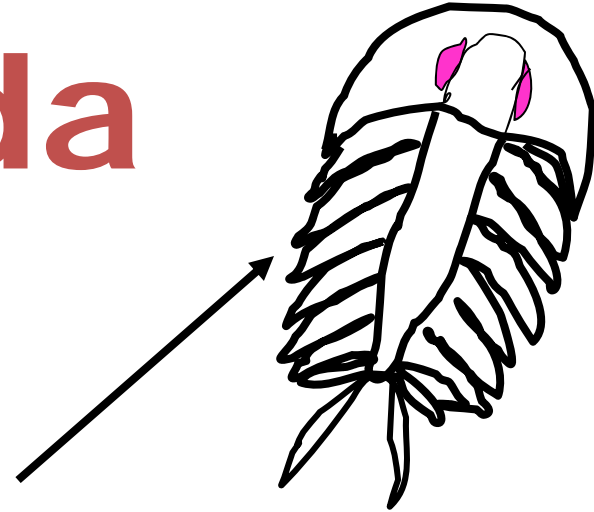


Phylum

Arthropoda

Once upon a time there lived a fossil!?



5 SUBPHYLA:

- 1 **Trilobitmorpha**
- 2 **Crustacea**
- 3 **Chelicerata**
- 4 **Myriapoda** (Diplopoda & Chilopoda)
- 5 **Hexapoda** (Insecta)

Phylum

Arthropoda

(Send your e-mails 'CC MOB') or

Subphylum 2 **Crustacea** 'B O C C M'

Class **Copepoda**

Class **Cirripedia** (Head of the mob!)

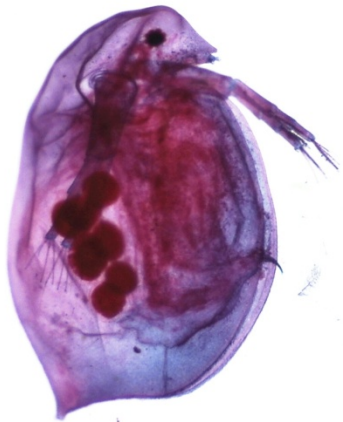
Class **Malacostraca** ←

Class **Ostracoda**

Class **Branchiopoda**

Subphylum 2

Crustacea



Class **Branchiopoda**

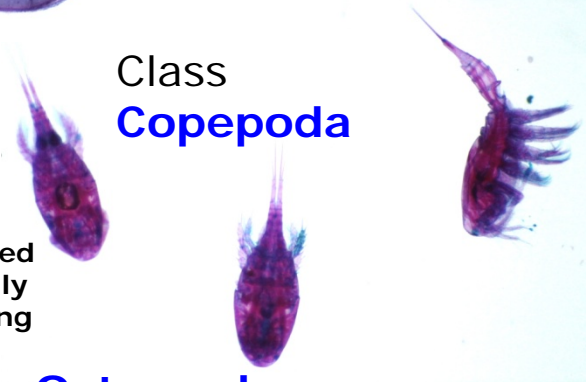
“Lung feet”

Fairy Shrimp

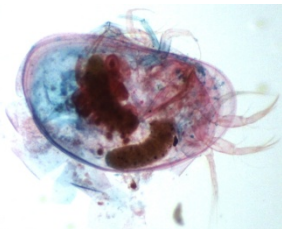
Daphnia

Class **Copepoda**

Tiny red-eyed
aliens! Really
weird looking



Class **Ostracoda**



Seed shrimp
with bivalve-
like shell



Class **Cirripedia**

Acorn & Stalked
Barnacles

Class **Malacostraca**

= Largest class
4 ORDERS

**Do not need to know
the names of these
Orders for the
practical! S.A.I.D. –
just note that A & B
are closely related.**



