

# Invertebrate Zoology

## Unit 4: Molluscs and Annelids

### Objective 1: Describe the form and function of Molluscs

Students should be able to:

- 1) Describe the form and function of Molluscs
- 2) Explain the common characteristics of the phylum Mollusca
- 3) Describe the various body forms and location of structures of Molluscs

How to study:

a) Read Pages: 326-330

b) Understand vocabulary terms:

head-foot: The active area containing the feeding, cephalic sensory, and locomotor organs. It depends primarily on muscular action for its function.  
visceral mass: The portion containing digestive, circulatory, respiratory, and reproductive organs, and it depends primarily on ciliary tracts for its functioning.

Mantle: a protective outgrowth consisting of two folds of skin on the dorsal body wall.

Gills: a series of microfilaments which absorb oxygen from the water.

Shell: Some mollusks produce a protective hard shell over the visceral mass.

- Outer layer (Periostracum); Composed of hardened protein
- Middle prismatic layer; Closely packed prisms of calcium carbonate and increases with animal growth
- Inner nacreous layer; Next to the mantle; the nacre is laid

down in thin layers

Aids in Pearl formation; Shiny layer in abalone, nautilus, and bivalve

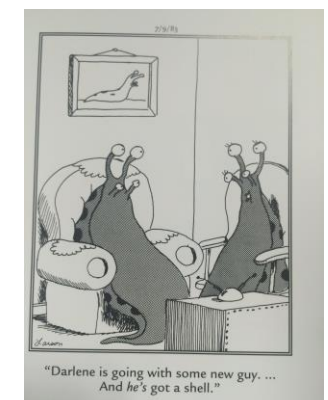
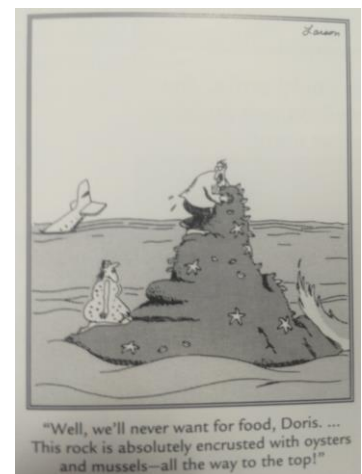
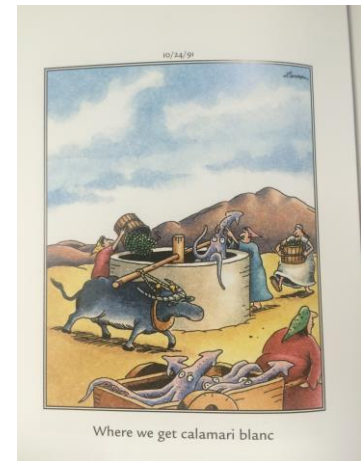
Radula: A rasping protrusible, tongue-like organ found in all molluscs except bivalves and most solenogasters. It is a ribbon-like membrane on which are mounted rows of tiny teeth that point backward.

Open circulatory system: a pumping heart, blood vessels and blood sinuses. Blood is pumped from the heart into open spaces.

Closed circulatory system: Closed circulatory systems have the blood closed at all times within vessels of different size and wall thickness. In this type of system, blood is pumped by a heart through vessels, and does not normally fill body cavities.

Dioecious: Separate sexes (male and female individuals)

Torsion: A twisting phenomenon in gastropod development that alters the position of the visceral and pallial organs by 180 degrees.



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Ovovivparity: A mode of reproduction in animals in which embryos that develop inside eggs remain in the mother's body until they are ready to hatch.

- c) Complete, review, and understand the homework assignments on:  
Assignment 1 Unit 4 Objective 1
- d) Understand the following notes: Mollusca Notes

## Objective 2: Differentiate between the classes of Molluscs (Caudofoveata, Solenogastres, Monoplacophora, Polyplacophora)

Students should be able to:

- 1) Explain the characteristics of the members of the 4 classes.
- 2) Describe the basic body structure of each class.
- 3) Identify an example of each class.

