INSECTS

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INTRODUCTION

- Insects belong to a largest group of invertebrates called **arthropods**

Research

- They are considered to be the most successful organisms on land. **Discuss the characteristics that have contributed to success of insects**.
- Their physical structure and behavior give an idea of the role they play in the environment.
- Using knowledge of classification, mention the unique characteristics of insects.

EXPECTED RESPONSES.

- Evolution of special organs for flight. The wings which enable them to diverse and colonize new areas.
- Impervious exoskeleton made of chitin which has protected them from drying up in the terrestrial environment.
- The small size has enabled them to tackle every place.
- Excretion of toxic products as uric acid has enabled them to conserve water
- Disposition of legs enables them to maintain swift locomotion.
- The compound eyes that provide wide field of view for food and enemies.
- The modified mouth parts that suit a variety of food materials.
- The high reproductive rate that ensures enormous number of offsprings is produced.

INSECT ANATOMY

- identify the typical divisions of an insects' body
- Attempt activity 6.1, **St Benard book 1**

EXPECTED RESPONSES.

- They have 3 main body parts i.e. head, thorax and abdomen
- They have 3 thoracic segments i.e. pro-thorax, meso-thorax and meta-thorax
- They have 3 pairs of legs (6 legs)

IS THIS A TRUE INSECT? GIVE REASONS .

CONT……

- Identify the functions of each of the identified feature on the head and take note.

Attempt activity 6.2 , st Bernard book 1

STRUCTURES ON THE HEAD

- **Antenna:** They are long, segmented ,tapering sensitive to touch, smell and vibrations.
- **Eyes :** they are large and kidney shaped for seeing to locate food and predators
- The head is **small** & **pear-shaped.**

STRUCTURES ON THE HEAD

- **Antenna:** they are short, segmented, hairy and of same size with three joints with last having spine hair.
- **Eyes :** compound eyes, large and oval shaped & three simple eyes (ocelli) arranged in triangle

STRUCTURES ON THE HEAD

- **Antenna:** They are segmented, short and clubbed
- **Eyes :**compound, large and oval shaped
- The head is **not fixed** on the thorax and therefore it is free to move (mobile).

STRUCTURES ON THE HEAD

- **Antenna:** they are short, tapering, segmented and hairy
- **Eyes :** they are large, oval shaped and compound.

STRUCTURES ON THE HEAD

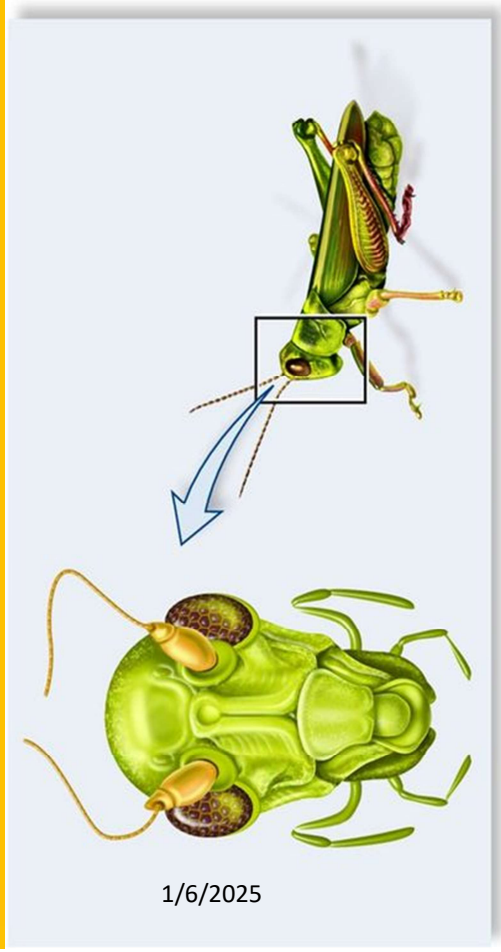
- **Antenna:** they are short, same size and segmented
- **Eyes :**they lack compound eyes

STRUCTURES ON THE HEAD

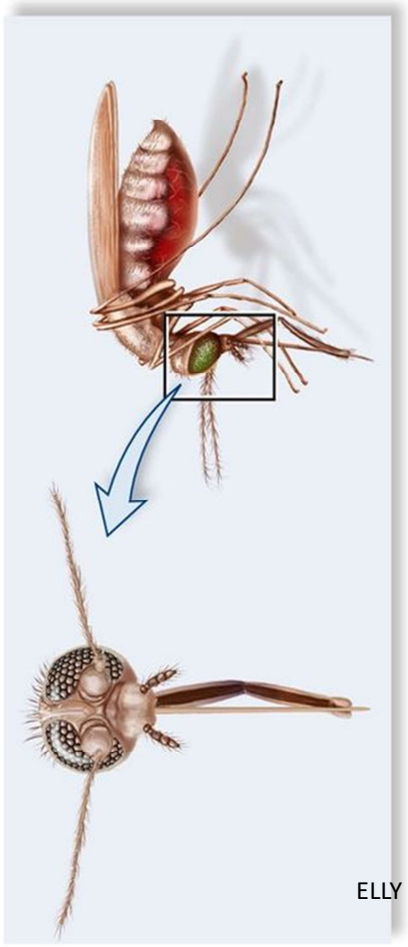
- **Antenna:** they are long, clubbed at the end and segmented
- **Eyes :** they are large, compound and oval shaped
- The head bears a coiled proboscis for sucking nectar.

MOUTH PARTS

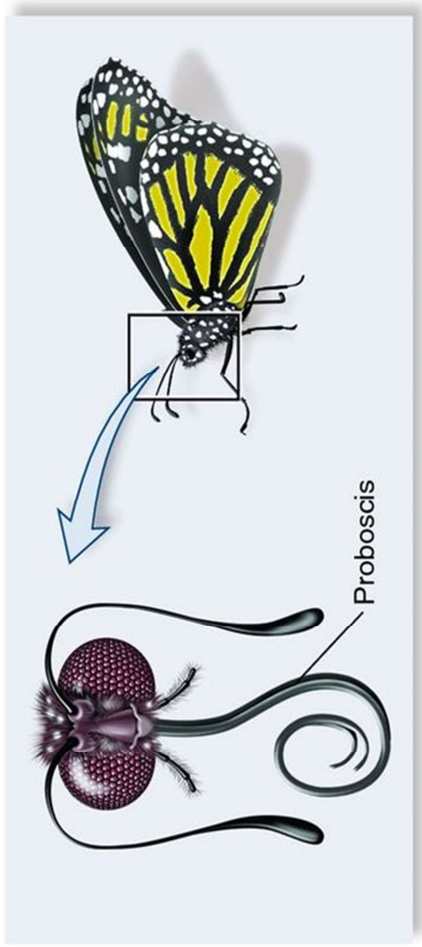
MOUTH PARTS



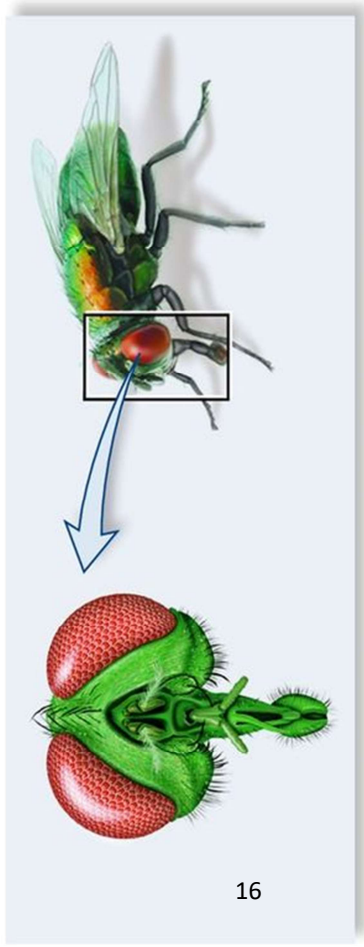
(a) Chewing (grasshopper)