Stomatopoda

Mantis Shrimp

Amphipoda

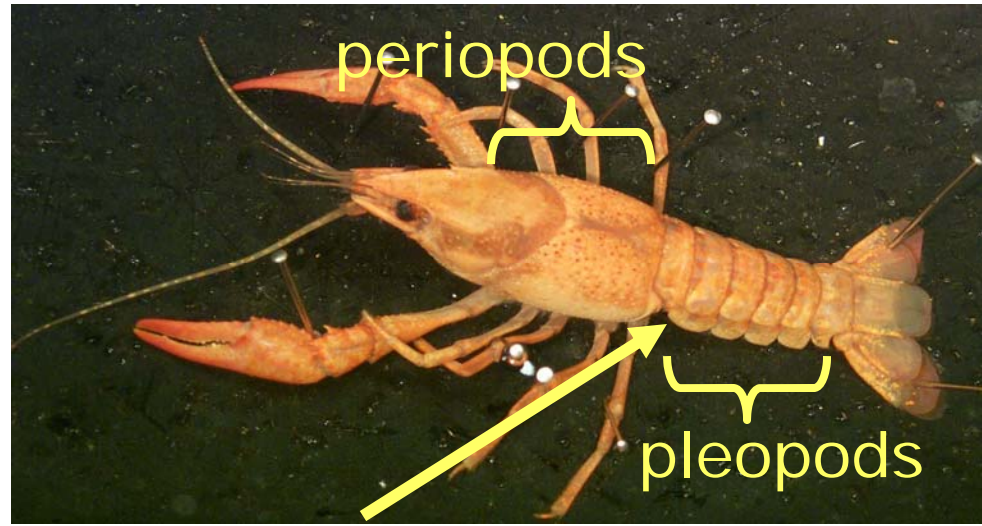
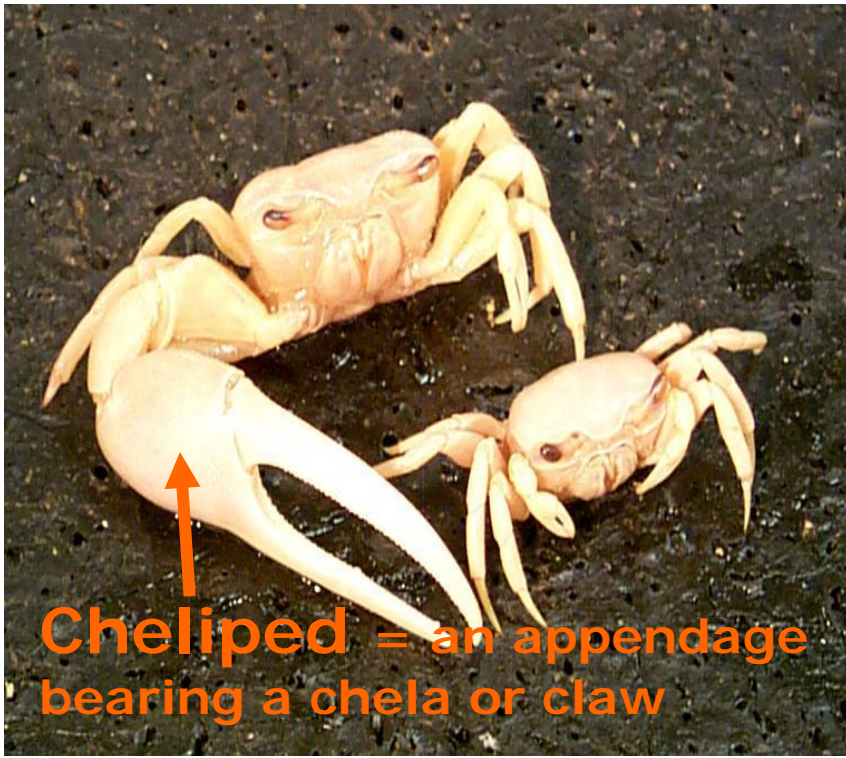
Beach Hoppers &
Sand Fleas

Isopoda B

Pill bugs
Giant Sea Roach

Decapoda A

Crabs, Lobsters etc..



Crayfish - 1st pleopod in males = specialized intromissive organ. Absent or reduced in females.

Subphylum 2

Crustacea

Class **Malacostraca**

Order **Decapoda**

Help! I've fallen and I can't get up!



Phylum

Arthropoda

Subphylum 3

Chelicerata



'PAM' !

'AMP' or

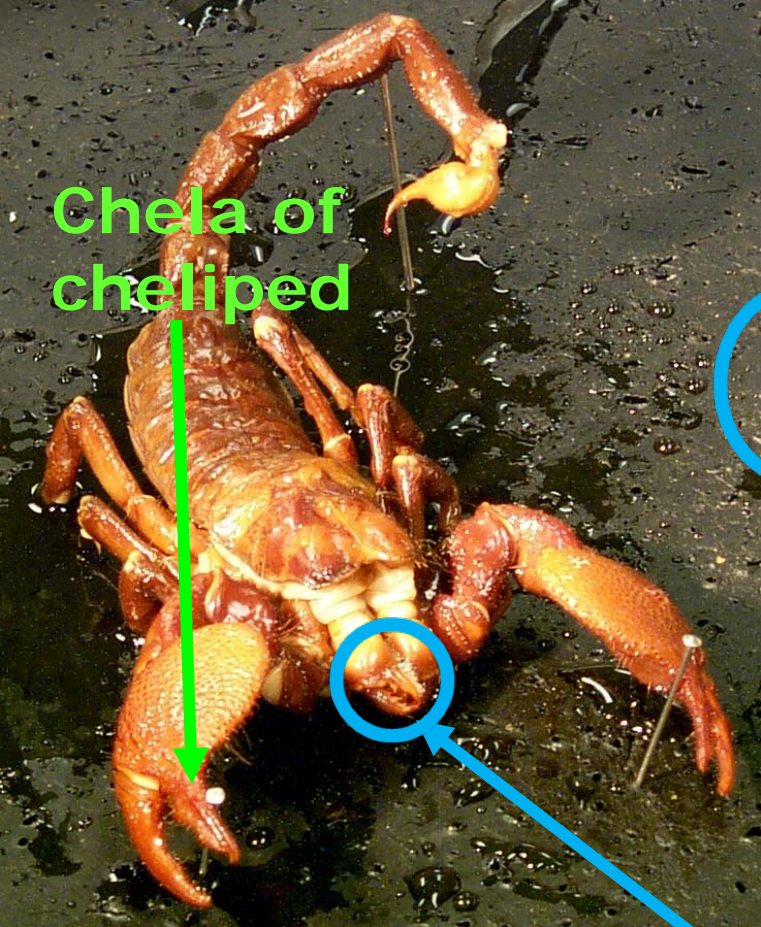
'MAP'

