

# Arthropoda

Most diverse Phylum

The total number of arthropod species exceeds the number of other animal phylum Combined

900,000 have been recorded

Probably the same number are not found yet

↳ Why?

Ocean

Small

rain forest

There are more beetle species that  
there are of all vertebrate

Arthropods means “jointed” “foot”

Like annelids have a coelom and  
segmented

Appendages- structures that extends from the arthropod's body wall

Have joints and bend

Legs for walking

Antennae for sensing environment

Mouthparts

Majority are small

Size range from 80 micrometers to 3.6 meters



[http://www.afsc.noaa.gov/race/media/photo\\_gallery/inverte\\_files/Red\\_king\\_crab.htm](http://www.afsc.noaa.gov/race/media/photo_gallery/inverte_files/Red_king_crab.htm)



[http://biology.arizona.edu/sciconn/lessons2/Geiger/Picpages/parasitic\\_mites\\_and\\_blue\\_mold.htm](http://biology.arizona.edu/sciconn/lessons2/Geiger/Picpages/parasitic_mites_and_blue_mold.htm)

Arthropods are divided into two groups  
Subphylum Urinaria- with jaws

Subphylum Chelicerata or Subphylum  
Crustacea with fangs and pinchers

# Characteristics of Arthropods

Jointed Appendages

Segmentation

Distinct head, often with compound eyes

Exoskeleton

Tracheae and spiracles

Open circulatory system

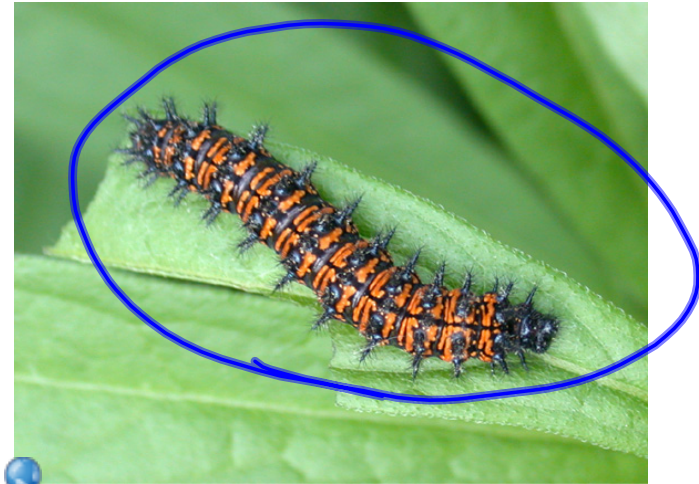
Malpighian tubules

Wings

# Segmentation

Sometimes only exist during the  
larval stage

Example caterpillar vs butterfly



[http://www.foagm.org/Album\\_02-07/caterpillar%20\(ID\\_.jpg](http://www.foagm.org/Album_02-07/caterpillar%20(ID_.jpg)