(b) Blood sucking (mosquito)



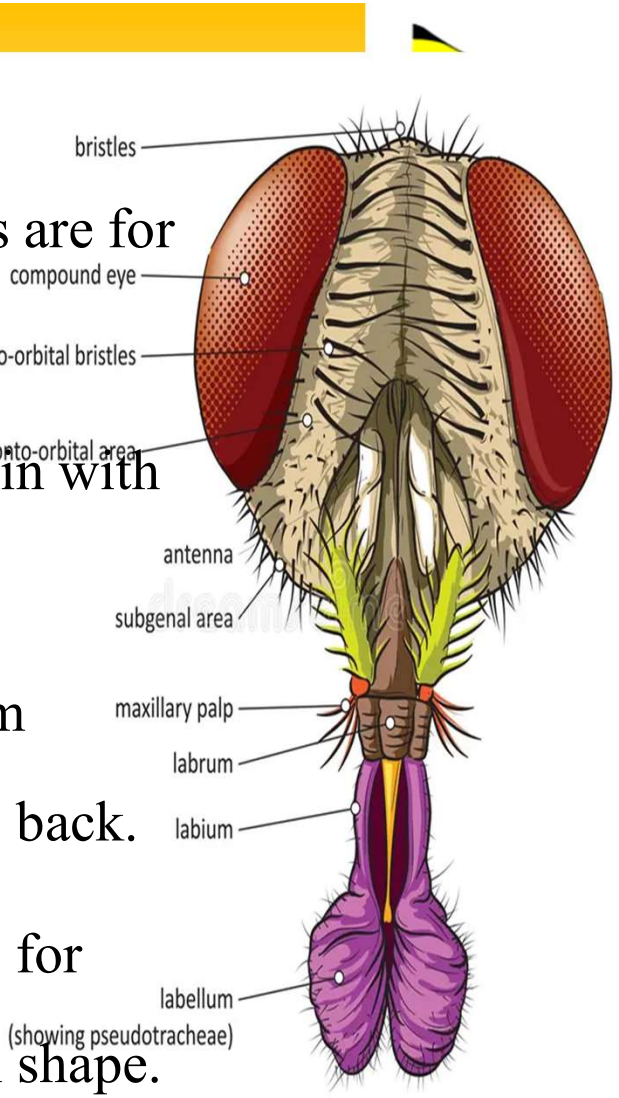
(c) Nectar sucking (butterfly)



(d) Lapping up liquid (housefly)

MOSQUITO AND HOUSEFLY

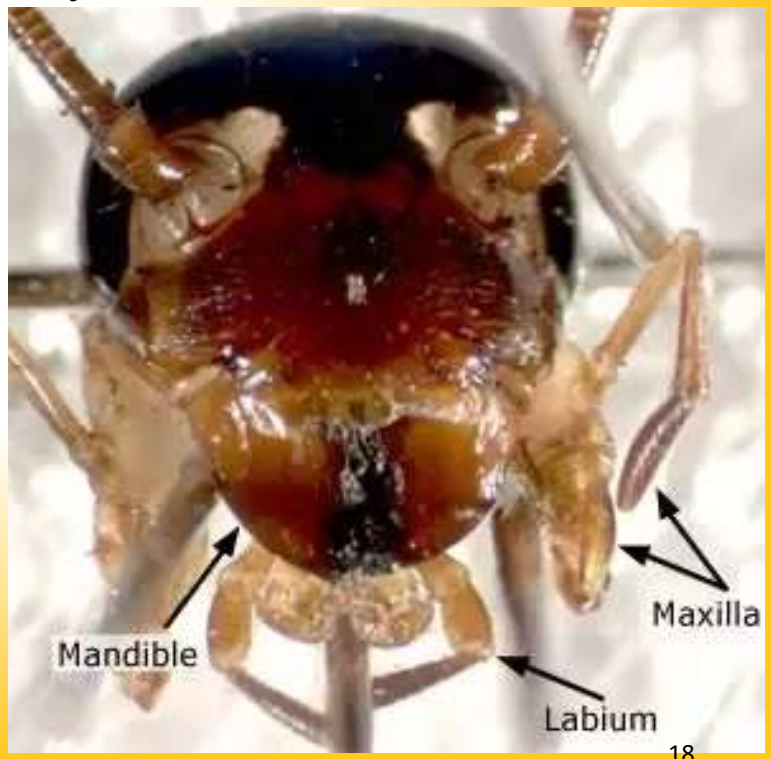
- Male mouth parts are for **sucking** but the female mouth parts are for **piercing and sucking**.
- When the female mosquito bites someone, she pierces the skin with the stylets and inserts the sucking and salivary tubes.
- Saliva is secreted into the wound and prevents the blood from clotting and blocking the tubes mean while the labium bends back.
- **House fly**: The labium (upper lip) is modified into proboscis for sucking, which is expanded at the distal end to form a funnel shape.