“the literate Chelicerates”

Class **Pycnogonida**

Class **Arachnida**

Class **Merostomata**

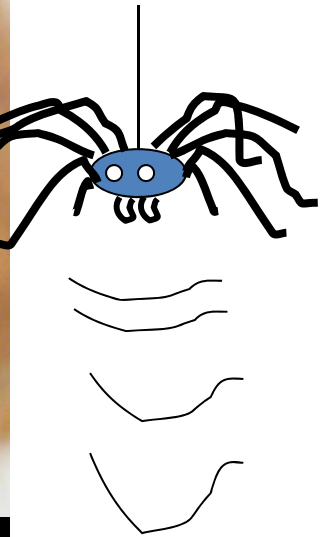


Chela of cheliped

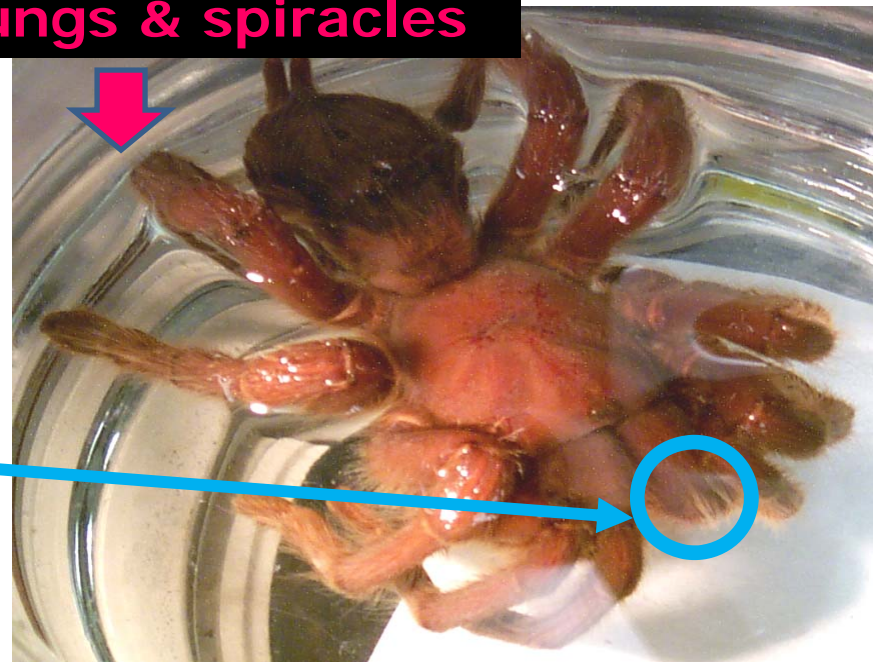


fanged chelicera -
to bite and suck
blood

Book lungs & spiracles



Fang =
Chelicera



Subphylum 3

Chelicerata

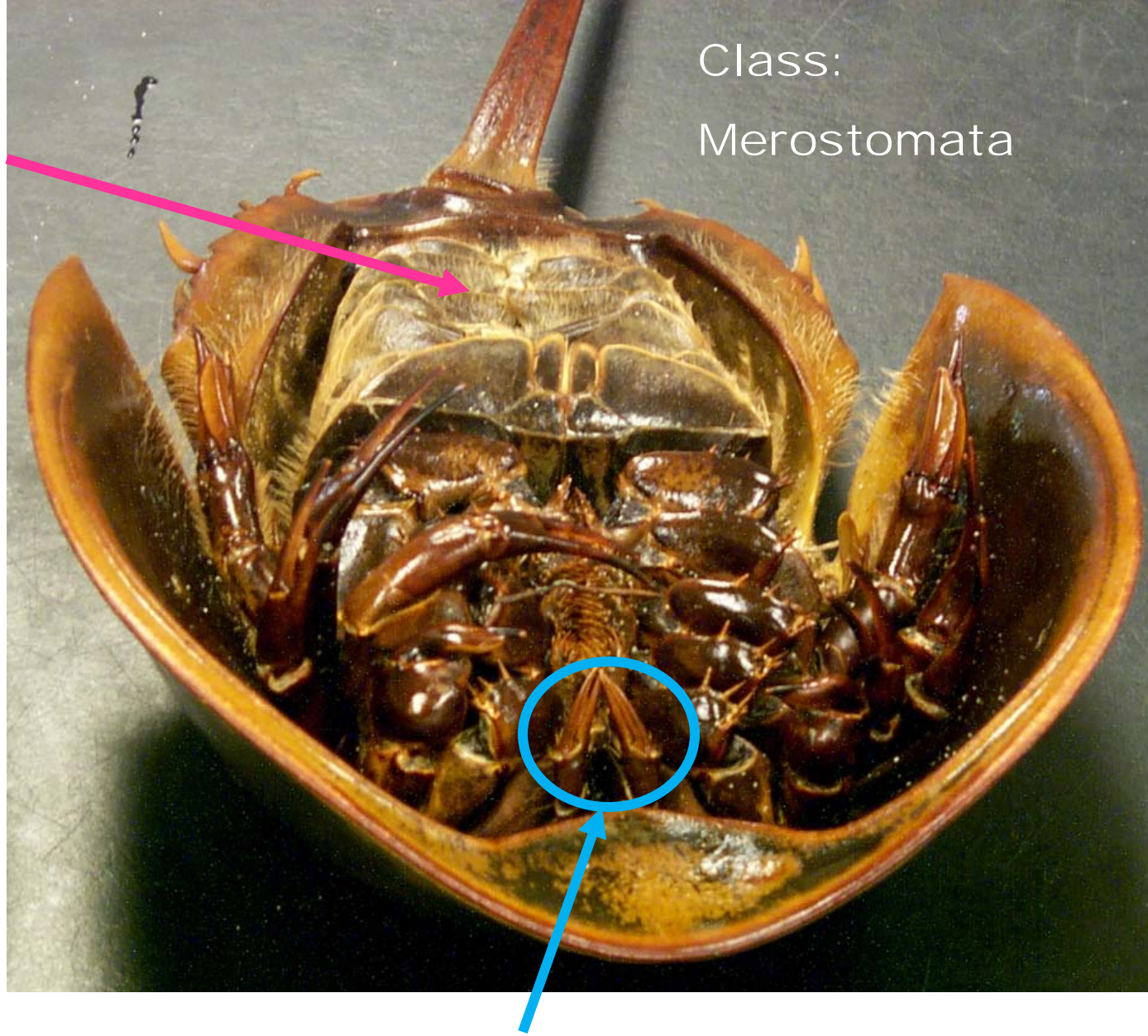
Arachnida

Class:
Merostomata

**Book
gills**

Males clasps
females with
their 1st
periopods =
pedipalp.

In the males this
is much enlarged
to form a boxing
glove. In
