

# Invertebrate Zoology

## Unit 2: Phylums: Porifera, Cnidaria, and Ctenophora

**Objective 1:** Differentiate between the 3 types of Poriferians (Asconoids, Syconoids, and Leuconoids) and the three main classes of sponges (Calcarea, Hexactinellida, and Demospongiae)

Students should be able to:

- 1) Describe the characteristics of each canal type of sponge (Asconoid, Syconoid, and Leuconoid)
- 2) Identify an example of each canal type.
- 3) Describe the form and function of each canal type
- 4) Describe the characteristics of each class of sponge (Calcarea, Hexactinellida, and Demospongiae).
- 5) Identify an example of each class of sponge
- 6) Describe the form and function of each class including type of symmetry.

How to study:

a) Read Pages: 242-251

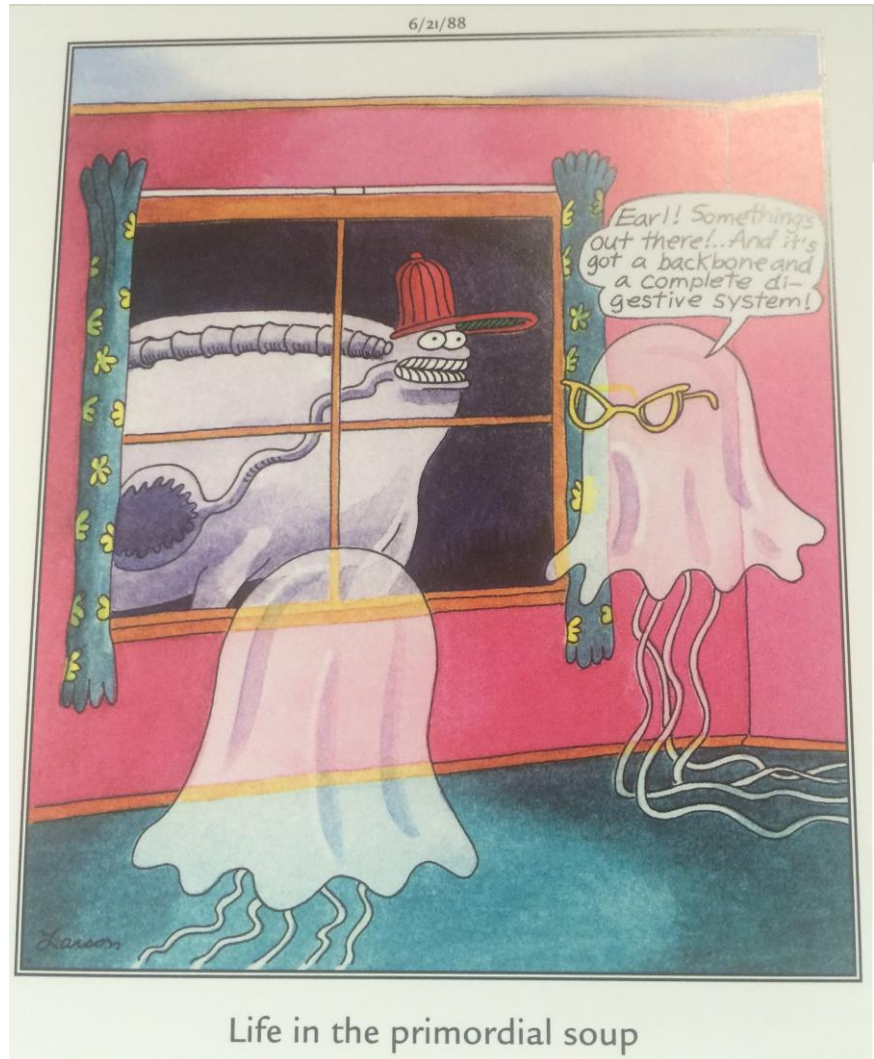
b) Understand vocabulary terms:

-Asconoid: members of the class Calcarea. They are small in size, tubular, and are the most simple type of sponge. Examples include *Leucosolenia*.

