

SOLUTIONS TO THE STUDY GUIDE FOR MODULE #11

1. a. Invertebrates – Animals that lack a backbone
- b. Vertebrates – Animals that possess a backbone
- c. Spherical symmetry – An organism possesses spherical symmetry if it can be cut into two identical halves by any cut that runs through the organism's center.
- d. Radial symmetry – An organism possesses radial symmetry if it can be cut into two identical halves by any longitudinal cut through its center.
- e. Bilateral symmetry – An organism possesses bilateral symmetry if it can only be cut into two identical halves by a single longitudinal cut along its center which divides it into right and left halves.
- f. Epidermis – An outer layer of cells designed to provide protection
- g. Mesenchyme – The jellylike substance that separates the epidermis from the inner cells in a sponge
- h. Collar cells – Flagellated cells that push water through a sponge
- i. Amoebocytes – Cells that move using pseudopods and perform a variety of functions in animals
- j. Gemmule – A cluster of cells encased in a hard, spicule-reinforced shell
- k. Polyp – The sessile, tubular form of a cnidarian with a mouth and tentacles at one end and a basal disk at the other
- l. Medusa – A free-swimming cnidarian with a bell-shaped body and tentacles
- m. Epithelium – Animal tissue consisting of one or more layers of cells that have only one free surface, because the other surface adheres to a membrane or other substance
- n. Mesoglea – The jelly-like substance that separates the epithelial cells in a cnidarian
- o. Nematocysts – Small capsules that contain a toxin which is injected into prey or predators
- p. Testes – Organs that produce sperm
- q. Ovaries – Organs that produce eggs
- r. Anterior end – The end of an animal that contains its head
- s. Posterior end – The end of an animal that contains its tail
- t. Circulatory system – A system designed to transport food and other necessary substances throughout a creature's body

- u. Nervous system – A system of sensitive cells that respond to stimuli such as sound, touch, and taste
 - v. Ganglia – Masses of nerve cell bodies
 - w. Hermaphroditic – Possessing both the male and the female reproductive organs
 - x. Regeneration – The ability to regrow a missing part of the body
 - y. Mantle – A sheath of tissue that encloses the vital organs of a mollusk, secretes its shell, and performs respiration
 - z. Shell – A tough, multilayered structure secreted by the mantle, generally used for protection, but sometimes for body support
 - aa. Visceral hump – A hump that contains a mollusk’s heart, digestive, and excretory organs
 - bb. Foot – A muscular organ that is used for locomotion and takes a variety of forms depending on the animal
 - cc. Radula – An organ covered with teeth that mollusks use to scrape food into their mouths
 - dd. Univalve – An organism with a single shell
 - ee. Bivalve – An organism with two shells
2. No. All but one of the phyla in the animal kingdom are invertebrates (organisms with no backbones).
3. a. Bilateral, because it can only be cut into identical right and left halves
- b. Radial, because any up and down cut through the center makes two identical halves
- c. Bilateral, because it can only be cut into identical right and left halves
- d. Radial, because any up and down cut through the center makes two identical halves
4. Sponges get their prey by pulling water into themselves. The water brings algae, bacteria, and organic matter that sponges eat.
5. It contains spongin, because spongin is soft. Spicules make a sponge hard and prickly. These substances support the sponge.
6. When asexually reproducing, sponges use budding.
7. Amebocytes help digest and transport nutrients, they help carry waste to be excreted, they bring necessary gases such as oxygen to the cells, and they form the spicules or spongin.
8. A sponge produces gemmules during inclement times.

9. Hydra nematocysts are triggered with pressure, while the sea anemone's are triggered chemically.
10. Cnidarians do not need these systems because their body walls are so thin that gases diffuse right through them.
11. Jellyfish spend part of their lives as polyps and the other part as medusas.
12. It must be in medusa form, because jellyfish can only reproduce sexually in medusa form.
13. Large coral colonies are called coral reefs.
14. a. mouth b. ventral nerve cord c. seminal receptacles d. seminal vesicles e. ventral blood vessel
f. nephridia with nephridiopores g. clitellum h. intestine i. dorsal blood vessel j. gizzard k. crop
l. oviduct m. ovary n. esophagus o. aortic arches p. pharynx q. ganglia
15. Earthworms bring minerals up from the lower parts of the soil and mix them with the nutrients at the top of the soil, which makes the soil fertile for plants. Their tunnels also allow oxygen to travel to the roots of a plant more easily.
16. If the first earthworm feels slimy near the clitellum, this means that it is covered with a slime coat. Thus, the first one must have recently mated but not yet produced a cocoon.
17. The earthworm is hermaphroditic and the hydra can be as well. However, although a hydra can sometimes mate with itself, an earthworm cannot.
18. The earthworm will suffocate, because oxygen cannot travel through a dry cuticle.
19. Planarians do not need circulatory systems because the intestine is so highly-branched that all cells are near it, so they can get their food directly from the intestine.
20. Without complex nervous or digestive systems, it must not need to seek out and fully digest prey. The only way it can survive, therefore, is by being parasitic.
21. When planarians asexually reproduce, they do so by regeneration.
22. a. Cnidaria b. Mollusca c. Porifera d. Platyhelminthes e. Annelida