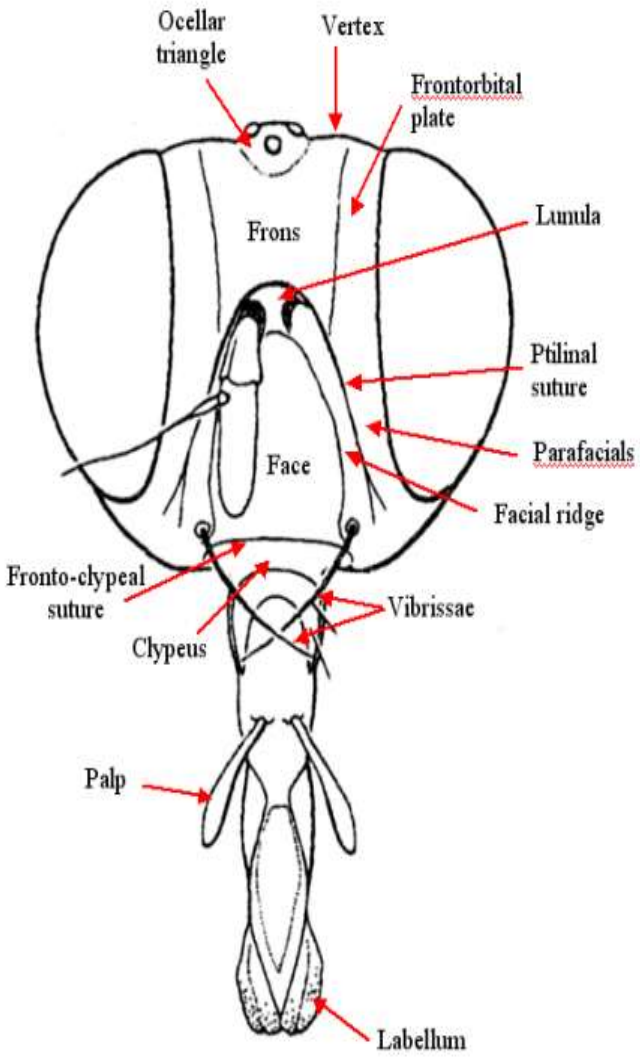


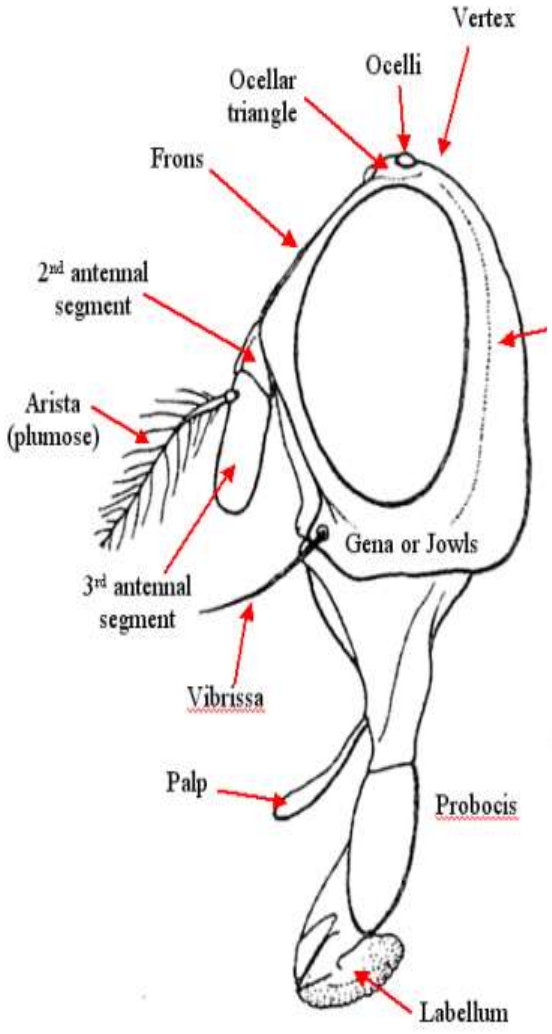
COCKROACH AND TERMITE

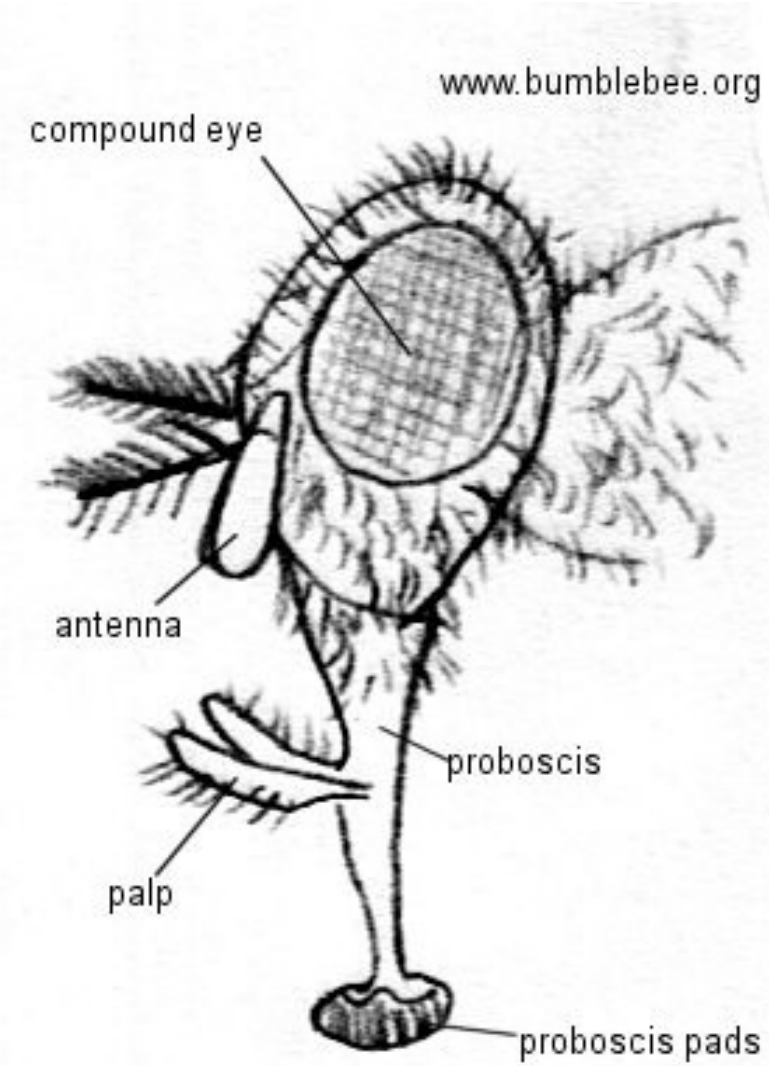
Cockroach.

- The head has *biting and chewing mouth parts* – **mandibles** for cutting and crushing food, maxillary palps for holding food.