Adults have three distinct regions

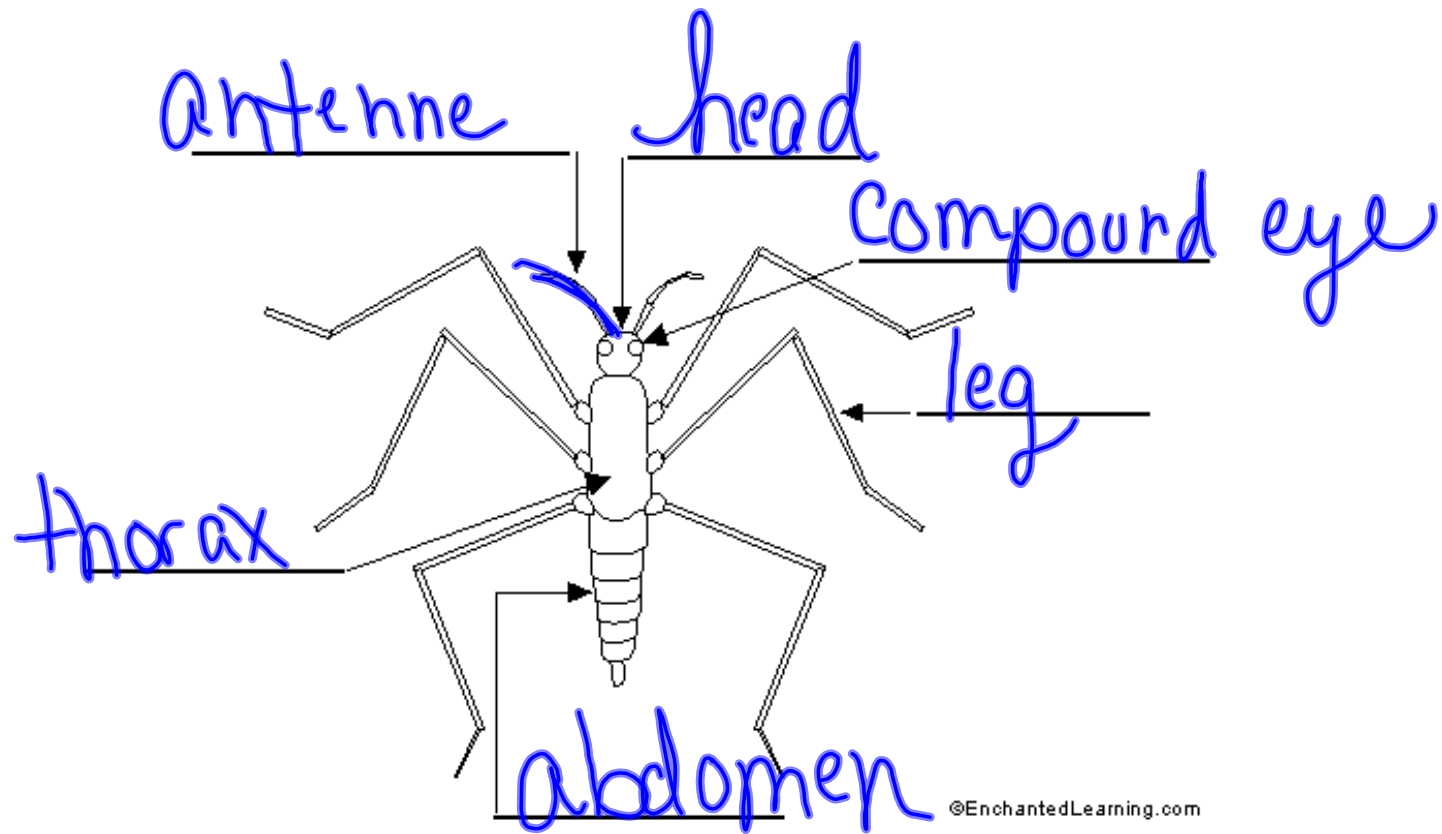
Head

Thorax

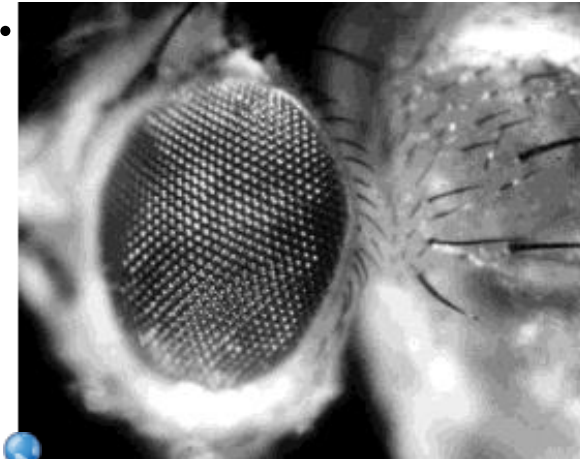
Abdomen

Some have a cephalothorax- head and  
thorax fused





Compound eye- an eye made of thousands of individual visual units each with its own lens and retina. The brain received images from each and pieces them together.



[http://users.rcn.com/jkimball.ma.  
ultranet/BiologyPages/C/CompoundEye.html](http://users.rcn.com/jkimball.ma.ultranet/BiologyPages/C/CompoundEye.html)

Image is fuzzy but motion is  
seen quicker.

