I. Transport

1. **Slow-moving species: *Open* circulatory system**
   a) The blood is pumped by a simple heart

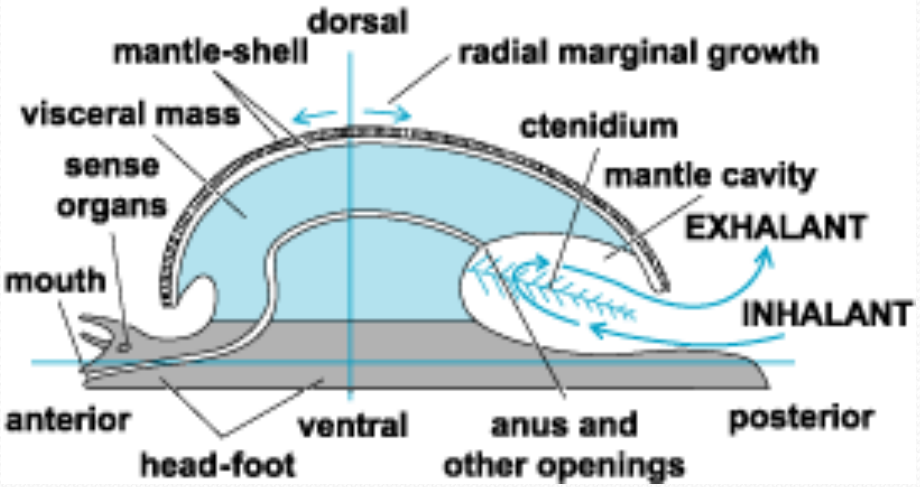
   b) Blood works its way through body tissues in open spaces called sinuses

   c) Sinuses drain into vessels that pass first through the gills for O_2/ CO_2 exchange, then back to the heart

2. **Fast-moving species: *Closed* system (more *efficient*)**

J. Excretion

1. Undigested food leaves through the ***anus*** as ***feces***
2. Ammonia is removed from the body ***fluids*** by tube-shaped organs called ***nephridia***



K. Response

1. ***Simple*** **nervous systems**

a) In mollusks that live inactive lives e.g. *clams*

i) Several small *ganglia* near the mouth

ii) A few *nerve* cords

iii) Simple sense organs: *chemical* and *touch* receptors, statocysts (*balance*) & *ocelli* (eyespots)

2. ***Complex*** **nervous systems** **Escape Video**

a) In active predators. e.g. *Octopus*

i) Well-developed *brain* = *memory* &intelligence

ii) Complex sense organs e.g. image-forming *eyes*

Octopus Intelligence

L. Reproduction

1. Most commonly: *separate* sexes and *external* fertilization; eggs and sperm are released into the *open* water and find each other by chance. A free-swimming *larvae* develop from the resulting fertilized eggs

