Phylum Arthropoda

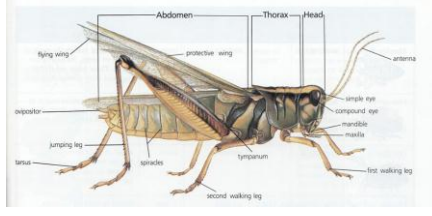
Chapter 13 Part 2 of 3

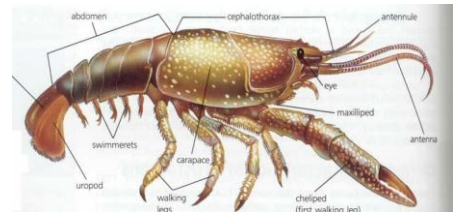
Phylum Arthropoda:

- *"Jointed feet"*
- General Characteristics:
  - Exoskeleton made of chitin present and must be molted when out grown, segmented body, Jointed appendages and attachments.
  - Aquatic, marine and freshwater, and terrestrial
  - Development:
    - incomplete metamorphosis: grasshoppers – egg → nymph → adult
    - complete metamorphosis: butterflies – egg → larvae → pupa → adult

Life Functions

- Respiration: by gills or tracheal tubes
- Circulation: by hearts pumping thru an open system
- Excretion: elimination of nitrogenous wastes by malpighian tubules **on most** terrestrial arthropods, simple diffusion or by green glands in aquatic arthropods.
- Nervous system: well developed, sensory appendages include, antenna, antennules, ocelli, compound eyes, tympanum along w/ cerebral ganglia now called a brain.
- Reproduction: sexes are separate, dieocous.



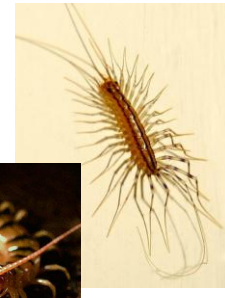


Classification

- Class Insecta - all six legged, arthropods with three body sections: head, thorax and abdomen: 14 “Need to Know” orders
- Class Arachnida – spiders, ticks, mites, chiggers and scorpions
- Class Crustacea – crabs, lobsters, barnacles, crayfish, pill bugs
- Class Chilopoda – Centipedes
- Class Diplopoda - Millipeds

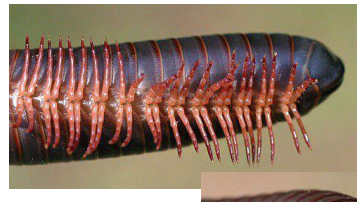
Class Chilopoda

- Centipedes
- Long worm-like body
- Body made of many segments
- One pair of legs per segment
- Carnivorous life style – active predator



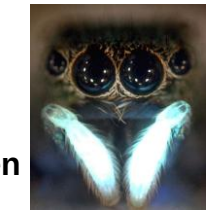
Class Diplopoda

- Millipeds
- Long worm-like body
- Body made of many segments
- Two pair of legs per segment
- Herbivore life style



Class Arachnida

- spiders, ticks, mites, chiggers and scorpions
- 2 body sections: **cephlathorax and abdomen**
- 4 pair of walking legs
- no antenna
- respiration via “book lungs”









Class Crustacea

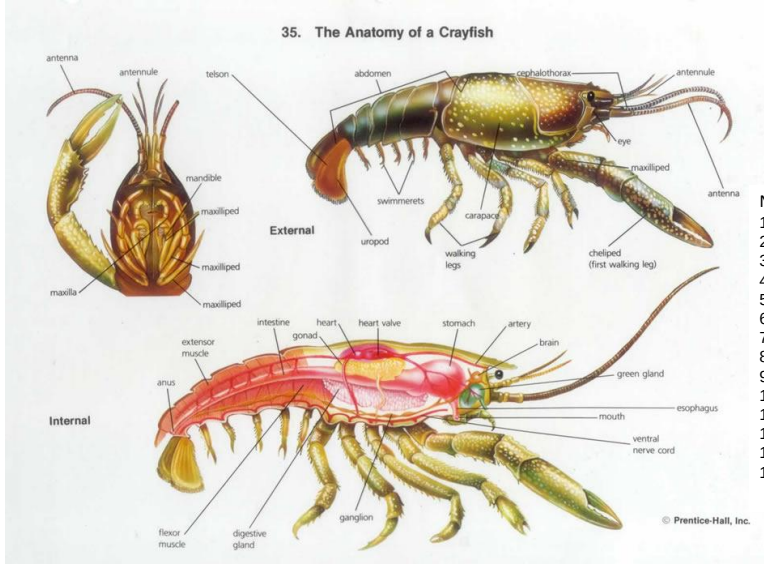
- crayfish , crabs, lobsters, barnacles, crayfish, pill bugs,
- We’ll use crayfish as an example of this class & dissect one in lab
- Usually two or three body segments, sometimes more
- Two pair of antenna
- 5 or more paired appendages
- mouth parts formed by appendages called mandibles
- usually aquatic