How to study:

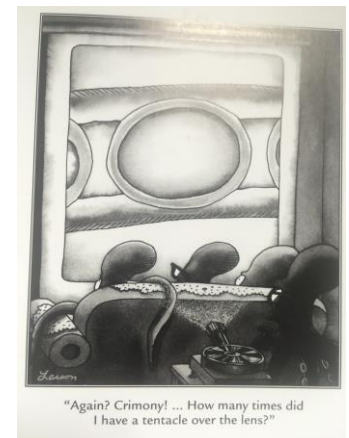
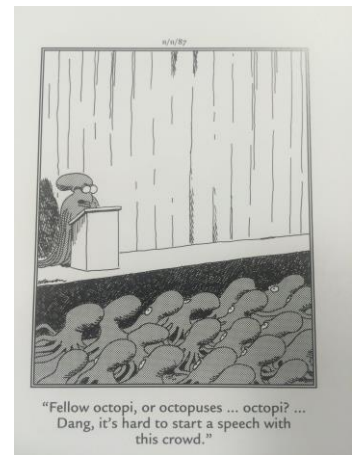
a) Read Pages: 330-332

b) Understand vocabulary terms:

- Class Caudofoveata: Wormlike. Shell, head and excretory organs absent. Radula usually present. Mantle with chitinous cuticle and calcareous scales. Sexes separate. Was united with solenogasters but now classified separately. Examples *Chaetoderma*, *Limifossor*
- Class Solenogastres: Solenogasters. Wormlike, shell, head, and excretory organs absent; radula usually absent. Mantle covered with scales or spicules; Hermaphrodite. Example: *Neomenia*
- Class Monoplacophora: Body bilaterally symmetrical with broad, flat foot; A single dome-shaped shell  
Five or six pairs of gills in shallow mantle cavity. Radula present. Separate sexes. Example: *Neopilina*
- Class Polyplacophora: Chitons are somewhat flattened with 7 or 8 dorsal plates. Most prefer rocky intertidal surfaces. Chiton radula is reinforced with iron mineral. Scrapes algae from the rocks. Example: Chitons

c) Know these diagrams: Fig 16-2, 16-18, 16-38.

- d) Understand the following notes: Mollusc Notes
- e) Complete, review, and understand: Assignment 2 Unit 4 Objective 2 and 3.



## Objective 3: Differentiate between the classes of Molluscs: (Scaphopoda, Gastropoda, Bivalvia, Cephalopoda)

Students should be able to:

- 1) Explain the characteristics of the members of the 4 classes.

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- 2) Describe the basic body structure of each class.
- 3) Identify an example of each class.

How to study:

- a) Read Pages: Pg 332-349
- b) Understand vocabulary terms:

-Class Scaphopoda: Tusk Shells. Body enclosed in a one piece, tubular shell open at both ends.

Conical foot; Mouth with radula and tentacles, head absent. Sexes are separate. Example: *Dentalium*

-Class Gastropoda: Snails, slugs, conch, whelks, and others. Body asymmetrical, usually in a coiled shell (shell uncoiled or absent in some); Head well developed, with radula; foot large and flat; one or two gills, or with mantle modified into secondary gills or lung; dioecious or monoecious. Examples: *Busycon*, *Physa*, *Helix*, *Aplysia*.

-Class Bivalvia: Bivalves. Body enclosed in a two-lobed mantle; shell of two lateral valves of variable size and form, with dorsal hinge; cephalization much reduced; no radula; foot usually wedge-shaped; gills plate-like; sexes usually separate. Examples: *Anodonta*, *Venus*, *Tagelus*, *Teredo*.

-Class Cephalopoda: Squids, nautiloids, and octopuses. Shell often reduced or absent; head well developed with eyes and radula; foot modified into arms or tentacles; siphon present; sexes separate. Examples: *Logio*, *Octopus*, *Sepia*.

c) Complete, review, and understand: Assignment 2 Unit 4 Objectives 2 and 3 Inv Zoology.

d) Understand the following notes: Mollusca Notes

## Objective 4: Describe the Internal Form and Function of Gastropods, Bivalves, and Cephalopods.

Students should be able to:

- 1) Identify the modes of respiration, circulatory, excretion, nervous system, and reproduction for Gastropods, Bivalves, and Cephalopods.