2. *Tentacled* mollusks: separate sexes and *internal* fertilization

Cuttlefish Habits and Mating

3. Many snails: hermaphrodites *internal* fertilization

Slug Mating

III. Snail, Slugs, and Their Relatives

A. Class *Gastropoda*; origin of name: *Stomach*

Foot

B. All move by means of a broad, muscular *foot* located on the *ventral* (stomach) side

C. Have a *one-piece* shell that protects their soft bodies

IV. Two-Shelled Mollusks

A. Class ***Bivalvia***; Origin of name: ***bi*** = ***two***; ***valve*** = ***shell***

B. Have ***two*** shells that are hinged together at the back and held together by one or two powerful ***muscles***

C. Examples of bivalves: ***clams, oysters, scallops***

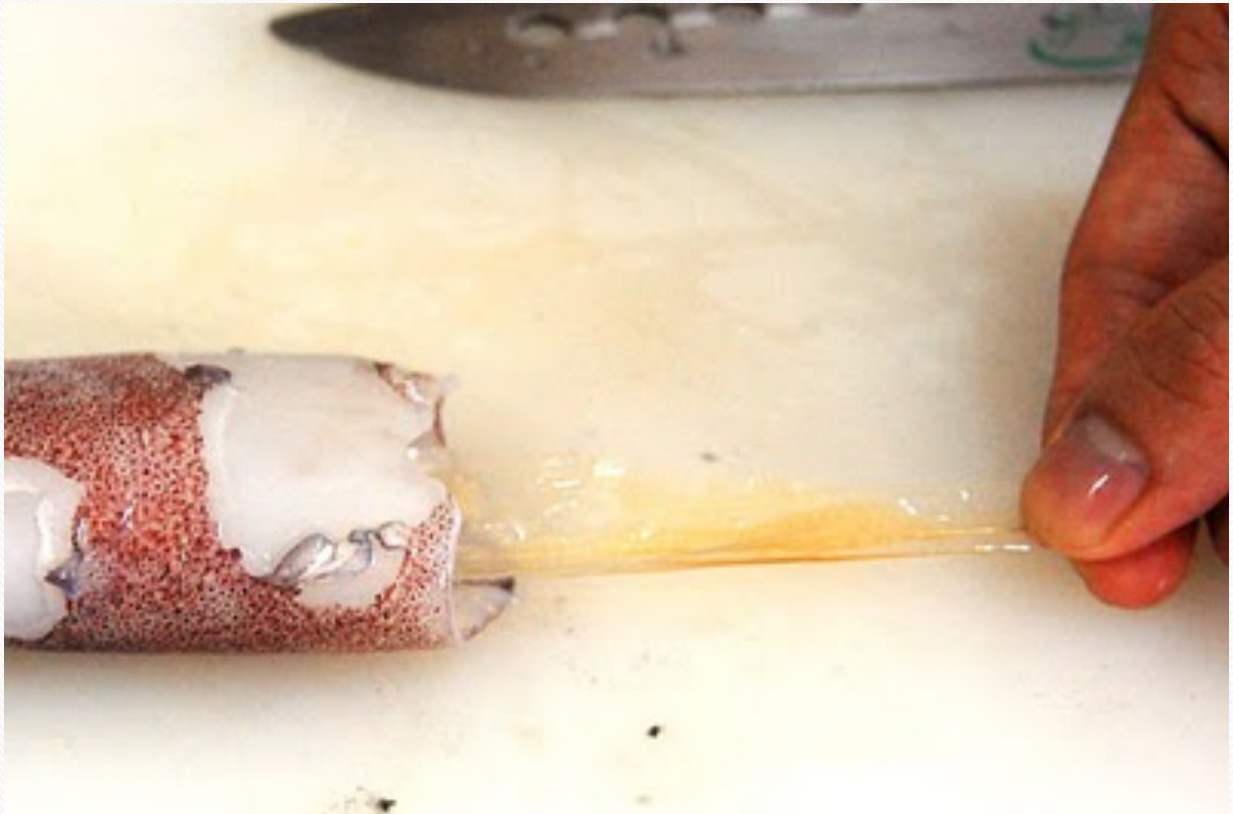
V. Tentacled Mollusks

A. Class *Cephalopoda;* Origin of name : *cephalo = head; pod = foot*

B. Examples of cephalopods: *cuttlefish, squids, octopi, nautiluses*

C. Size: *< 2 cm to 20 m*(!)

D. Most cephalopods have small *internal* shell (squid, cuttlefish) or *none* (octopus)



E. Defences:

1. **Move rapidly by using a form of *jet* propulsion forcing *water* out of the mantle**

cavity through the tubelike *siphon*

2. **Release dark-colored, foul-tasting *ink***
3. **Change *colour* to blend into *surroundings***

VI. How Mollusks Fit into the World

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A. Many ecological roles:

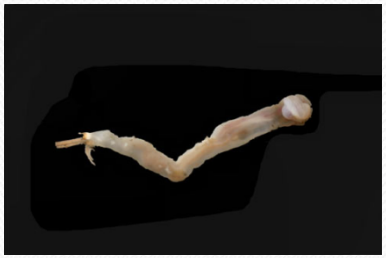
1. *Herbi*vores
2. *Carni*vores
3. Scavengers: eat *detritus* (clean up dead material)

B. Food source for *humans* and other animals

http://www.youtube.com/watch?v=-ju7_ZORsZw

C. 3 examples of mollusks and how they are detrimental:

1. **Damage *gardens* and *crops***



2. **Shipworms: destroy wooden *boats* and *docks***

3 *Clams and oysters* can concentrate toxins in the water (e.g. *red* tide) that can harm or kill those who unknowingly harvest them