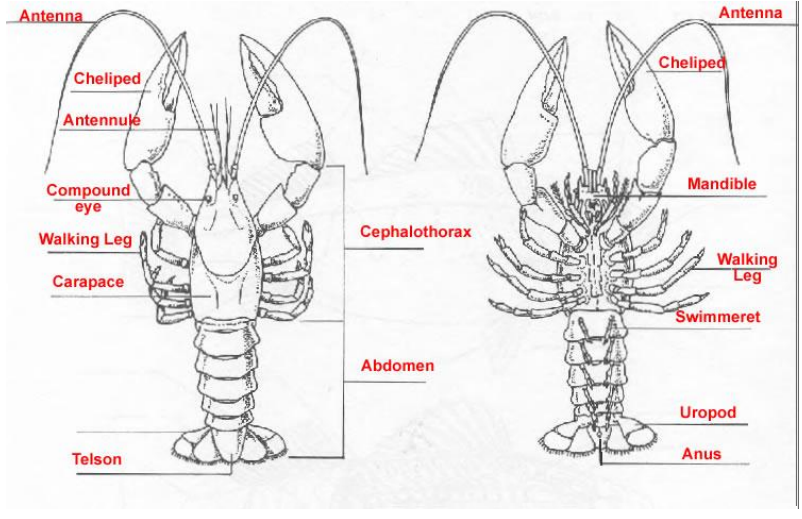
Class Crustacea - Crayfish



Need-to-Knows

1. Abdomen
2. Cephalothorax
3. Carapace
4. Cervical Groove
5. Antenna
6. Antennule
7. Cheliped
8. Swimmeret
9. Telson
10. Uropod
11. Gills
12. Green Gland
13. Stomach
14. Intestine

Crayfish

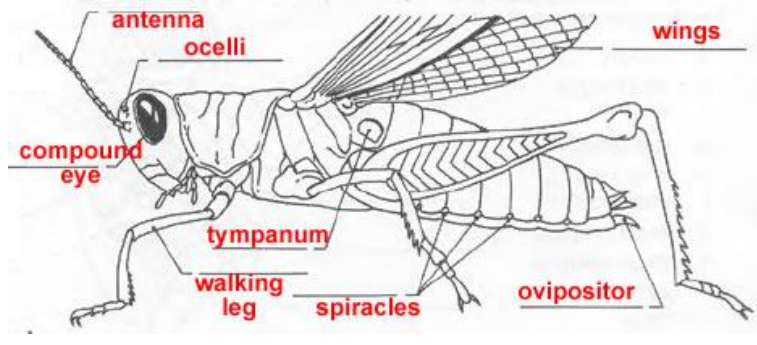


Class Insecta

- all six legged, arthropods with three body sections: head, thorax and abdomen:
- We will use the grasshopper as the representative example of the class and will dissect one in lab
- 14 “Need-to-Know” orders
  - Know example
  - Know description
  - Perfect matching question on exam!!

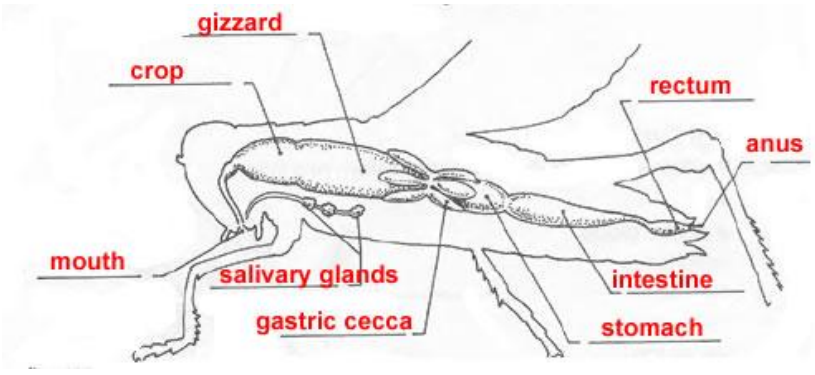
External Grasshopper

Structures: Antenna, compound eye, ocelli, tympanum, spiracles, ovipositor (egg laying apparatus), wings,



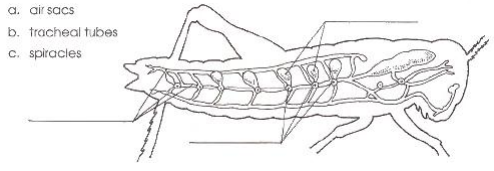
Internal Grasshopper

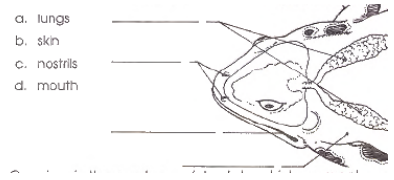
Structures: mouth, salivary glands, crop, gizzard, gastric cecca, stomach, intestine, rectum, anus