females the 1st
periopod or
pedipalp is just a
regular walking
leg.



Chelicera = modified
here as a claw

TAGMOSIS

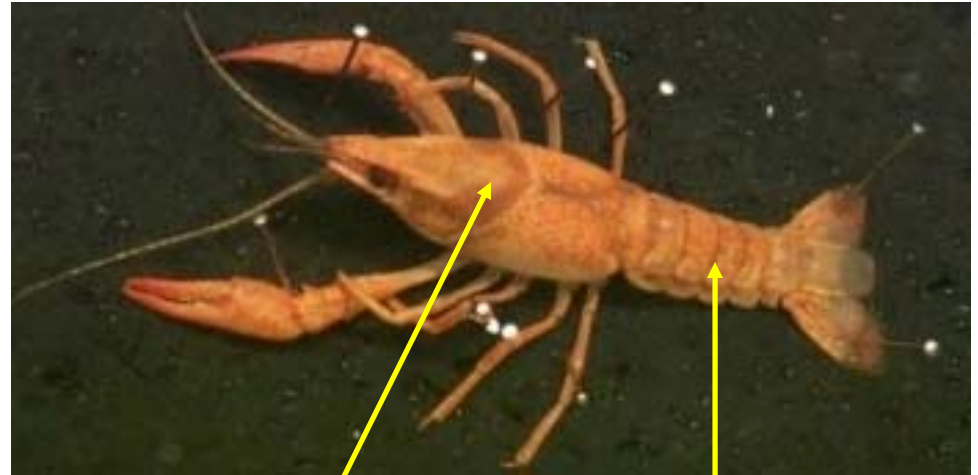
Book lungs/B. gills & tracheal system

Chelicerata



Prosoma
(Cephalothorax) Opisthosoma
(Abdomen)

Crustacea



Cephalothorax Abdomen

Crustacea belong to the mob, they've been punched in their nose so gills do the job.

Gills only

Phylum

Arthropoda

Subphylum

Myriapoda

'DIC' or 'CID'

Class **Chilopoda**

Class **Diplopoda**

Which one has most legs per segment?



