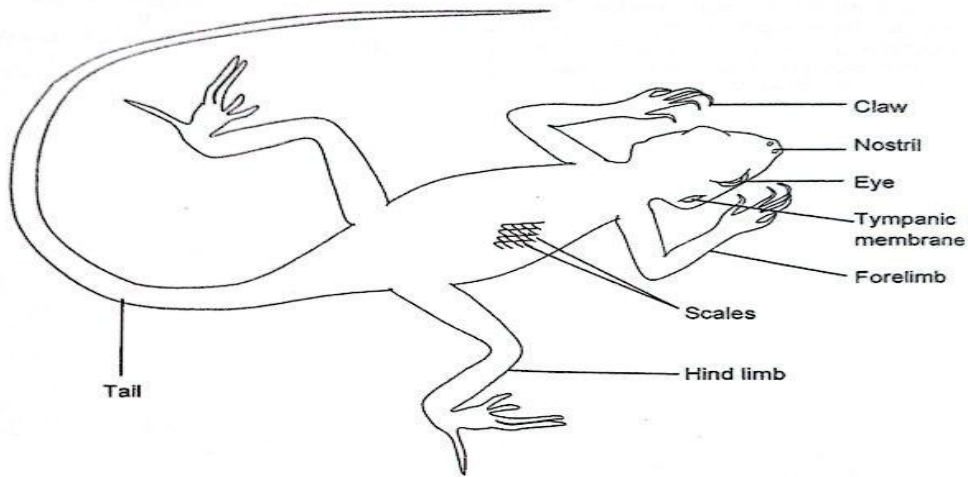
Use the following points to draw a table

- ✓ Number of legs

- ✓ Wings or no wings
- ✓ Antennae
- ✓ Segmentation
- ✓ Compound or no compound eyes
- ✓ Type of skeleton
- ✓ Claws and spine
- ✓ Spiracles
- ✓ Jointed legs

Specimen K – Lizard





Drawing of the dorsal view of Agama lizard x 0.5

HABITAT

Gardens/trees/under stones/walls/ceiling

Reasons:

Horny scales to reduce desiccation on land

Two pairs of limbs to support the body and for movement on land

Clawed digits to hold on support or for climbing

Mode of reproduction:

Sexual with internal fertilisation, oviparity with cleidoic eggs. Parental care

Mode of nutrition: Holozoic

Feeding habit: Carnivorous

Diet: Insects

Position in the food chain:

Third trophic level / Secondary consumer

Reasons:

Feeds on flesh of animals

State the sex

Hint:

a)

Male

Reasons:

- Pre-anal pad present around cloaca
- Relatively Bigger in size
- Brightly coloured
- Bright orange head
- More prominent nuchal crest
- More prominent gular fold
- Tail is blue at the base, orange or black in the middle and black at the tip

b) Female

Reasons:

- Dull colour
- Absence of prominent gular fold and nuchal crest

Classification

Phylum - Chordata

Class - Reptilia

REASONS

- ✓ Skin is covered with dry, horny epidermal scales
- ✓ Have two pairs of limbs with clawed digits
- ✓ Have homodont dentition
- ✓ Absence of external ear

Observable characteristics in Agama lizard

- ❖ Skin is covered with dry, horny epidermal scales
- ❖ Have two pairs of limbs with claws
- ❖ Have homodont dentition

Adaptive features of lizard in its habitat

- ✓ Clawed digits for holding onto ground and for climbing

- ✓ Scales for protection against desiccation and mechanical injury
- ✓ Long hind Legs for fast movement on land
- ✓ Long tail for balancing when moving

Observable features that help in sexual behaviour

1. Nuchal crest raised during courtship
2. Gular fold is lowered during courtship
3. Brightly coloured to attract females
4. Pre-anal pad to provide attachment during mating

Note:

Adaptive features to live in its habitat may also be used to answer question relating reasons why a student states the organism lives in that habitat.

Adaptations for movement in agama lizard

- ✧ Two pairs of legs lift the body off ground while Moving
- ✧ Clawed digits for holding onto ground and for climbing
- ✧ Long hind Legs for fast movement on land
- ✧ Long tail for balancing when moving

Adaptations to escape danger

- Detachable tail
- Colour can blend with the environment
- Long hind legs for fast movement

Adaptations to regulate temperature

- Scales to reduce excessive evaporation of water in dry season
- Basks in the sun in the morning
- Hides under stone in hot afternoon (weather)
- Remains inactive during cold weather (night)

Observable features in ventral view of the male

- Gular fold
- Cloacal opening
- The male has a hemi-penis at each end of the cloaca
- The male's pre-anal pads provide firm contact.