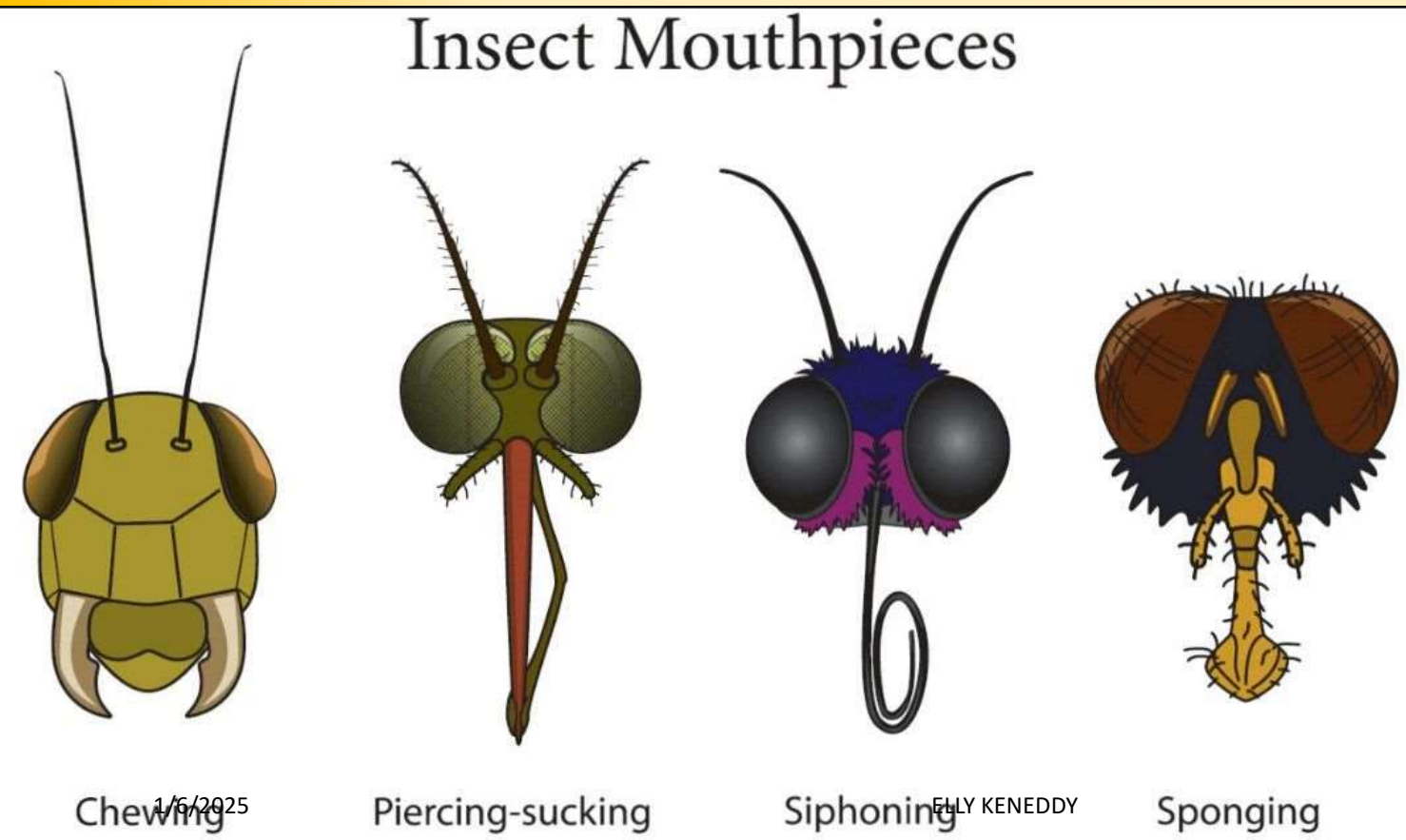






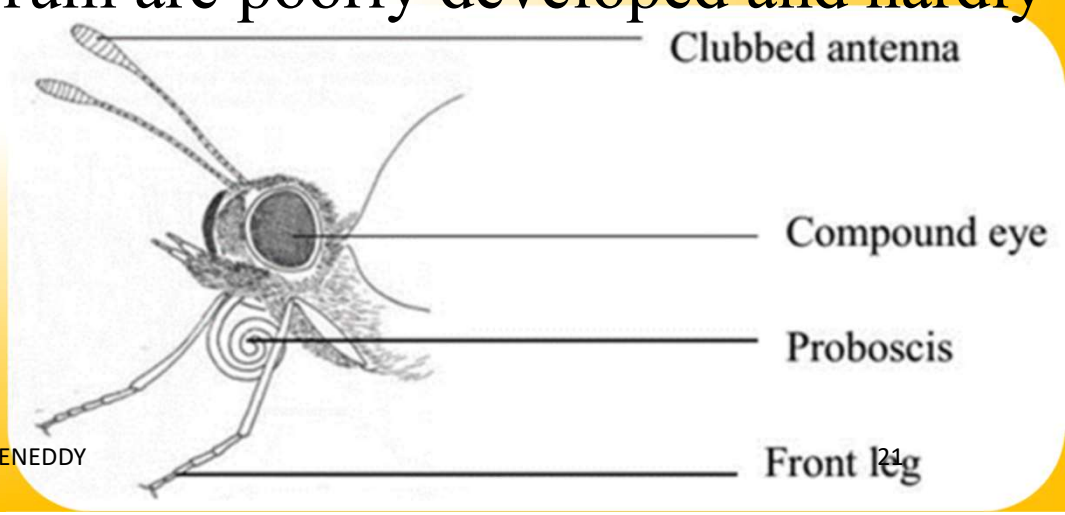
***Musca domestica*, House fly adult head**

MOUTH PARTS

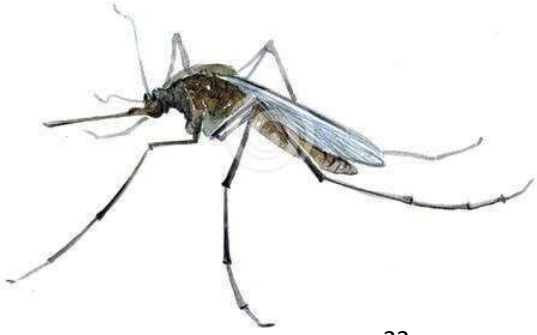

Insect Mouthpieces
Chewing
Piercing-sucking
Siphoning
Sponging

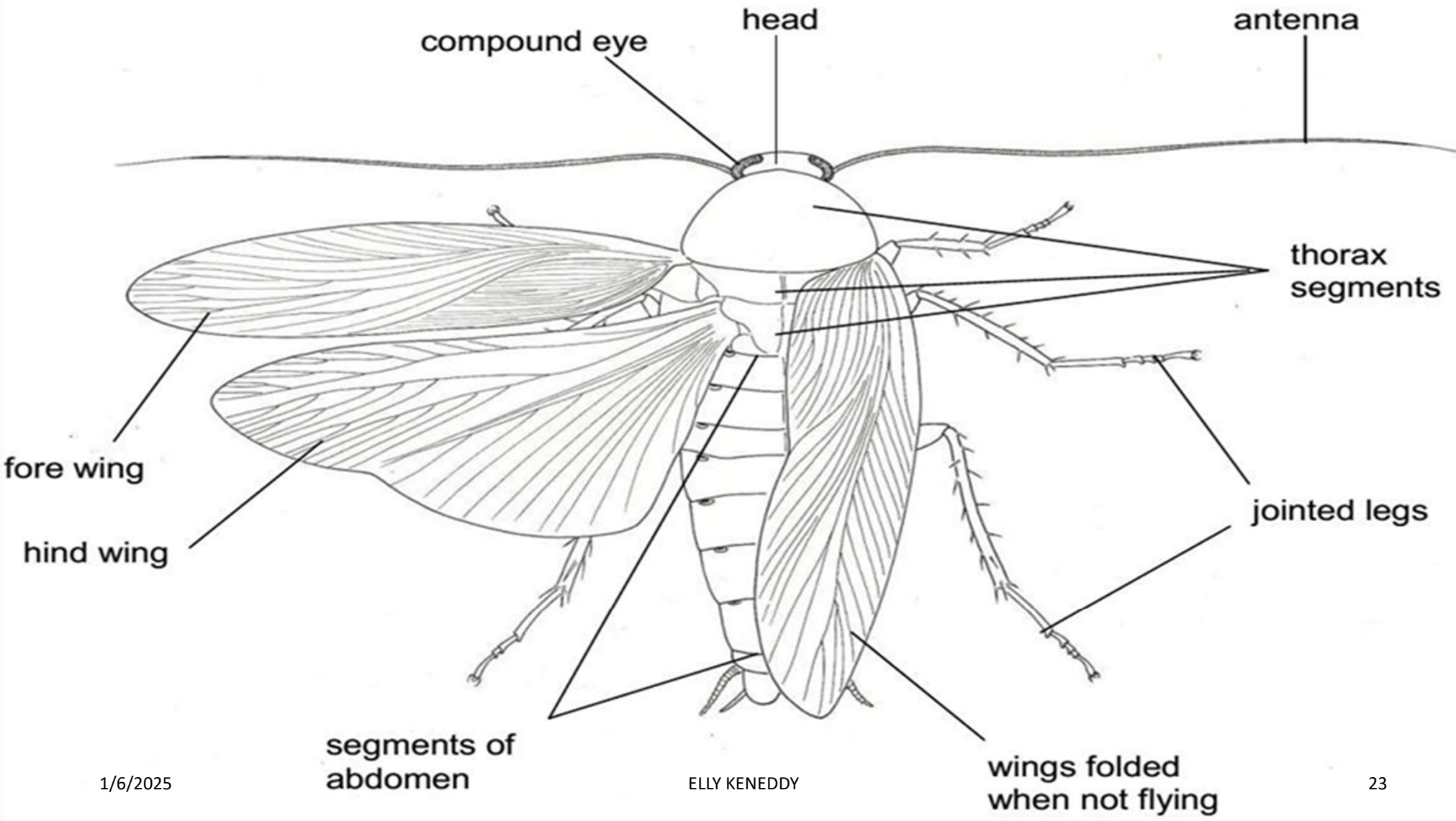
BUTTERFLY

- The head also bears the mouth part specially adapted for **sucking nectar**. The sucking part is long, hollow and flexible tube called proboscis. This has a modified pair of maxillae which coils up when not in use.
- The mandibles, the labium and labrum are poorly developed and hardly used.