Class **Diplopoda**
2 pairs of legs/segment

Subphylum 4
Myriapoda

Rounded head with no obvious jaws as it is a deposit feeder



Class **Chilopoda**
1 pair of legs/segment

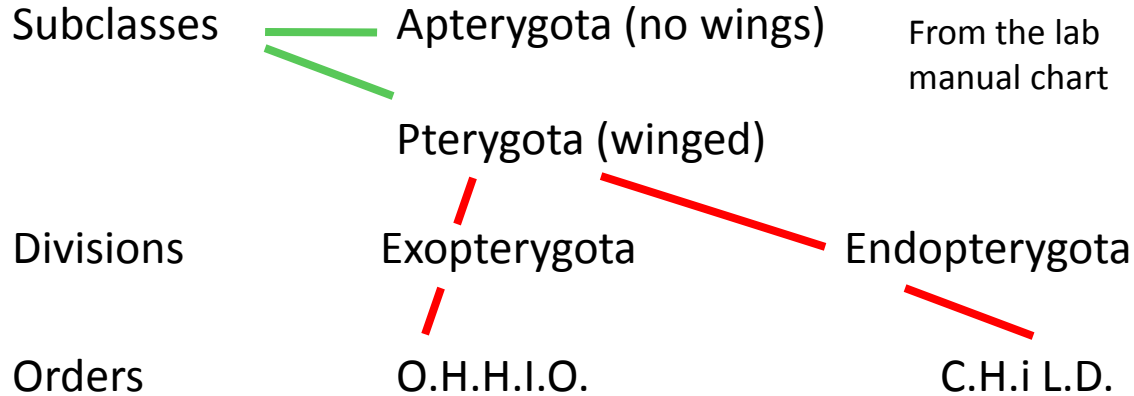
Vicious jaws of a carnivorous predator

Just to clarify.....

Phylum **Arthropoda**

Subphylum **Hexapoda**

Class **Insecta**



Phylum

Arthropoda

Subphylum

Hexapoda

Orders

Order **Orthoptera**

Order **Hemiptera**

Order **Homoptera**

Order **Isoptera**

Order **Odonata**

Class

Insecta

'OHHIO' & 'CHiLD'

Order **Coleoptera**

Order **Hymenoptera**

Order **Lepidoptera**

Order **Diptera**

**The
“bugs!”**

**Ah! The smell
of mothballs!**

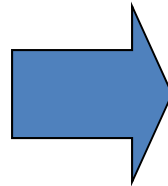
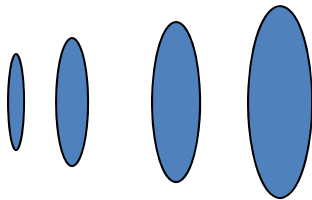


Metamorphosis

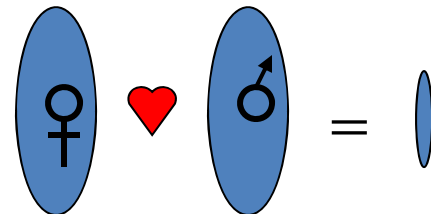
is the change

from a **LARVAL** form to..... an **ADULT** form

...which grows
by **MOLTING**
..but does
NOT REPRODUCE



..which does not
grow (**MOLT**)
..but does
REPRODUCE



Their wings have completely

G T G

HOLOMETABOLISM

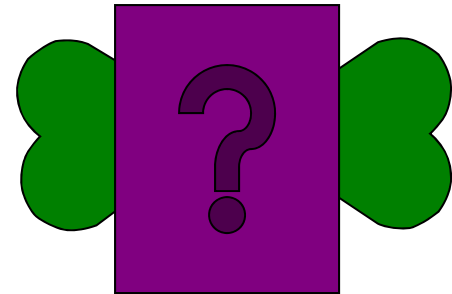
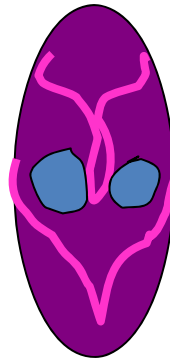
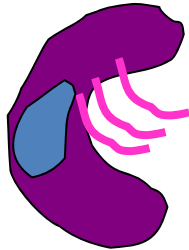
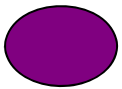
T T U
T

Holometabolism

Holometabola = Endopterygota

4 ORDERS

Egg -> larvae -> pupa -> adult



Holometabolism

4 ORDERS

-Wings on the **INSIDE** in the larva

and must undergo a **complete metamorphosis**
to bring them out in the adult.

This is a VERY dramatic change

Division **Endopterygota**

Holometabolous Life Cycle

4 ORDERS:

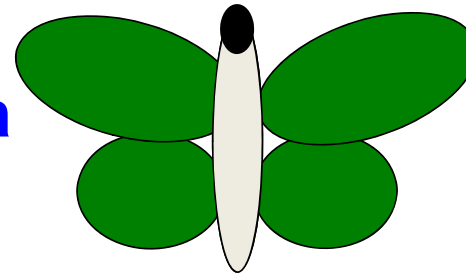
Order **Hymenoptera**

Bees, ants, wasps



Order **Lepidoptera**

Butterflies, moths

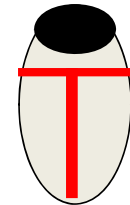


CHiLD = Bugs
for decorating
a nursery or a
children's
picture book.

Order **Coleoptera**

True Beetles.

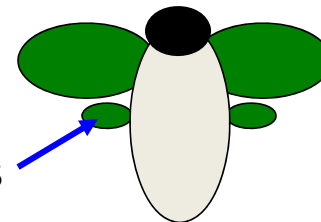
Look for "T" formed by ELYTRA



Order **Diptera**

True flies

Look for HALTERES



Hemimetabolism

5 ORDERS

-Wings on the **OUTSIDE** in the larva already.

Only need an **incomplete/partial metamorphosis**

= **(using half of the effort)**

to bring the insect to the mature adult stage.