TAIL OF AGAMA LIZARD

Functions of tail of agama lizard:

1. Balancing during movement
2. Defence: Detachable tail to escape predation

SPECIMEN L : ADULT COCKROACH

HABITAT: Dark, warm places such as in cupboards, chop boxes etc

CLASSIFICATION

- Kingdom Animalia
- Phylum Arthropoda
- Class Insecta
- Order Dictyoptera

REASONS FOR CLASSIFYING SPECIMEN L INTO ORDER DICTYOPTERA

- d. It has biting mouthparts
- e. It has leathery wings

REASONS FOR CLASSIFYING SPECIMEN L INTO PHYLUM ARTHROPODA

- i. It is bilaterally symmetrical
- j. It has three body division; head, thorax and abdomen
- k. It has jointed appendages
- l. The body is covered with a chitinous exoskeleton
- m. It is metamerically segmented

FOOD SOURCE

- Starch
- Clothing
- Paper and books
- Dead insects

FEATURES OF BIOLOGICAL IMPORTANCE/SIGNIFICANCE

- Presence of long antennae for the detecting sensation and smelling
- Presence of an exoskeleton for protection against mechanical injury and desiccation
- Presence of mouth parts modified for biting and chewing
- Forewings are hardened and leathery for protection
- The brownish body colour blends with its environment

OBSERVABLE FEATURES OF SPECIMEN L FOR FEEDING

Chewing mouthparts consist of the mandibles and maxillae

OBSERVABLE FEATURES WHICH ENABLE SPECIMEN L TO ESCAPE FROM ITS PREDATORS

Presence of wings for flying away from danger

The dark brown colour of specimen J blends with the dark environment in cupboards and drawers

Presence of long sensitive antennae for detecting vibrations and sensations

Large compound eyes for sight

Presence of long and strong walking legs for running

The dorsoventrally flattened body enables it to fit into crevices

ECONOMIC IMPORTANCE

It destroys materials in the home

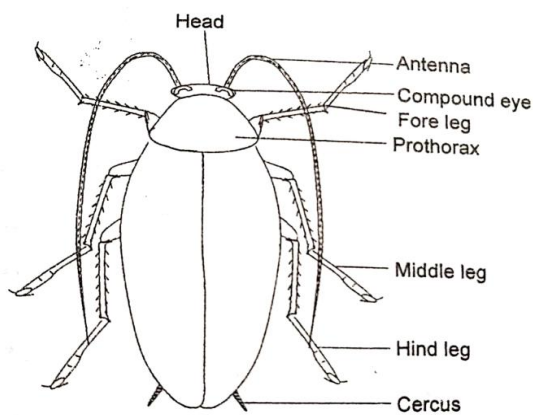
It carries germs of diseases

It distributes dirt, excreta and faeces as they run over materials

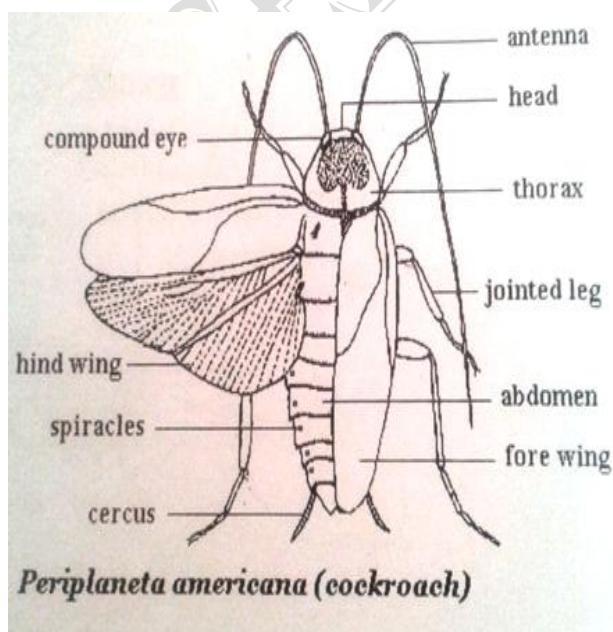
It is a household pest which feeds on foods