Wings



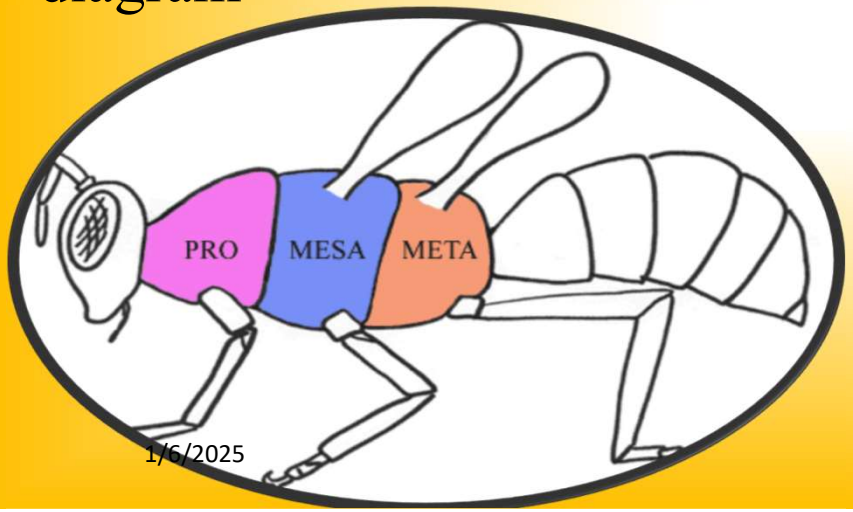

compound eye
head
antenna
thorax segments
fore wing
hind wing
jointed legs
segments of abdomen
wings folded when not flying

EXTERNAL FEATURES OF A COCKROACH

- The adult cockroach is about 4cm long.
- It is **dorsal- ventrally flattened** body with **brown colour**.
- It has **a hard thick exoskeleton** made of chitin.
- The body is made up of three main divisions, each segment of thorax and abdomen consists of dorsal plate tegmen) a ventral plate, sternum and two internal plates, pleura.

THORAX

- How many segments make up the thorax?
- Name the identified thoracic segments.
- Mention the parts associated with the thorax observed in the diagram

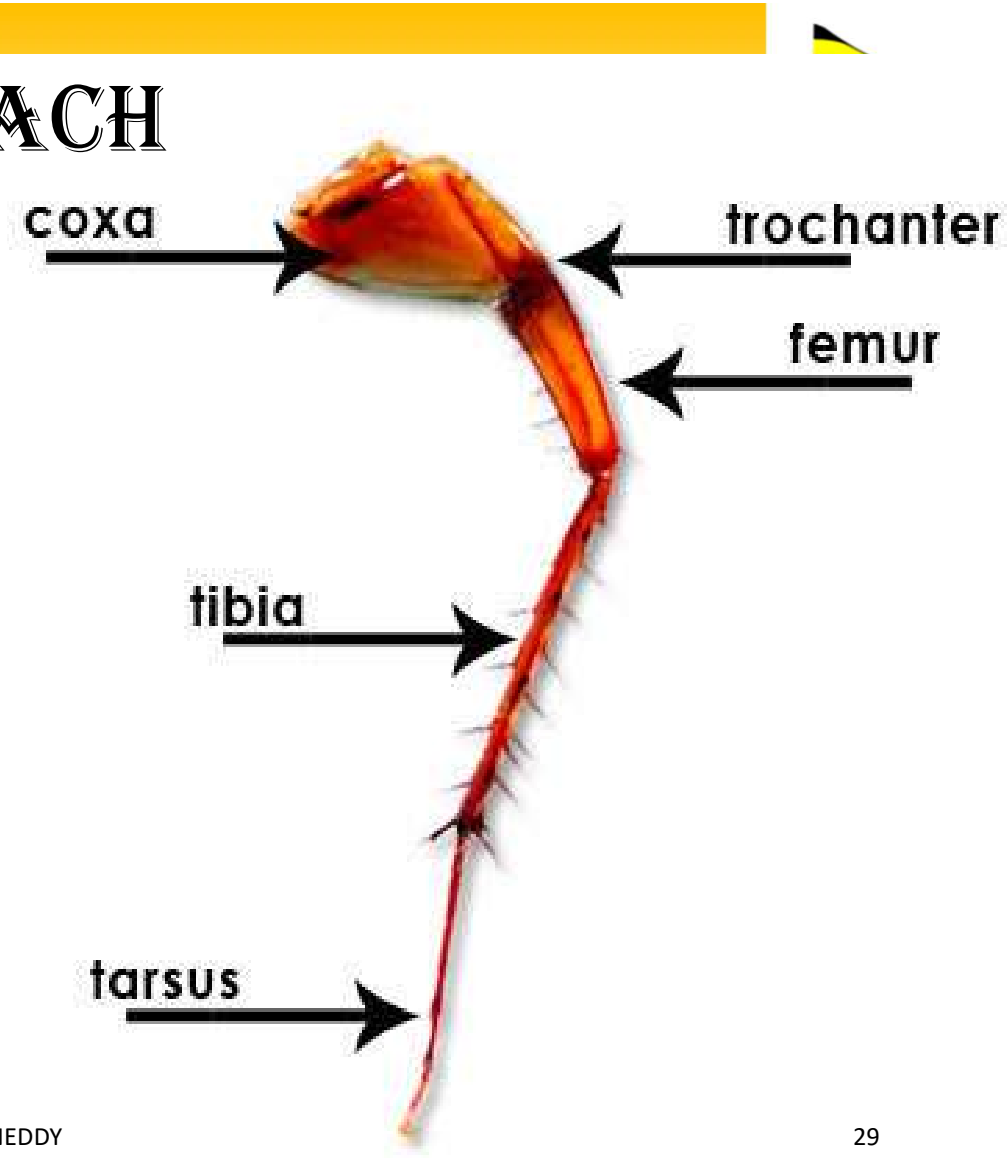


THORAX OF A COCKROACH.

- The thorax consists of three segments: the **Pro-thorax**, the **Meso-thorax** and the **Meta-thorax**.
- Each of the segments bears a pair of jointed legs on its ventral surface. They end in a pair of sharp claws with a soft hairy pad, the **arolium.** The prothorax is the largest of the thoracic segment
- The paired wings are attached to dorsal surface of Meso-thorax and Meta-thorax.
- The anterior (fore) wings are **narrow, brown, leathery, still** and are called **elytra** or **tegmina**.
- They are not used for flight but for covering and protection of broad, membranous posterior (hind) wings when at rest.