-Syconoid: member so the class Calcarea. They are larger tubular sponges with a thicker and more complex wall than Asconoids. Example includes *Sycon*.

-Leuconoid: members of all three classes sponge (Calcarea, Hexactinellida, and Demospongiae). They are the most complex and largest of the sponge types. The surface area of choanocytes is larger than other canal types. Water filtratration is increased in this canal type. An example includes *Leuconia*. Most species of leuconoid sponges are in the class Calcarea and are the only types in other classes. Class Calcarea: Contain spicules composed of calcium carbonate. The spicules are straight and have 3-4 rays. The sponges are small in size (less than 10 cm) and are tubular or vase shaped. They can be asconoid, syconoid, or leuconoid in structure. Examples include *Leucosolenia* and *Sycon*. Sponges are asymmetrical.

Class Hexactinellida: These are "glass" sponges and are nearly all deep-sea forms. Most are radially symmetrical, with vase or funnel shaped bodies attached by stalks of root spicules to a substrate.



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The sponges have 6 rayed siliceous spicules when bound together into a network forming a glasslike structure. An example includes *Euplectella* or Venus flower basket.

Class Demospongiae: 95% of sponges are in this class including most large sponges. Spicules are siliceous, but NOT 6 rayed. Spicules may be bound in spongin or may be absent. Examples include *Spongia* and *Hippospongia*. Contains species which are marine and freshwater. Freshwater sponges can produce gemmules. Sponges are asymmetrical.

c) Complete, review, and understand the homework assignments on MyBigCampus: Assignment 1

d) Understand the following notes: Porifera PPT Notes

## **Objective 2:** Describe the characteristics of the Phylum Porifera

Students should be able to:

- 1) Explain the common characteristics of the members of the phylum Porifera.
- 2) Describe the process of digestion, reproduction, excretion, and respiration for members of the phylum Porifera
- 3) Describe the basic structure of a sponge.
- 4) Identify the basic structures of a sponge from diagram.

How to study:

a) Read Pages: 242-251

b) Understand vocabulary terms:

-sessile: Attached at the base; fixed to one spot; not able to move

-hermaphrodite: an organism which contains both male and female gametes (sperm and eggs)

-spicules: One of the minute calcareous or siliceous skeletal bodies found in sponges, radiolarians, soft corals, and sea cucumbers.

-spongin: Fibrous, collagenous material forming the skeletal network of some sponges

-external buds: a part of the sponge which detaches after reaching a certain size and can float away to make a new sponge.

-gemmules: formed in freshwater sponges and some marine sponges. Contain archaeocytes and surrounded by tough spongin coat. They can develop into new sponges.

-sexual reproduction: the reproductive strategy which combines sperm from males and an egg (oocyte) from females. They unite to form a new organism.

-asexual reproduction: the reproductive strategy which only using the DNA of 1 parent to create an offspring that is genetically identical to the parent.

-Osculum: The exit hole on the top of the sponge. Filtered water exit from this structure.

-Spongocoel: The center hole in sponges.

c) Know these diagrams: Characteristics of Phylum Porifera pg 243.

Figure 12-6 pg 244; Fig 12-7 Pg 245.

d) Understand the following notes: Porifera Notes

e) Complete, review, and understand: MBC assignment 2

## **Objective 3:** Describe the form and function of the cell types in sponges

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Students should be able to:

- 1) Differentiate the different types of cells in a sponge.
- 2) Explain the form and function of each type of cell in a sponge.
- 3) Identify by diagram the location of each type of cell in a sponge.

How to study:

a) Read Pages: Pg 246-247

b) Understand vocabulary terms:

-Choanocyte (collar cells): flagellated collar cells which keep the current flowing by beating flagella. They trap and phagocytize food particles passing by. They also can produce sperm

-Archaeocytes: Cells which digest particles to provide nutrients.

-Amoebocytes: amoeba-like cells found throughout the sponge; store, digest and transport food, excrete wastes, secrete skeleton and also may give rise to buds in asexual reproduction.