Their wings **are** already out

W

HEMIMETABOLISM

N

L

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Y

Hemimetabolism

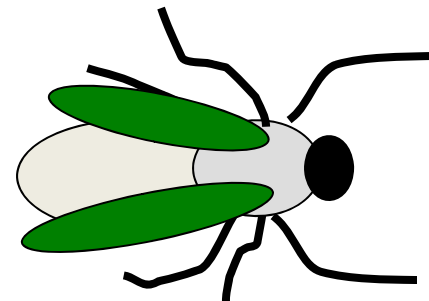
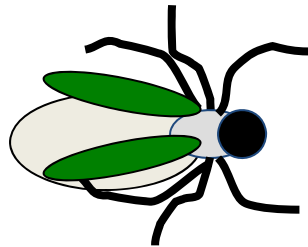
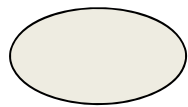
Incomplete metamorphosis Wings on the outside

Hemimetabola = Exopterygota

5 ORDERS

egg -> nymph (mini adult) -> adult

(Naiad if aquatic)



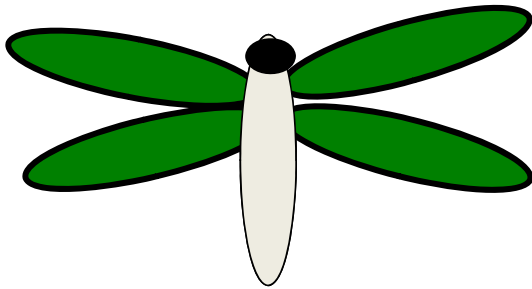
Division **Exopterygota**

Hemimetabolous Life Cycle

5 ORDERS:

Order **Odonata**

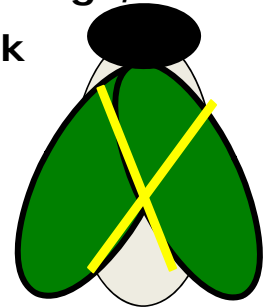
Dragonflies, damselflies



Order **Hemiptera**

Bug allies (assassin bugs, bedbugs)

Look for "X" on back formed by wings crossing over each other. True bugs.

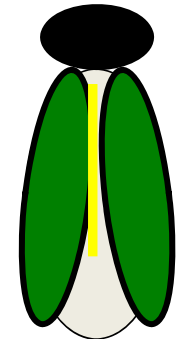


O

Order **Homoptera**

(cicadas, aphids)

Look for "home" formed by wings over back of insect



H

Order **Isoptera**

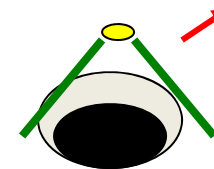
Termites

H

I

Order **Orthoptera**

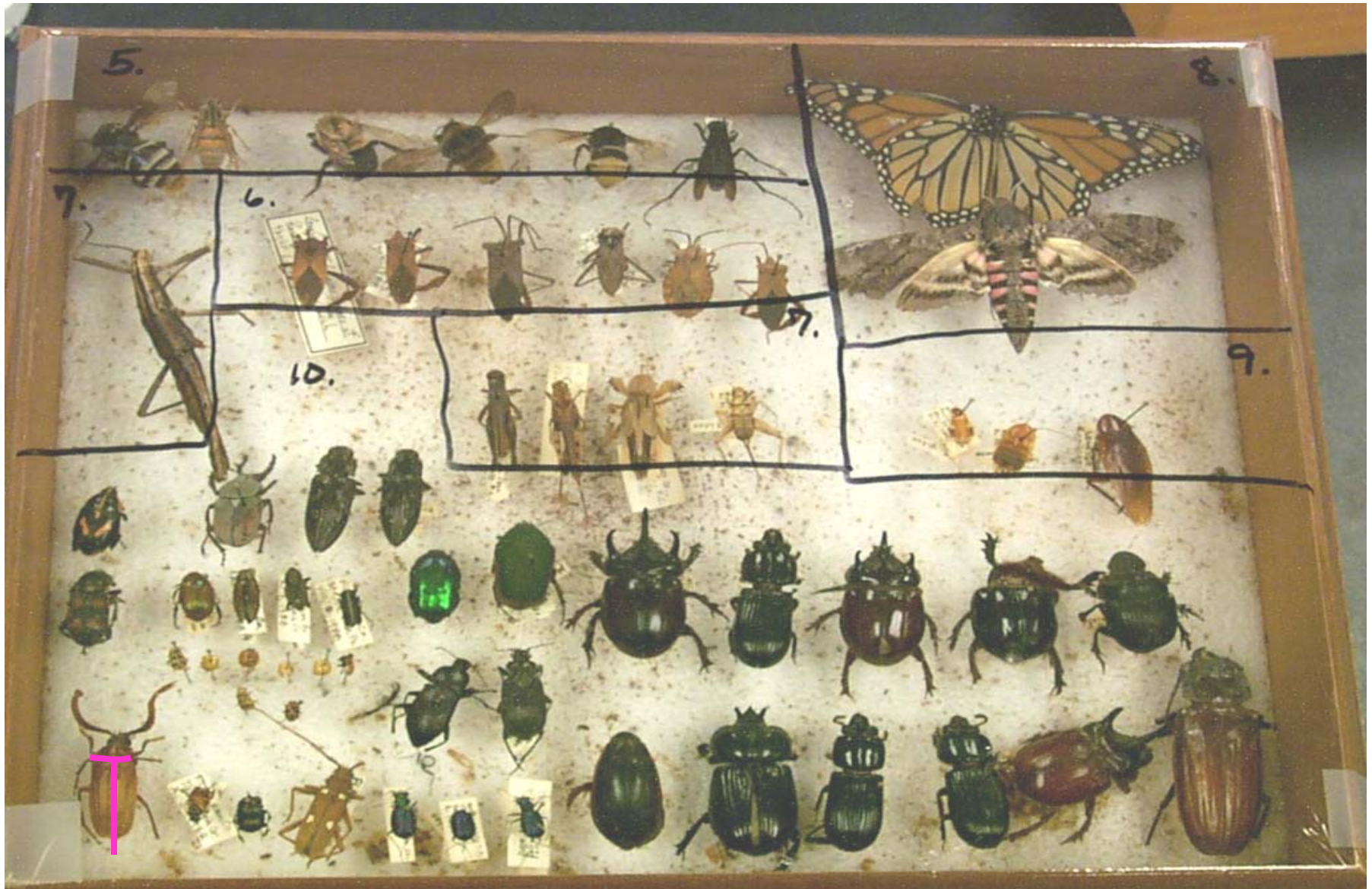
Crickets, grasshoppers, Roaches & mantids