How to study:

- a) Read Pages: 332-349
- b) Understand Vocabulary Terms:

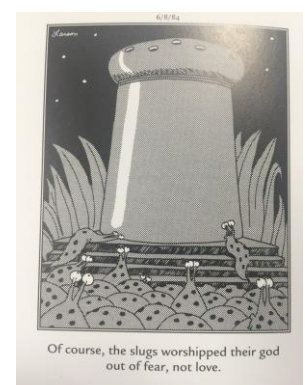
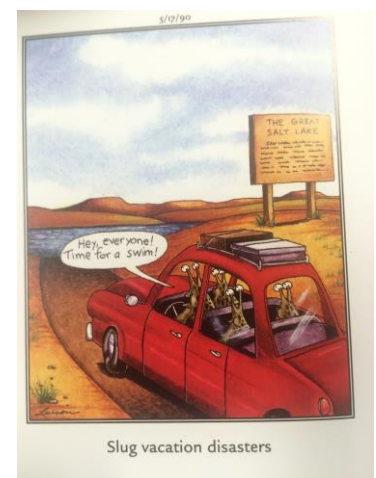
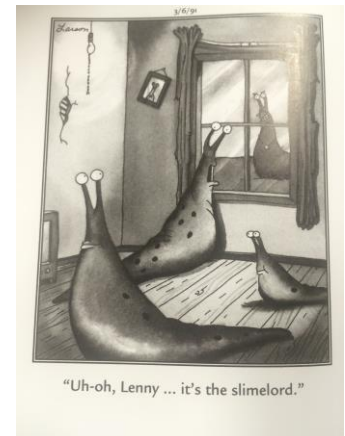
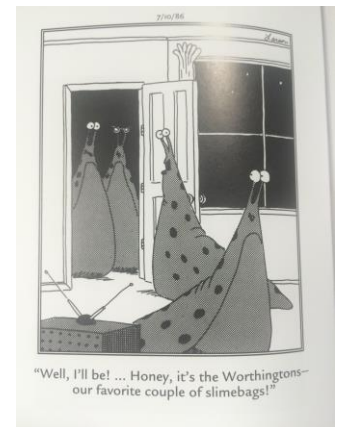
-Torsion: A twisting process that makes the Mollusc visceral mass asymmetrical.

-Coiling: The spiral winding of the shell and visceral mass. It is NOT the same as torsion.

-Ctenidium: Located in the mantle cavity, this acts as gills for some Molluscs

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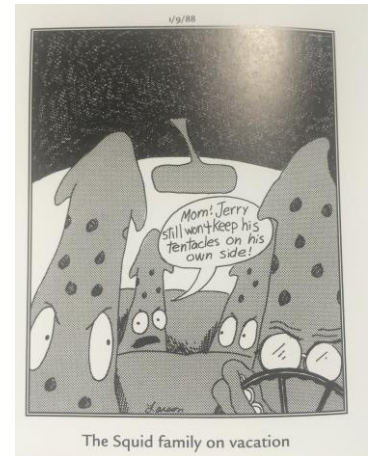
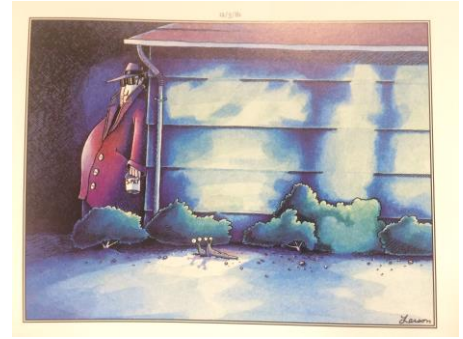
- Lung:** A highly vascular area in some Molluscs which aids in respiration it has an opening called a pneumostome.
- Dioecious:** Having male and female gonads in separate individuals.
- Monoecious:** Having both male and female gonads in the same organism: Hermaphrodite
- Pulmonates:** Molluscs which show detorsion and include land and most freshwater snails and slugs. They lost their ctenidia and their vascularized mantle wall has become a lung. They are monoecious.
- Chromatophores:** Cells in the skin that contain pigment granules.

This can change the color of the skin of some mollusks. They are used for camouflage and communication.