-Epithelial-like cells: These cells are thin and flat. They contract in response to touch or to irritating chemicals. In so doing, they close pores in the sponge.

-Pore Cell: Surrounding each pore is a pore cell. Pore cells allow water carrying food and oxygen into the sponge's body.

c) Complete, review, and understand MBC Assignment 2.

d) Understand the following notes: Porifera Notes

e) Know these diagrams: Fig 12-5 Pg 243; Fig 12-7 Pg 245; Fig 12-12 pg 247;

## Objective 4: Describe the form and function of Cnidarians

Students should be able to:

- 1) Describe the two forms of Cnidarians (Polyp and Medusa).
- 2) Identify the various body parts of Cnidarians
- 3) Explain the function of the types of cells which Cnidarians are composed.
- 4) Describe the process of digestion, respiration, nervous system, and locomotion of Cnidarians.

How to study:

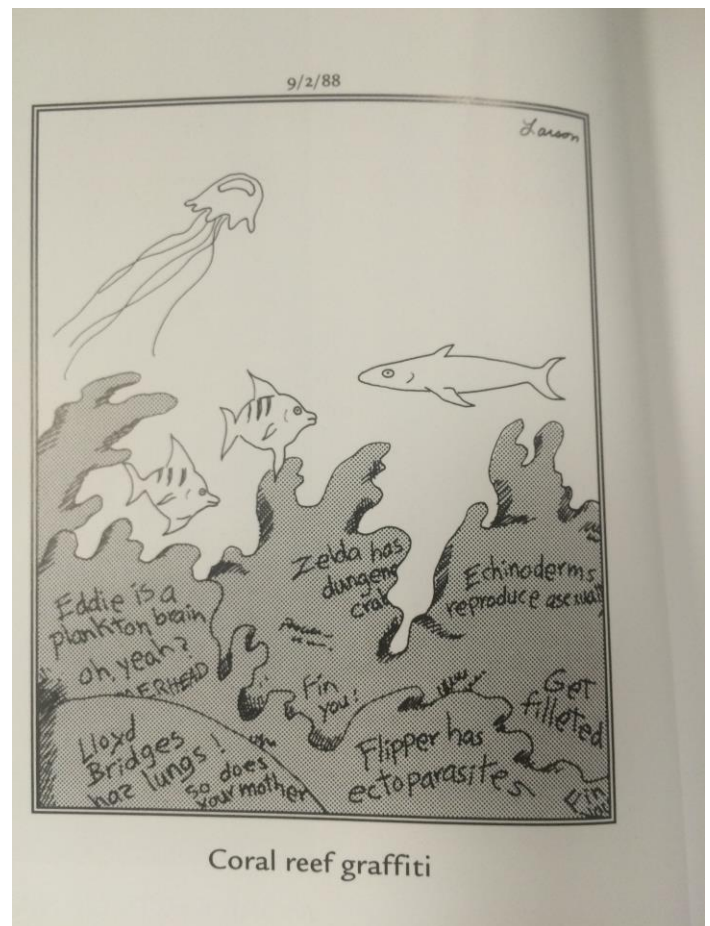
a) Read Pages: 254-259

b) Understand Vocabulary Terms:

-nematocyst: A capsule that contains a coiled, threadlike tube. The tube may be sticky or barbed, and it may contain toxic substances. They are located on stinging cells on the tentacles.

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Larson, Gary. *The Complete Far Side*. Kansas City, Mo.: Andrews McMeel Pub., 2003. Print.



-polyp: the sessile form of a cnidarian. Its mouth is surrounded by tentacles. Examples include sea anemones and corals.

-medusa: the free swimming form of a cnidarian. It possesses an umbrella-shaped, floating body, called a bell, with the mouth on the underside.

-gastrovascular cavity: An area inside the cnidarian which has cells adapted for digestion and release enzymes over captured prey. Any undigested materials are ejected back out through the mouth.

-nerve net: A simple nervous system (without a brain), in which impulses to and from all parts of the body are sent. The impulses cause contractions of muscle-like cells in the two cell layers.