Why is this important?

Some have single eyes, some  
have compound eyes, and  
some have both

## Exoskeleton

The shell is thinner and flexible  
where the joints are

Exoskeleton protects an arthropods  
from predator and helps prevent  
water loss

The skeleton can not grow larger so they need to shed and discard their exoskeleton (molting)

Triggered by a release of hormones.

The new skeleton is beneath and still soft.

The new skeleton then hardens.

# Respiration

Tracheae- a network of fine tubes

Air enters through the spiracles and passes into the tracheae delivering oxygen to the body

# Excretion

Malpighian tubules- slender  
fingerlike extensions from the  
arthropod's gut that are bathed by  
the blood that surrounds them

## Subphylum Uniramia

Mostly terrestrial arthropods with  
chewing mouth parts

3 class

Insecta (insects)

Diplopoda (millipedes)

Chilopoda (centipedes)



# Insect Body Plan

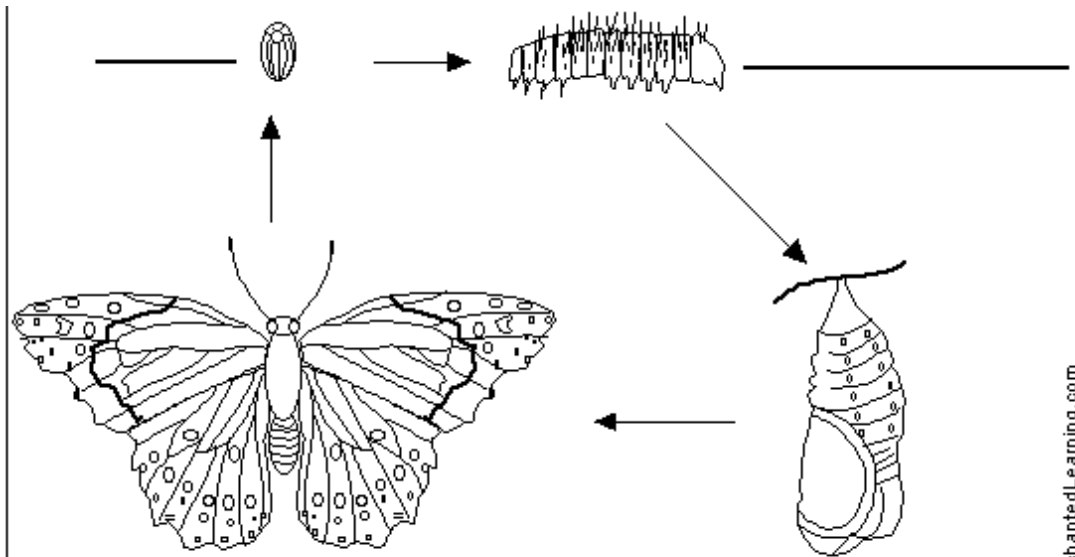
Head: has the specialized mouth parts,  
one pair of antennae, compound eye

Thorax: three fused segments usually with  
3 pairs of jointed legs and  
wings

Abdomen: 9-11 segments

Metamorphosis: dramatic physical change

Incomplete metamorphosis-  
Egg hatches into a juvenile (nymph) a  
small wingless adult



Complete metamorphosis- the wingless wormlike larval encloses itself in a protective capsule (chrysalis) passes through a pupa stage and changes to an adult

## Flight

An insect's wing develop from saclike outgrowths of the body wall of the thorax.

The veins in the wings carry air not blood.

In most insects only 1 pair of wings are used for flight.

## Social Insects

Order Hymenoptera and Order Isoptera have evolved elaborate Social systems

There are marked division of labor with specific functions

Caste- role of an individual in a colony.

Many times most members of the colony are sterile.

Insect Relatives

Centipedes have 1 pair of legs per segment and can have up to 173 segments. They are also

carnivores

Millipedes have two sets of legs per segment and can have from 11 to more than 100 segments. They are also

herbivores