-**Ink gland:** A gland which most cephalopods and nautiloids have that secretes sepia, a dark fluid containing the pigment melanin. The pigment is deposited into an ink sac that empties into the rectum. The Mollusc can then release the dark cloud to confuse or distract a predator.

**Open circulatory system:** a pumping heart, blood vessels and blood sinuses. Blood is pumped from the heart into open spaces.

**Closed circulatory system:** Closed circulatory systems have the blood closed at all times within vessels of different size and wall thickness. In this type of system, blood is pumped by a heart through vessels, and does not normally fill body cavities.



c) Know these diagrams: Figure 16-11 Pg 333, Pg 16-18 Pg 337, 16-30 Pg 342, 16-38 Pg 348

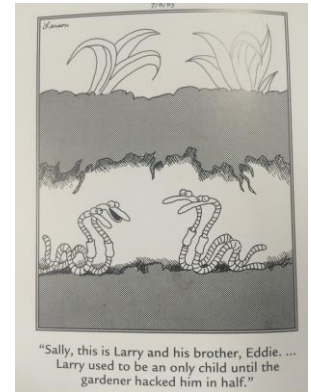
d) Understand the following notes: Mollusc Notes

e) Complete, review, and understand: MBC Assignment 3 Unit 4 Objective 4

## Objective 5: Describe the form and function of the phylum Annelida

Students should be able to:

- 1) Describe the body structure of the various Annelids.
- 2) Explain the processes of respiration, excretion, locomotion, feeding, and reproduction for Annelids.

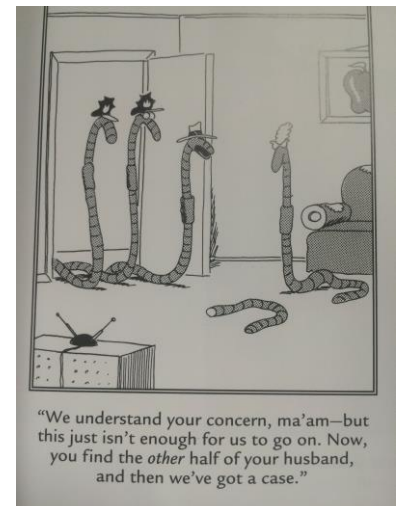


How to study:

a) Read Pages: 356-371

b) Understand vocabulary terms:

- Annuli or metameres:** Segments marked with circular rings.
- Metamerism:** The body is divided into a series of segments, each having similar components of all major organ systems.
- Setae:** Chitinous bristles on the surface of some annelids. They aid in locomotion (movement) and deter predators.
- Prostomium:** The anterior portion of annelids. (Head)
- Pygidium:** The terminal portion of annelids. (Tail)



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-Segmented Body: Part of the middle section of an Annelid which have all the major organs.

-Peritonium: A layer of mesodermal epithelium which meet to form the walls between segments.

-Hydrostatic skeleton: A mass of fluid or plastic parenchyma enclosed within a muscular wall to provide the support necessary for antagonistic muscle action.

-Clitellum: Thickened saddle-like portion of certain mid-body segment of many oligochaetes and leeches. Used for reproduction.

-Parapodia: One of the paired lateral processes on each side of most segments in polychaete annelids. Variously modified for locomotion, respiration, or feeding.

-Trochophore: A free swimming ciliated marine larva characteristic of most molluscs and annelids.

-Nephridia: One of the segmentally arranged, paired excretory tubules of Annelids. (The kidneys of Annelids)

-Radioles: Featherlike processes from the head of many tubicolous polychaete worms, primarily used for feeding.

c) Know these diagrams: Fig 17-1 Pg 357; 17-3 Pg 358;

d) Understand the following notes: Annelid Notes

e) Complete, review, and understand: Assignment 4 Unit 4 Objective 5 Inv Zoology

## Objective 6: Differentiate the classes of Annelids (Polychaeta, Oligochaeta, Hirudinea)

Students should be able to:

- 1) Explain the main characteristics of the different types of Annelids
- 2) Identify examples of each class of Annelids.
- 3) Identify by diagram examples of each class of Annelids.