-budding: The release of a part of an organism which can develop into another organism. (a form of asexual reproduction).

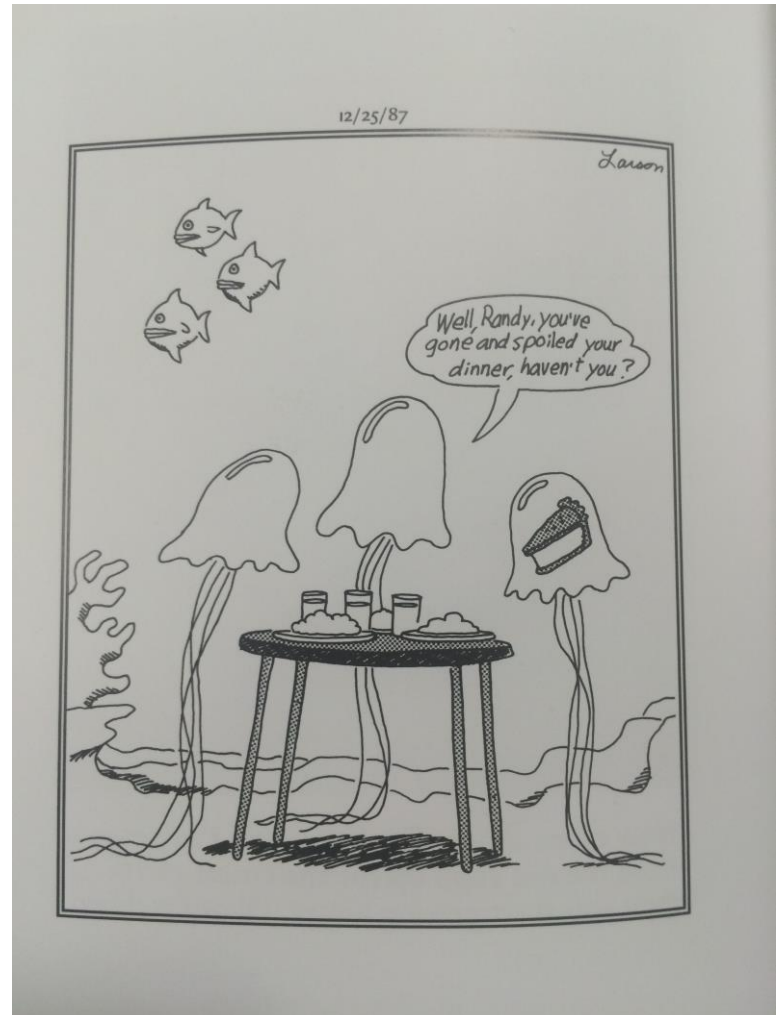
-Polymorphism: The presence in a species of more than one structural type of individual. (polyp and medusa).

-dimorphism: two body types or forms (polyp and medusa).

c) Know these diagrams: Figure 13-2 pg 255; Fig 13-3 pg 257; Characteristics of Phylum Cnidaria Pg 256;

d) Understand the following notes: Cnidarian Notes

e) Complete, review, and understand: MBC Assignment 3 Unit 2 Objective 4 and 5



## **Objective 5:** Describe the reproductive pattern for various Cnidarians.

Students should be able to:

- 1) Explain the cycle for *Obelia* (Fig 13-9)
- 2) Describe the forms of asexual reproduction for cnidarians.
- 3) Describe how sexual reproduction occurs for cnidarians.

How to study:

a) Read Pages: Pg 256-261

b) Understand vocabulary terms:

--sexual reproduction: the reproductive strategy which combines sperm from males and an egg (oocyte) from females. They unite to form a new organism.

--asexual reproduction: the reproductive strategy which only using the DNA of 1 parent to create an offspring that is genetically identical to the parent.

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-Larvae: a free swimming form of a cnidarian which developed from a zygote. It settles on a hard surface and metamorphoses into a polyp.