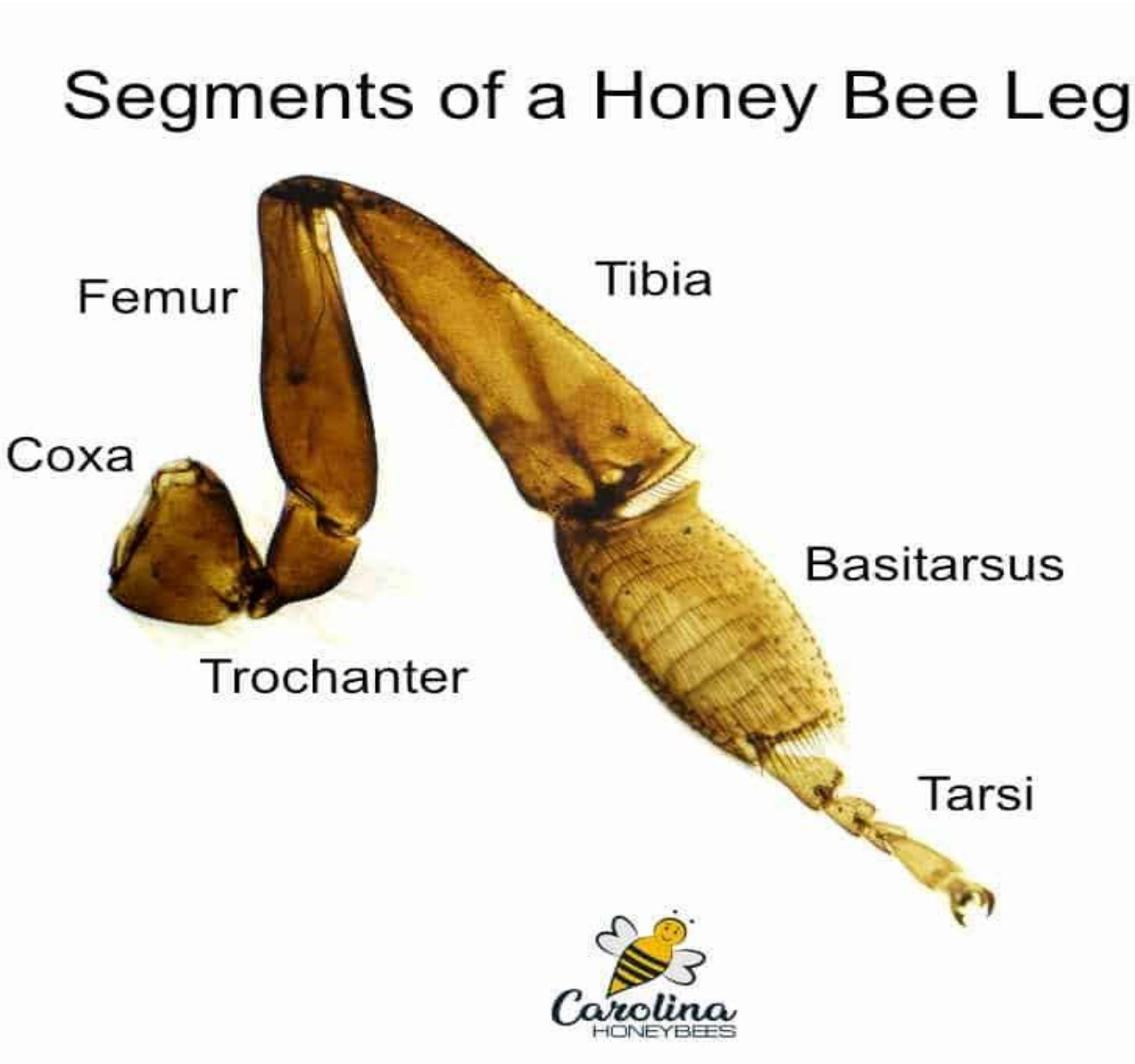
HIND LEG OF A COCKROACH

- The legs have **sharp spines** for defense.
- Each leg end in a pair of **sharp claws for walking on rough surfaces** with a **soft glandular pad/arolium** between claws for **walking on smooth surfaces**.

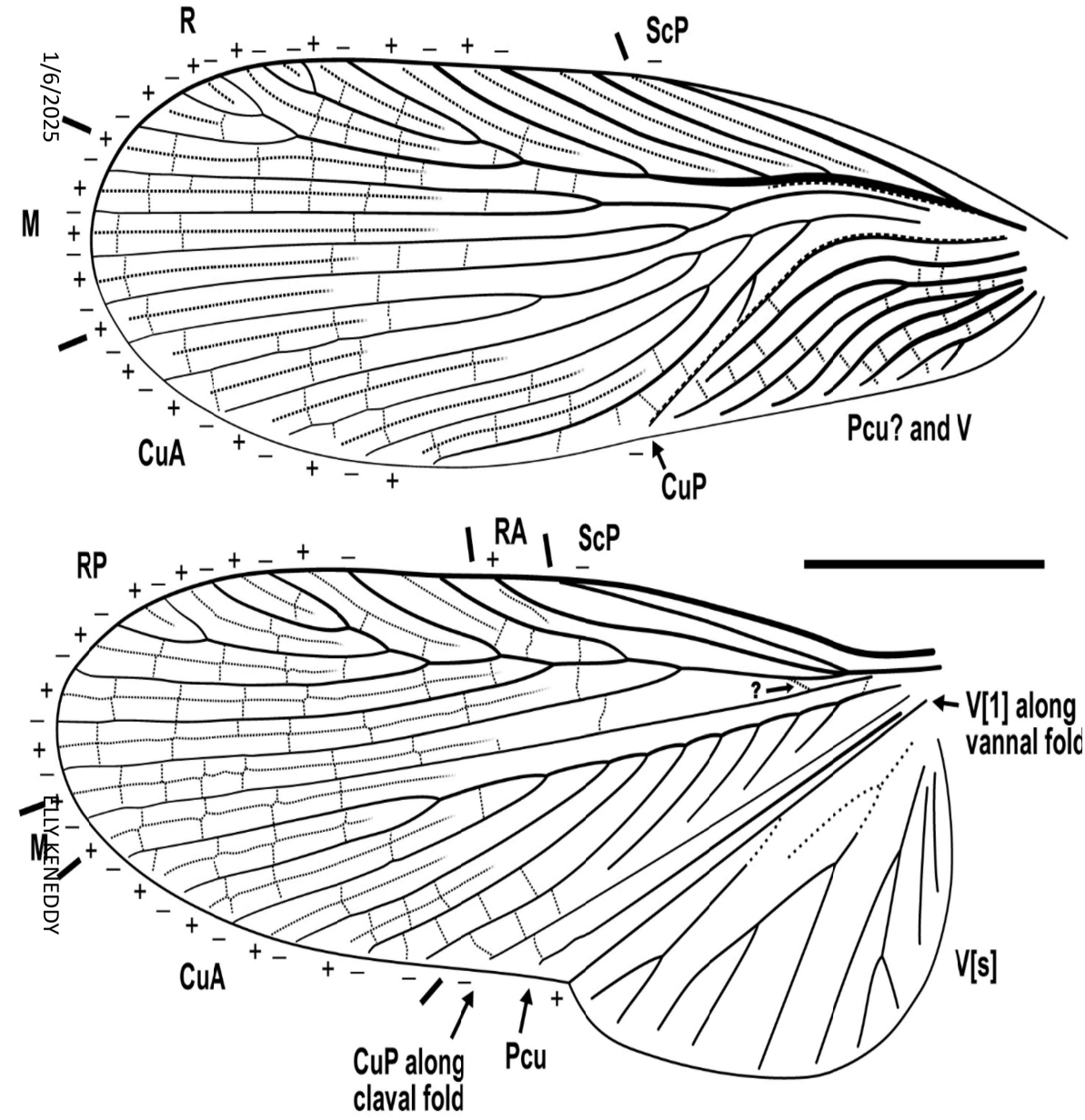


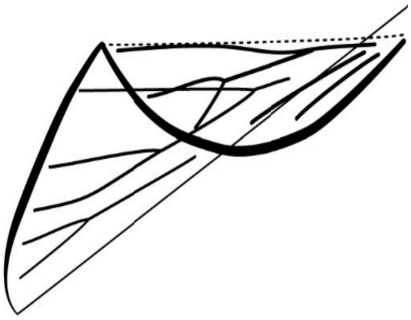
❖ These legs possess a hair like structure, prong at the distal end of the tibia.

❖The prong is used for scooping pollen grains out of the pollen basket on the hind leg.