How to study:

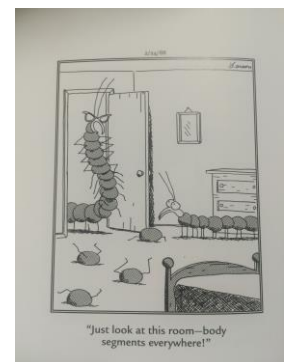
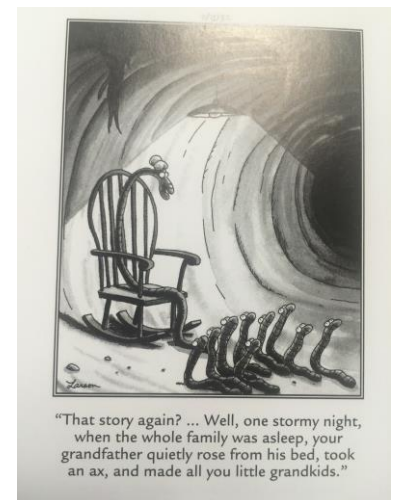
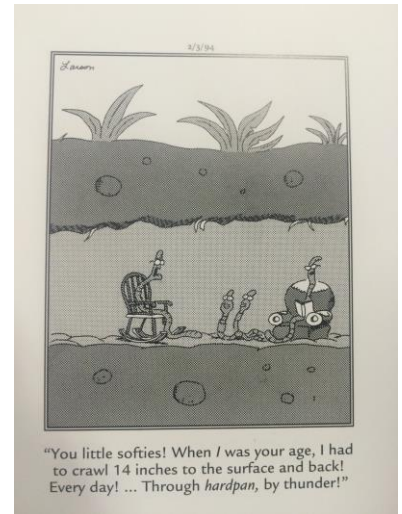
a) Read Pages: 357-370

b) Understand vocabulary terms:

-Class Polychaeta: Mostly marine, head distinct and bearing eyes and tentacles; most segments with parapodia bearing tufts of many setae; Clitellum absent; sexes usually separate; asexual budding in some; trochophore larva usually present. Examples include: *Nereis*, *Aphrodita*, *Gluycera*, *Arenicola*, *Chaetopterus*, *Amphirite*.

-Class Oligochaeta: Body with conspicuous segmentation; number of segments variable; setae few per segment; no parapodia; head absent; cliteillum present; coelom spacious and usually divided by intersegmental septa; hermaphroditic; development direct, no larva; chiefly terrestrial and freshwater. Examples include : *Lumbricus*, *stylaria*, *Aeolosoma*, *Tubifex*.

-Class Hirudinea: Leeches; Body with fixed number of segments with many annuli; oral and posterior suckers usually present; clitellum present; no parapodia; setae absent; coelom closely packed with



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connective tissue and muscle; development direct; hermaphroditic; terrestrial, freshwater, and marine, Examples include: *Hirudo*, *Placobdella*, *Macrobdella*

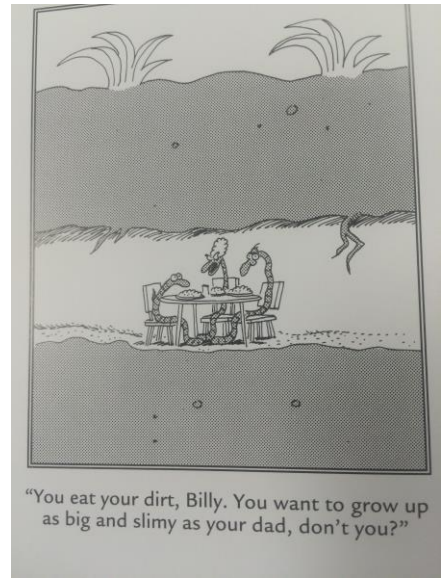
c) Know these diagrams: Classification of Phylum Annelida (Pg 370)