-polyp: the sessile form of a cnidarian. Its mouth is surrounded by tentacles. Examples include sea anemones and corals. They release medusa buds (asexual reproduction) which turn into the medusa form.

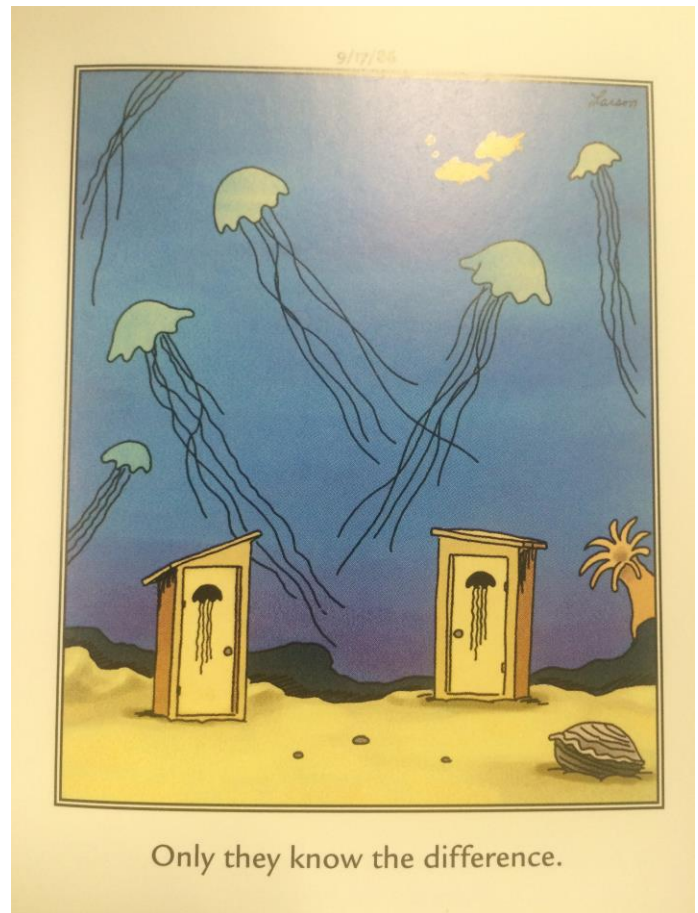
-medusa: the free swimming form of a cnidarian. It possesses an umbrella-shaped, floating body, called a bell, with the mouth on the underside. They release sperm and egg to form new zygotes (sexual reproduction).

c) Know these diagrams: Figure 8.10 (Pg 165)

d) Understand the following notes: Cnidarian Notes

e) Complete, review, and understand: MBC assignment 3 Unit 2 Objective 4+5

## Objective 6: Differentiate the classes of Cnidarians (Scyphozoa, Hydrozoa, Cubozoa, and Anthozoa)



Students should be able to:

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

How to study:

a) Read Pages: 259-275

b) Understand vocabulary terms:

-Class Hydrozoa: (Hydras) Solitary or colonial: asexual polyps and sexual medusa. Most are marine but some are freshwater. Examples include *Hydra*, *Obelia*, *physalia*, *tubularia*.

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-Class Scyphozoa: (common larger jellyfishes) polyp stage is reduced or absent: bell shaped medusa with eight notches that are provided with sense organs. Examples include *Aurelia*, *Cassiopeia*, *Rhizostoma*.

-Class Cubozoa: (small square jellyfishes) was part of Scyphozoa but now recognized in their own class. Medusa form is dominant. Polyp form is inconspicuous or unknown. The bells of these jellyfish are square shaped. Examples include: Box jellyfish

-Class Anthozoa: (Polyps) These are all polyps with a flower-like appearance. Examples include sea anemones and corals.

c) Know these diagrams: Classification of Phylum Cnidaria Pg 275.

d) Understand the following notes: Cnidarian Notes

e) Complete, review, and understand: MBC assignment 4

## **Objective 7:** Describe the form and function of Ctenophores

Students should be able to:

- 1) Describe the basic body form of Ctenophores
- 2) Explain the function of the body structures
- 3) Compare and contrast the structures of Cnidarians and Ctenophores

How to study:

a) Read Pages: 275-278

b) Understand vocabulary terms:

-Colloblast (glue cells): They secrete a sticky substance that is used for catching and holding small animals

-Comb rows: 8 equally spaced bands of cilia on comb plates. They move from the beating of the cilia on this plates.