More Worksheet Help
Gas Exchange

- In very simple organisms like hydra & earthworms, oxygen & carbon dioxide are **exchanged by simple diffusion** across epidermal cell membranes
- In more complex organisms, like **plants**, gas exchanges through **stomata** in the leaves & through **lenticels** in the stem
- In grasshoppers, gas exchanges through the holes in the side of the grasshopper (**spiracles**) travels thru **tracheal tubes** and enters the **air sacs** where exchange of oxygen & carbon dioxide takes place
- In Frogs, gas is exchanged thru **nostrils** and ends up in **true lungs**, & also thru **skin diffusion**





More Worksheet Help
Excretion in Living Organisms

- Single celled organisms use water vacuoles called **contractile vacuoles** to help **eliminate cellular wastes**.
- Since Cnidarians have no excretory organs they simply use **diffusion** across the epidermis directly into the water to remove wastes
- Earthworm have a **pair of nephridia** in each **metamere** that concentrate the cellular wastes in the **tubules** and are eliminated to the outside thru small **excretory pores** on the outside of each metamere.
- Grasshoppers concentrate excess water, salts & uric acid in the **malphigian tubules** then **dump this into the intestine** where they are eliminated along w/ **digestive wastes**
- The **Kidney** is the **excretory organ** in the **human**
- Sorry, I can't help anymore than that…. Unless you want me to fill them out for you…. Yea right, that ain't gonna happen!

Class Insecta

- 14 "Need to Know" orders by example and Description
  - Diptera – Flies, mosquitoes and gnats
  - Dermaptera – earwigs
  - Coleoptera – beetles
  - Hemiptera –true bugs
  - Orthoptera – crickets, grasshoppers, praying mantis, cockroach
  - Lepidoptera – butterflies and Moths
  - Homoptera – Leafhoppers and aphids:
  - Hymenoptera – ants, bees and wasps:
  - Ephemeroptera – mayflies
  - Odonata – dragonflies
  - Neuroptera – ant lions, lacewings
  - Isoptera – termites and white ants
  - Siphonaptera – Fleas
  - Thysanura – Silverfish

Details & photos of each order follows

Class Insecta

- Diptera – insects with only a single pair of wings
  - Flies, mosquitoes and gnats
- Dermaptera – insects w/ pincher-like structures on abdomen
  - earwigs
- Orthoptera – two pairs of wings, hind legs usually enlarged used for hopping or front pair designed for grasping prey crickets,
  - grasshoppers, praying mantis, Cockroach



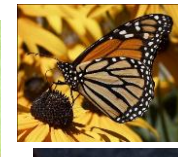
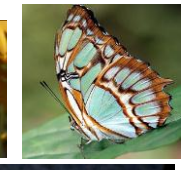




Class Insecta

- Coleoptera –two pair of wings, 1st pair forms hard protective shell & forms a straight line down the back medial surface of the abdomen : beetles
- Hemiptera – two pair of wings, 1st pair forms a leathery protection shield, while second pair are membranous and form an "X" on the back of the abdomen : true bugs
- Lepidoptera –: two pair of wings made of the same material. Wings are covered w/ scales that rub off easily. : butterflies and moths






Class Insecta

- Homoptera – small insects w/ soft plump body w/ small head. Wings slope down from the body when at rest: Leafhoppers and aphids
- Hymenoptera – Social insects found in large numbers within hives or colonies. Narrow pinched in "waist" between thorax and abdomen. Ability to sting used for protection: ants, bees and wasps
- Ephemeroptera – two or three long thread-like abdominal extensions extending from the posterior end of the abdomen: mayflies







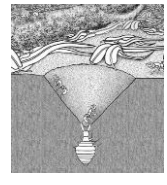

Class Insecta

- Odonata –two pair of wings about the same size and shape acting independently. Antenna are short and not obvious: dragonflies
- Neuroptera –: head w/ long antenna and large pincher like jaws used to capture prey items: ant lions & lacewings
- Isoptera –: soft bodied insects, usually social, abdomen usually has two short tails protruding from the posterior end of the abdomen: termites and white ants










Class Insecta

- Siphonaptera –tiny parasitic insect w/ body laterally flattened. Ability to hop w/ its hind legs: Fleas
- Thysanura –delicate, soft bodies w/ powdery scales. The abdomen have long jointed threadlike tails and antenna: Silverfish






We B Done!!
Keep an eye out for part 3:
Phylum: Echinodermata
the starfish, sea urchins, sea cucumbers and the like!