OUTER WING OF A COCKROACH





FEATURES ON THE THORAX OF A MOSQUITO

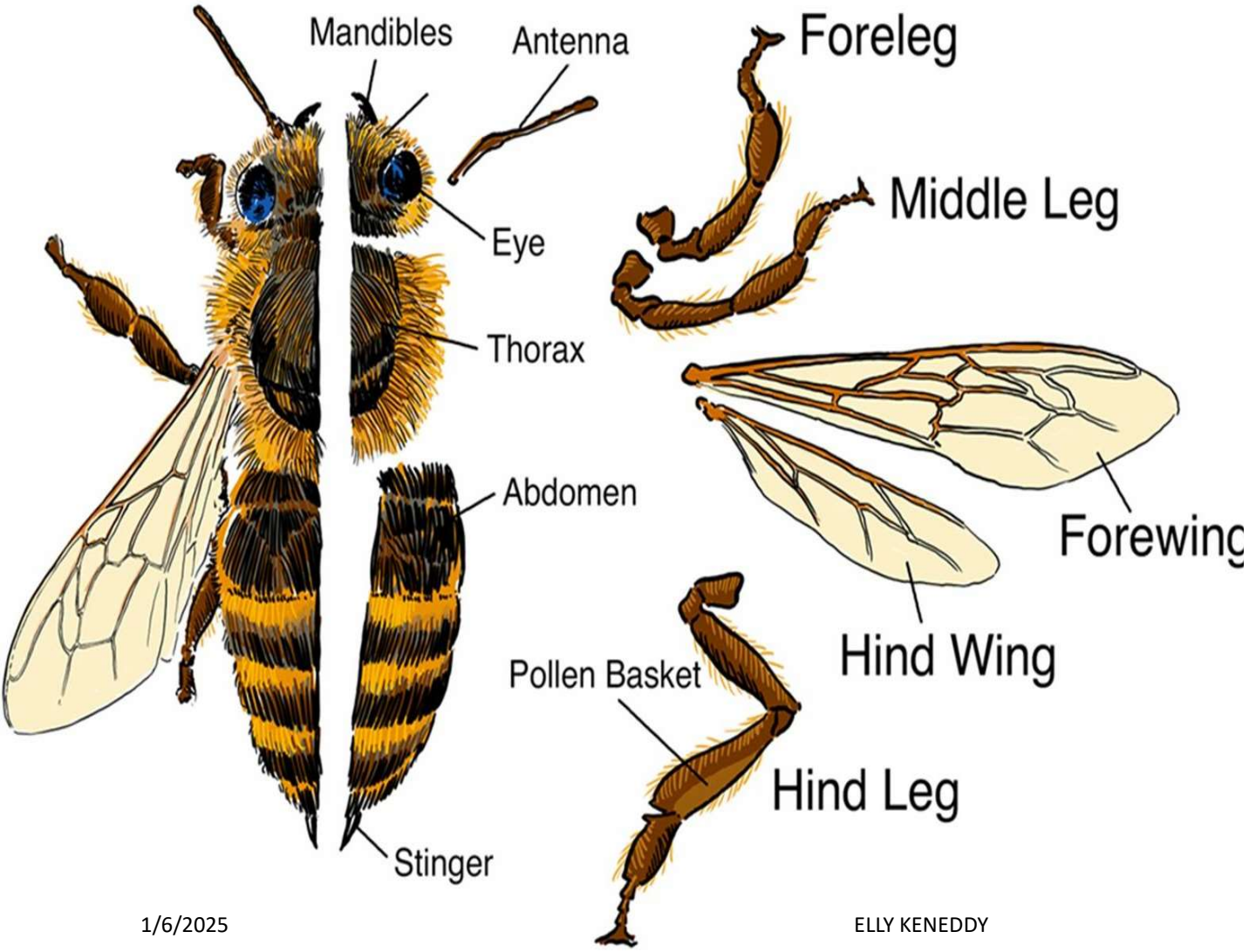
- The thorax is large and easily visible.
- It has the usual three segments bearing a pair of long slender legs.
- The mesothorax bears a pair of **membranous, transparent wings** while the metathorax bears a pair of **halteres** used in balancing and also sensory in function.

THE THORAX OF A HOUSEFLY

- The thorax is divided into three segments with each segment bearing a pair of jointed, hairy legs.
- The thorax bears two pairs of wings, **one pair is broad and membranous** for flight.
- The other pair of wings is reduced to **halteres** for balancing the house fly.

ABDOMEN OF A WORKER BEE

- Features on the abdomen include the first abdominal segment usually being fused with the **meta thoracic** segments.
- The last segment of abdomen has the **stinging device**.
- They have flexible segments which allow the bee to bend, stretch, and expand during breathing and stinging.
- The abdomen has six segments **four of which contain wax glands**.

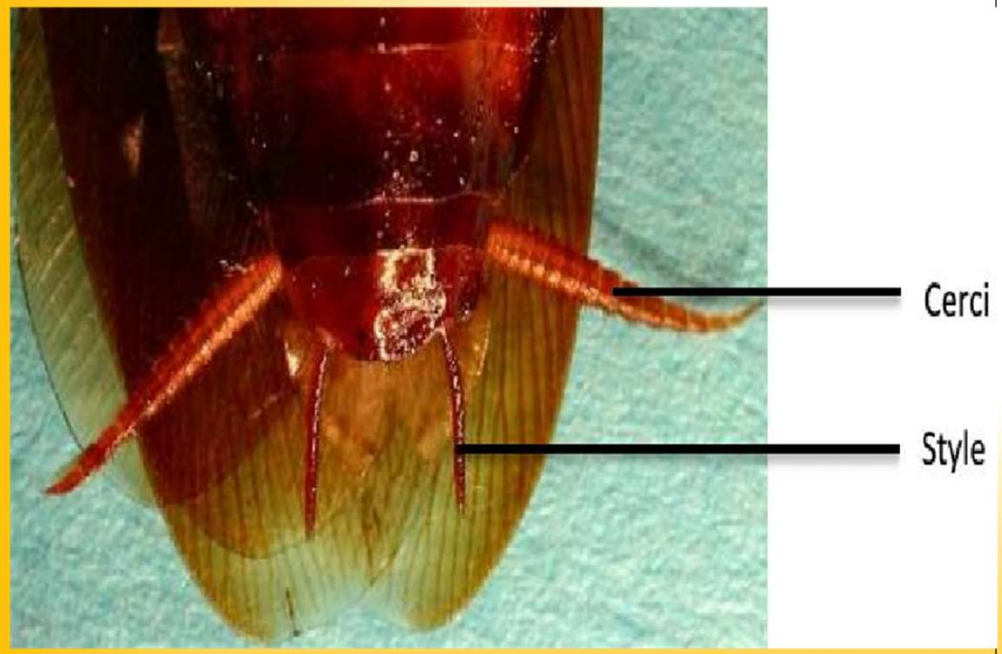

Mandibles
Antenna
Eye
Thorax
Abdomen
Stinger
Foreleg
Middle Leg
Forewing
Hind Wing
Pollen Basket
Hind Leg

ABDOMEN OF A COCKROACH.