d) Understand the following notes: Annelid Notes

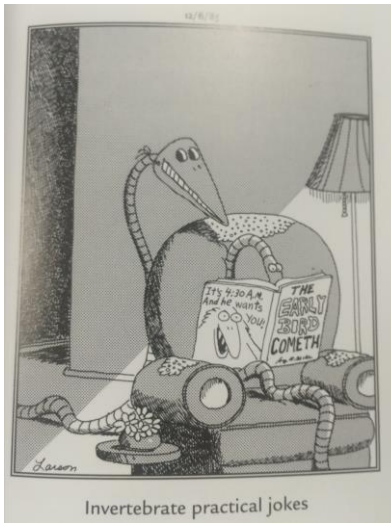
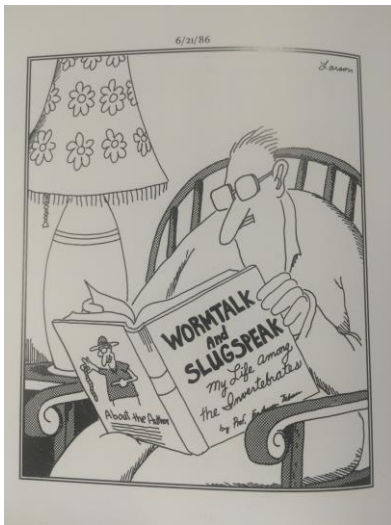
e) Complete, review, and understand: Assignment 5 Unit 4 Objective 6



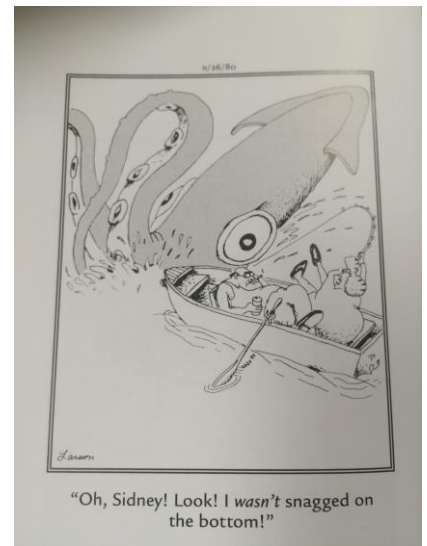
"Excuse our excitement, Mr. Farnsworth, but your cries for help have afforded science a rare opportunity."



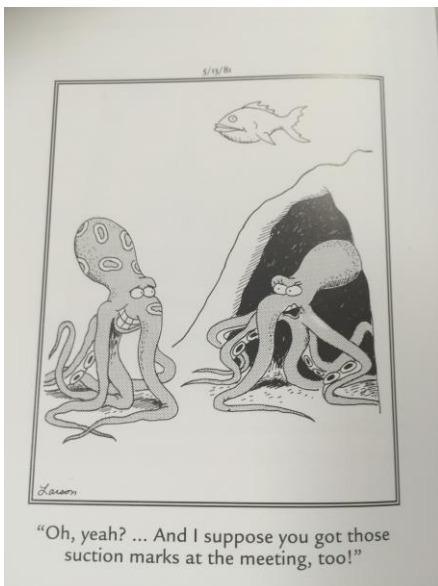
"You eat your dirt, Billy. You want to grow up as big and slimy as your dad, don't you?"



Invertebrate practical jokes



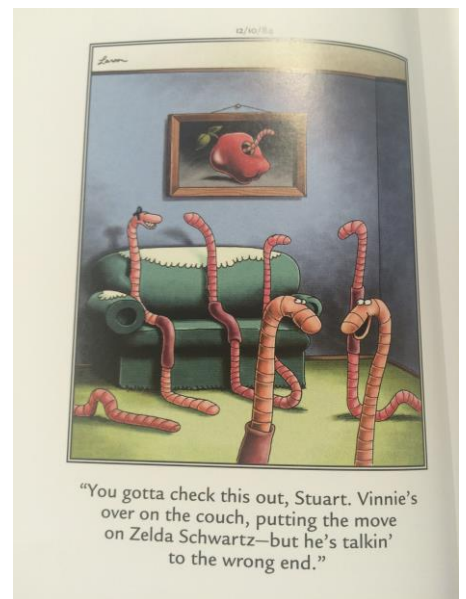
"Oh, Sidney! Look! I wasn't snagged on the bottom!"



"Oh, yeah? ... And I suppose you got those suction marks at the meeting, too!"



"Hold it right there, young man! ... Are you feeding the squid under the table again?"



"You gotta check this out, Stuart. Vinnie's over on the couch, putting the move on Zelda Schwartz—but he's talkin' to the wrong end."

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