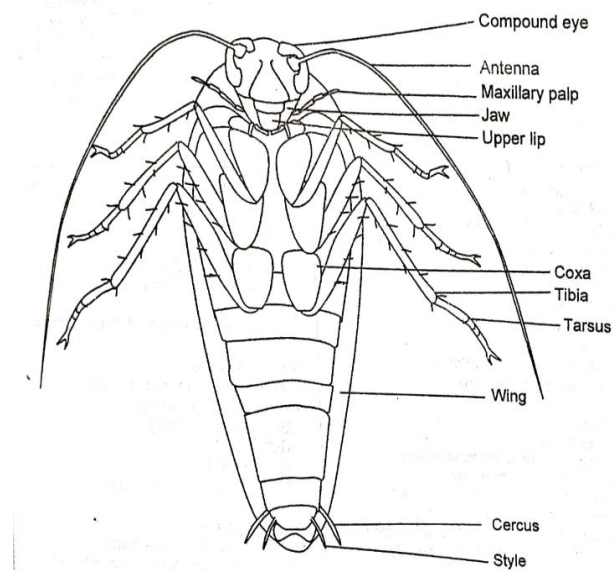
CONTROL OF SPECIMEN L

- Regular spraying of insecticides within drawers or boxes to kill adults
- Destruction of egg case prevents the eggs from hatching
- Camphor or naphthalene balls can be placed at obscured places in the room

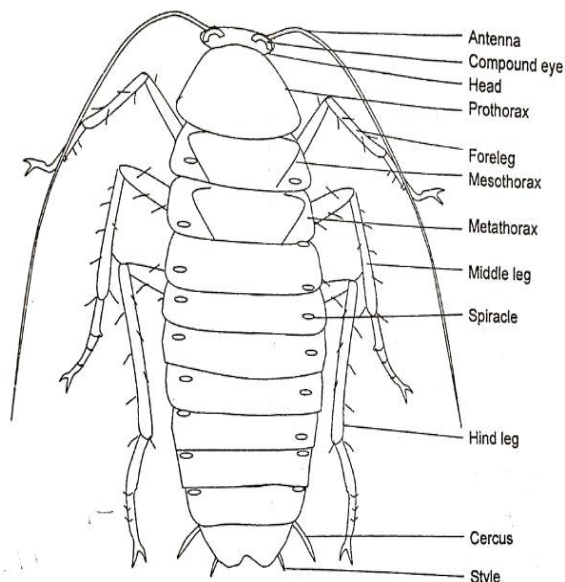


Drawing of the Dorsal view of Adult Cockroach x2





Drawing of the ventral view of male cockroach x3



Drawing of the dorsal view of the cockroach with wings removed x3

Difference between Cockroach(specimen L) and Millipede (specimen M)

Cockroach (specimen L)	Tilapia (specimen M)
Wings present	Wings absent
Three pairs of leg	Two pairs of legs
Relatively smaller	Relatively larger
Presence of cerci	Absence of cerci
Antenna present	Antennae absent
Dorso-ventrally flattened body	Laterally flattened body

Gills absent	Gills present
--------------	---------------

Difference between Cockroach(specimen L) and Grain weevil(specimen K)

Cockroach (specimen L)	Lizard (specimen K)
Tail absent	Tail present
Three pairs of leg	Two pairs of legs
Relatively smaller body	Relatively larger body
Presence of cerci	Absence of cerci
Antenna present	Antenna absent

SPECIMEN M: TILAPIA

HABITAT: Pond, brackish water

CLASSIFICATION

- Kingdom Animalia
- Phylum Chordata
- Class Osteichthyes

REASONS FOR CLASSIFYING SPECIMEN B INTO CLASS OSTEICHTHYES

- Gills are covered by operculum
- Skeletons are made up of mainly bones
- It has terminal mouth
- Presence of lateral line
- Presence of homocercal tail
- Presence of overlapping scales pointing backwards