-Gastrovascular system: consists of a mouth, a pharynx, a stomach, and a system of gastrovascular canals that branch through the jelly to extend to the comb plates.

-Bioluminescent: capable of producing light. This is caused by beating of their combs, causing a diffraction of light to form a rainbow of colors.

c) Know these diagrams: Figure 13-36 pg 277; Characteristics of Phylum Ctenophora Pg 276.

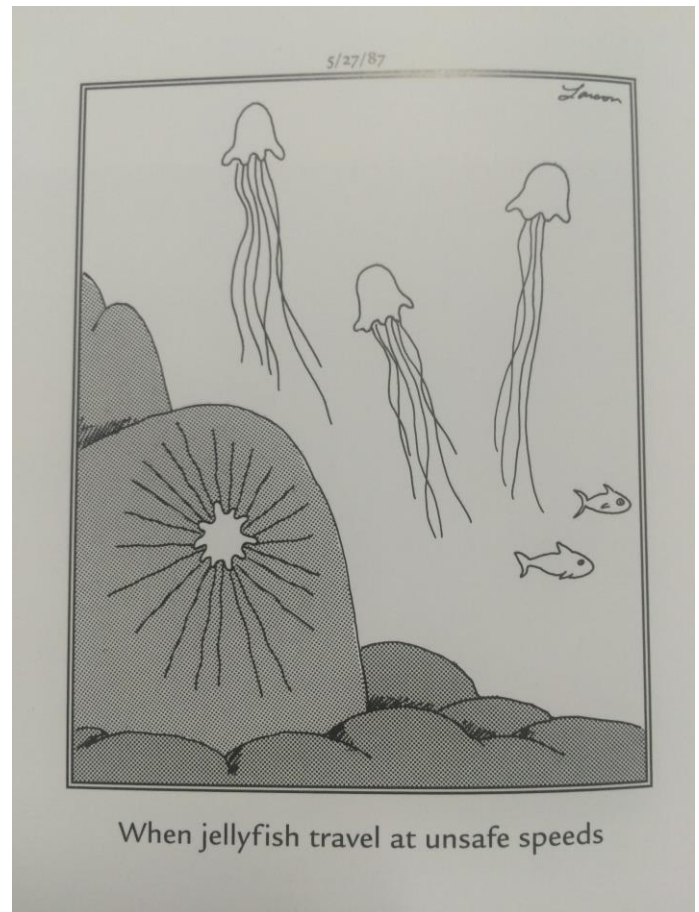
d) Understand the following notes: Ctenophore Notes

e) Complete, review, and understand: MBC assignment 5 Unit 2 Objectives 7 and 8

## **Objective 8:** Differentiate the characteristics of the classes of Ctenophores

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Students should be able to:

- 1) Describe the characteristics of the phylum Ctenophora and its two classes.
- 2) Identify an example of each class

1) Read Pgs: 275-278

2) Vocabulary Terms to Know:

-Phylum Ctenophora: composed of fewer than 100 species. All are marine and typically in warm waters. They take their name from the 8 rows of comb-like plates they bear for transportation/locomotion. Common names for ctenophores are "sea walnuts", "comb jellies", "gooseberries", or "Venus's girdles. "

-Class Tentaculata: with tentacle. Tentacles have sheaths into which they retract. Has a transparent body and 1.5-2.0 cm in diameter. Examples include *Pleurobrachia* and *Hormimorpha plumosa*.

-Class Nuda: without tentacles, but flattened in tentacular plane. Wide mouth and pharynx. Examples include *Beroe*.

3) Know these diagrams: Classification of Phylum Ctenophora Pt 278.

4) Understand the following notes: Ctenophora Notes