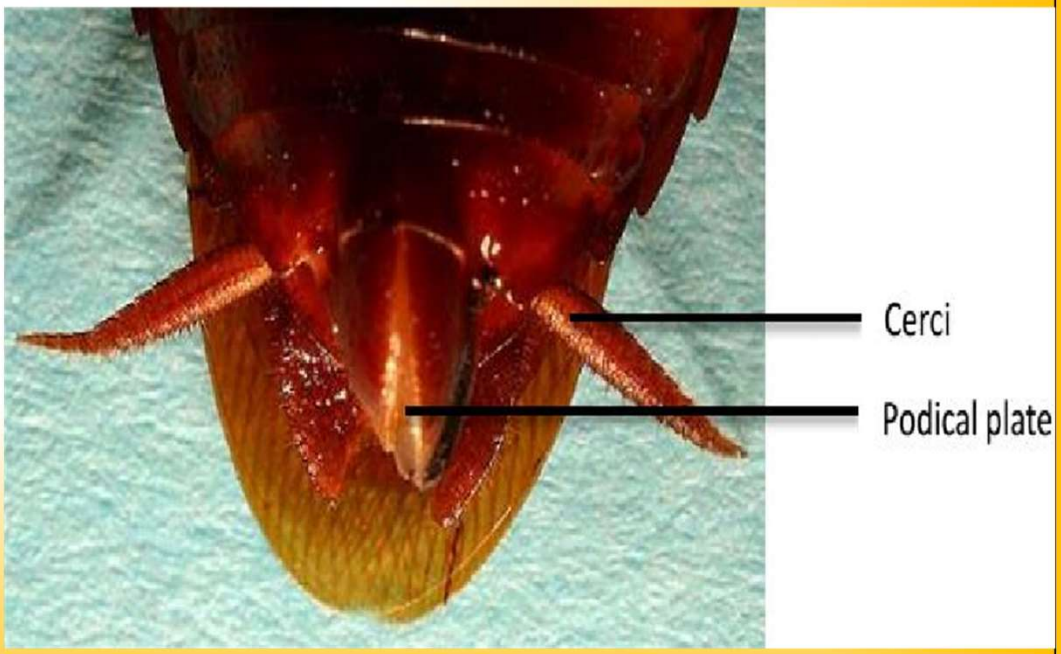
- This is made up of **10 segments**.
- Only seven are easily seen because tergum of seventh segment lovers 8^{th} and 9^{th} segment
- The flat, broad tergum of the 10^{th} segment bears a pair of jointed sensory structures, **the cerci in males**, another additional pair of short structures **styles**.
- In males, there is a pair of slender **styles** that are used to hold and manipulate the female during copulation.
- In females, there is a pair of boat shaped structures called the **podical plates** used for holding eggs.

ABDOMEN FEATURES

Drawing:

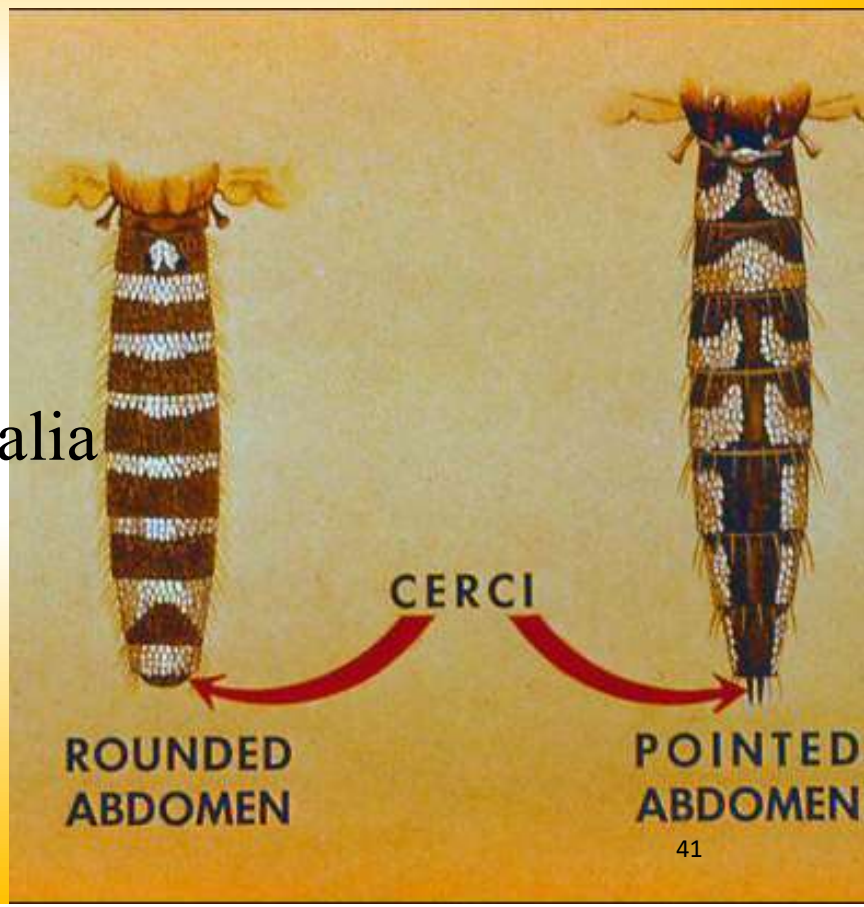


Drawing:



FEATURES ON THE ABDOMEN OF A MOSQUITO

- The abdomen is long and slender.
- It has 10 segments but only 8 are seen.
- The last segment bears the external genitalia



ECONOMIC IMPORTANCE OF COCKROACHES

- They destroy clothes, books, shoes, furniture and spoil food.
- They spread disease causing germs such as cholera, dysentery etc. especially those in latrines
- They contaminate food if not properly covered.
- They are food to some organisms like birds.
- They are used in biological studies as specimens.

ECONOMIC IMPORTANCE OF MOSQUITOES

- They carry malarial parasites which cause malaria. These germs are carried by a female anopheles. The disease causing parasite is referred to as ***plasmodium***.

Economic importance of house flies

- They feed on faeces and manure heaps, hence help in garbage disposal.
- They are vectors of diseases i.e. spread or transmit diseases such as dysentery, cholera, red eyes, trachoma, etc.
- It is a source of food for some organisms such as chameleons.
- They are specimens for study purposes.

ECONOMIC IMPORTANCE OF CITRUS BUTTERFLY

- From the cocoons of butterfly, silk threads are obtained for making silk clothes.
- The larvae spoil the leafy vegetable with fecal drops such as dodo.
- The scales may be respiratory hazards when inhaled.
- The caterpillar stage of a butterfly is significantly destructive on vegetables including crops such as cabbages,
- maize, millet sorghum etc. . . .
- Some caterpillars feed on insects thus help in destroying insect pests.
- The butterflies also are of much importance to the farmers in pollinating flowers of the crops.

CONTROL OF COCKROACHES

- Improve personal and public hygiene.
- Use of environmentally friendly insecticides like doom, etc.
- Use of biological control methods.
- Polish the walls of the house to close the small crevices.

CONTROL OF HOUSE FLIES AND PREVENTION OF DISEASES THEY SPREAD

- Spraying with an insecticide such as pyrethrum to kill the adult.
- Proper disposal of feaces in latrines with covers, so that flies cannot get to the waste to lay eggs.
- Washing hands with soap and clean water after visiting the latrine and before eating or preparing food.
- Disposing of wastes in such a way that flies cannot reach them. E.g. burning or burying them.
- Covering or storing food properly so that flies cannot settle on it.

CONTROL OF MOSQUITOES.

- Destroying the breeding places where larvae develop from by draining or applying a film of oil over the water surface to prevent oxygen reaching the mosquito larva.
- Burning or burying all empty containers to prevent water from collecting during the rainy season.
- Clearing bushes around homestead. Mosquitoes like to rest and breed on them during the rainy season.
- Biological control which involves the introduction of fish into water bodies which feed on the larvae and pupa.

CONT.....

- Mosquitoes can be killed by spraying with insecticides using special sprayers.
- Removal of small water containers such as old tins, bottles, and drainage channels, so as to reduce on breeding sites.
- Protecting our bodies from mosquito bites by using mosquito nets at night as well as wearing clothes which cover both legs and arms in the evening
- Parasites development in the human body can be controlled by taking modern prophylactic drugs regularly.
- Applying mosquito repellant cream to the body.

DICHOTOMOUS KEY.

- Using the observed characteristics, construct keys

ALWAYS AIM FOR EXCELLENCE

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