FEATURES OF BIOLOGICAL IMPORTANCE

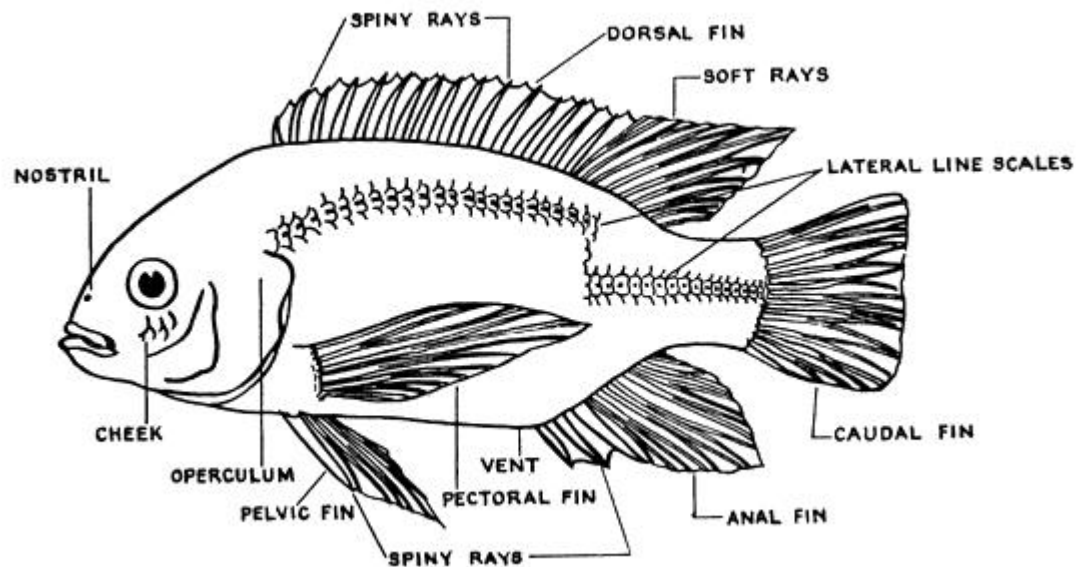
- Streamlined body for easy movement in water
- It has gills for gaseous exchange
- Lateral line for detection of vibration in the water body
- Large eyes provide wide range of vision

- Pectoral and pelvic fins for steering and braking
- Dorsal fins for balancing

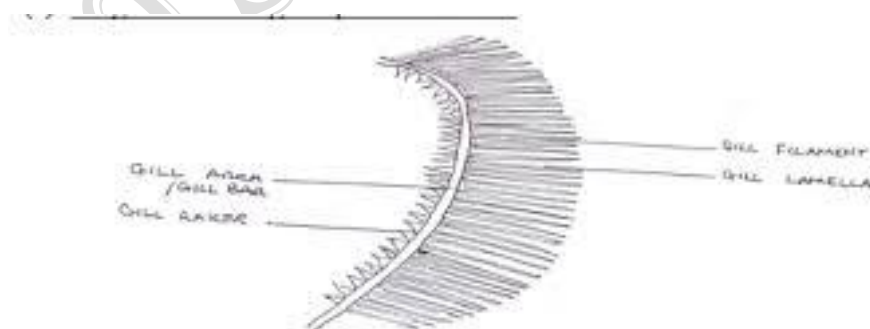
ECONOMIC IMPORTANCE

- It is a source of protein for humans
- It is used as a biological means of controlling mosquito larvae and pupae in ponds
- It is used in fish farming as a source of employment and income

DRAWING OF SPECIMEN B OR ITS GILLS



DRAWING OF GILLS



STRUCTURAL DIFFERENCES BETWEEN SPECIMEN L AND M

Specimen L	Specimen M

SIMILARITIES BETWEEN SPECIMEN L AND M

ADAPTATION FOR FEEDING IN SPECIMEN M

- It has wide mouth for trapping food
- Numerous small teeth for holding or nibbling food
- Nostrils for smelling food
- Gill rakes trap food particles

SPECIAL FEATURES OF GILL FILAMENT FOR GASEOUS EXCHANGE

- It is highly vascularized
- It has a large surface area for diffusion of gases
- It has moist surfaces to aid in the dissolution of gases
- It is thin walled and this facilitates easy diffusion of gases

SIGNIFICANCE OF THE DIFFERENCE IN COLOUR OF THE DORSAL AND VENTRAL SURFACES OF SPECIMEN B

- The dark dorsal surface is difficult to detect against the dark water below and the white or pale ventral side is difficult to detect against the sky above.

FUNCTIONS OF THE TWO OBSERVABLE SENSORY ORGANS ON THE TRUNK OF SPECIMEN B

- The skin is sensitive to touch.
- The lateral line detects vibrations in the water