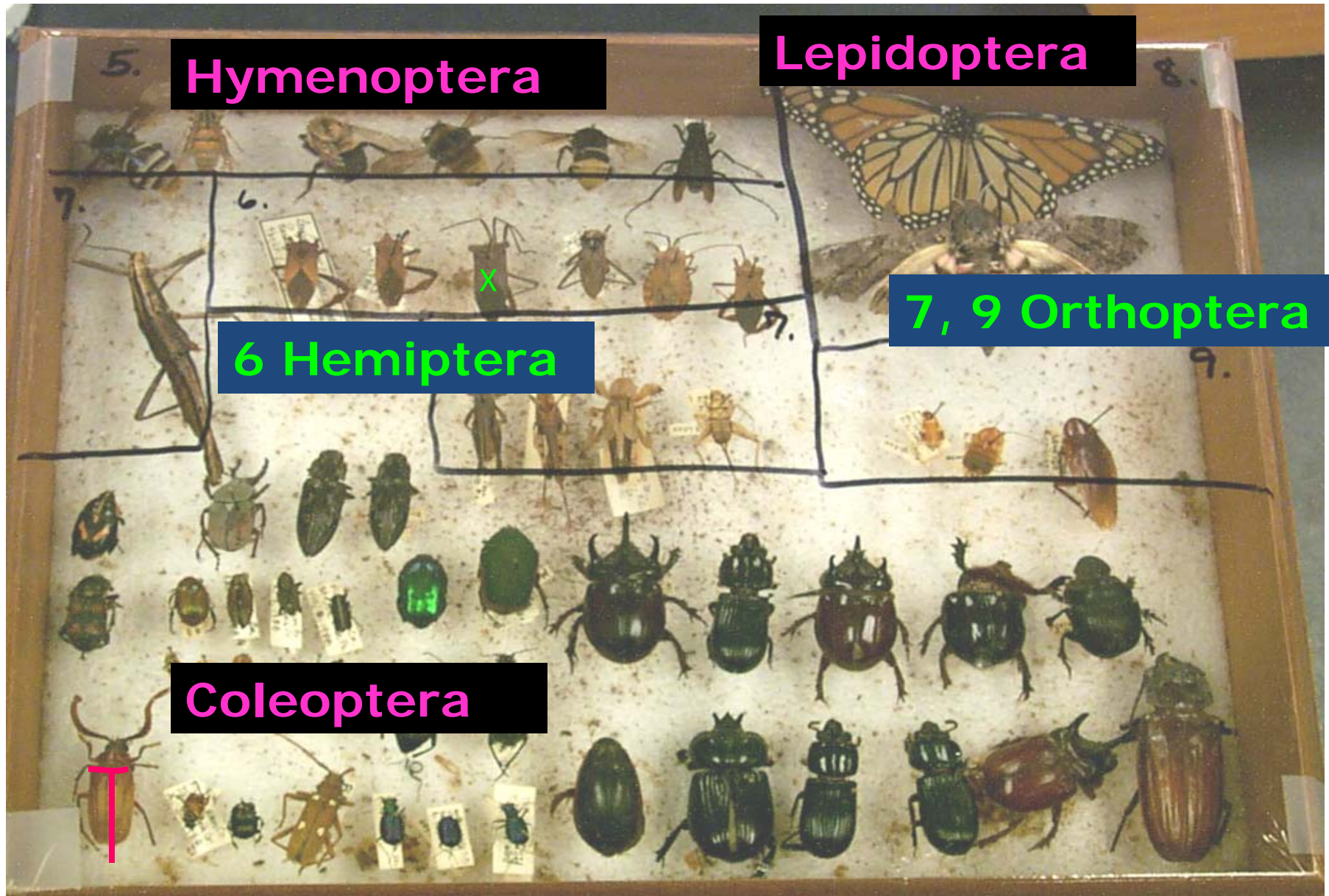
Head-on

O

Subphylum 5 **Hexapoda** Class **Insecta**



Subphylum 5 **Hexapoda** Class **Insecta**



5. **Hymenoptera**

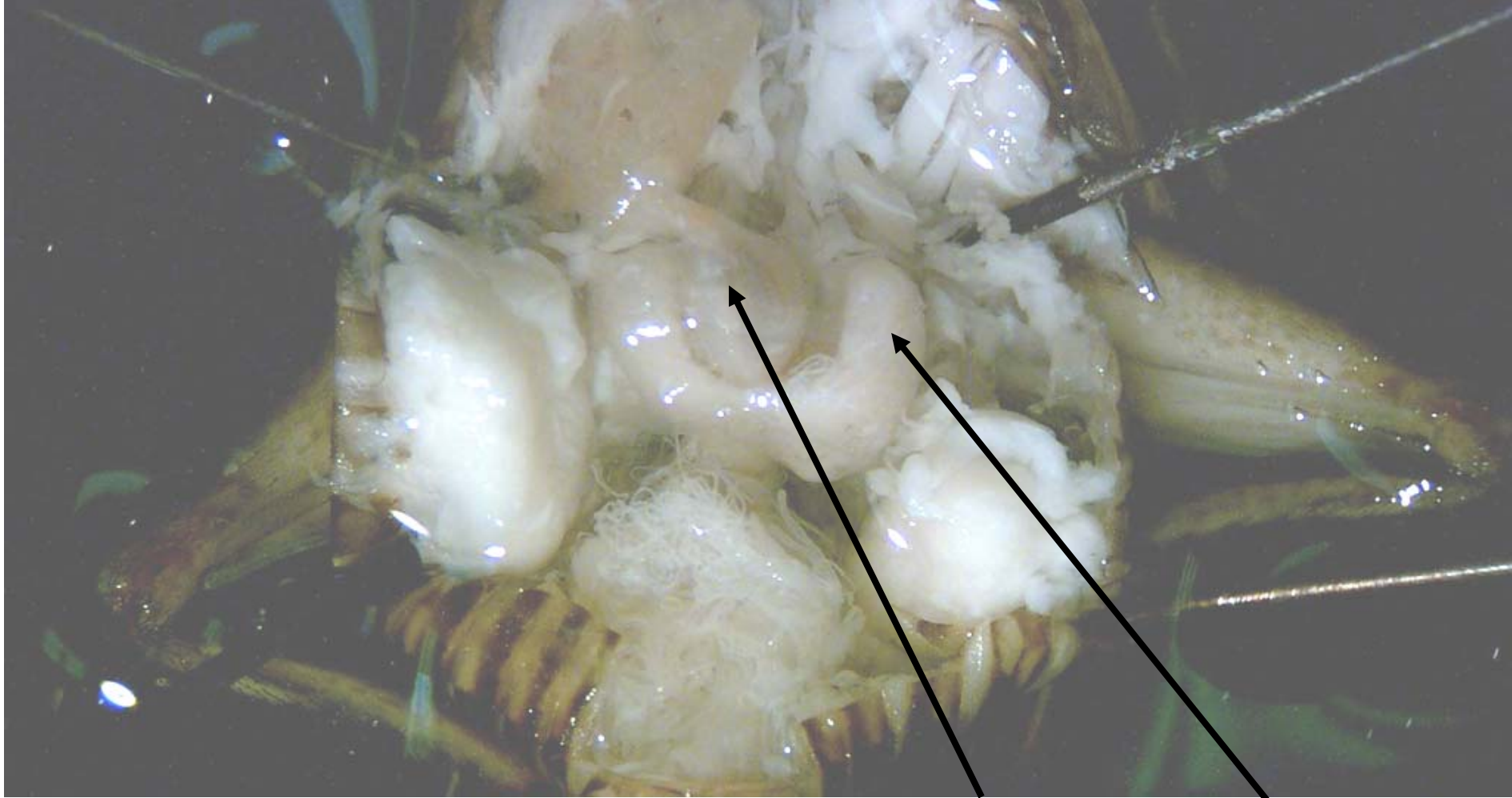
Lepidoptera 8.

7. **6 Hemiptera**

7, 9 Orthoptera 9.

Coleoptera

Don't forget that the fore- and hind gut portions are from ectodermally derived tissues!



Inside a Grasshopper... Remember the baseball and glove?

Phylum Arthropoda,
Subphylum Hexapoda,
Class Insecta, Order
Orthoptera



Crop - storage

Proventriculus – grinding
= mechanical digestion

Gastric Caecum
- chemical digestion

Female has ovarioles
(looks like rice grains!)

Malpighian Tubules
- excretion

Respiratory system = Tracheal system (has spiracles etc.)