

Ch 26 REVIEW Answers:

Porifera, Cnidarians and Unsegmented Worms

1. What are the characteristics that unify the Kingdom Animalia? *Animals are multicellular, have eukaryotic cells, and are heterotrophic by absorption.*
2. Which of the animals in this chapter are thought to be the most numerous? *Nematodes*
3. List the 3 main trends in animal evolution. *Body plans (sac or tube-within-a-tube), symmetry (asymmetry, radial symmetry and bilateral symmetry) and level of organization. Segmentation, including cephalization could be considered a fourth.*
4. Describe the terms anterior, posterior, ventral and dorsal. *Anterior refers to the top half of an animal with bilateral symmetry; posterior is the bottom half. The ventral surface is the "front" of the animal when dividing it on an axis that is 90° to the axis of symmetry. The dorsal surface is the "back".*
5. List the characteristics that unify Porifera. *Sponges have cellular level of organization, are asymmetrical and are sessile.*
6. Label the diagram of the sponge, and describe the function of each of the structures.

<i>a. osculum</i>	<i>e. amebocyte</i>
<i>b. collar cell</i>	<i>f. epidermis</i>
<i>c. pore cell</i>	<i>g. pore</i>
<i>d. spicule</i>	<i>h. central cavity</i>
7. Why are Porifera considered an evolutionary "dead-end"? *Porifera have no mouth, gut, specialized tissues or organs as most other animals do. Therefore, it seems unlikely that any animals have evolved from this body plan.*
8. Explain how sponges reproduce, both sexually and asexually. *Sponges are hermaphroditic – they release sperm into the internal cavity and they are carried away with the rest of the water out the osculum. They hold their eggs inside the body wall. When sperm enter the sponge through the pores, the amebocytes pick it up and deliver it to the egg. Fertilization occurs within the body wall, and the larvae develop there until they are large enough to be released. The larvae leave the parent sponge through the osculum, and then settle on the ocean floor to grow larger.*
Asexual reproduction is by budding – a piece of the sponge falls off and grows into a new sponge. They also produce gemmules in times of environmental stress. They gemmules will grow into a new sponge when the environmental conditions are again favourable.
9. What are gemmules and what are they for? *Gemmules are a small group of amebocytes encased in a hard shell of spicules. They are formed when the water gets too cold. They can withstand the cold temperatures, while the rest of sponge might perish. When the water heats up again, the gemmules regenerate a new sponge.*
10. How do we use sponges for medicinal purposes? For what conditions/diseases? *Sponges have incredible regenerative properties, and therefore are studied in hopes that we might better understand this ability and adopt it for ourselves. We also use some of the chemicals that sponges produce to protect themselves from predation. Some of these chemicals have been used in medicines – antibiotics, a treatment for leukemia, one for arthritis, and others that fight fungal infections.*
11. What are the characteristics that unify cnidarians? *Cnidarians have radial symmetry, a sac body plan, tissue level of organization, and nematocysts.*
12. What are nematocysts and how do they work? *Nematocysts are cells that are specialized to produce stinging "darts". These darts are held within the cells and are set off by a trigger mechanism. They*

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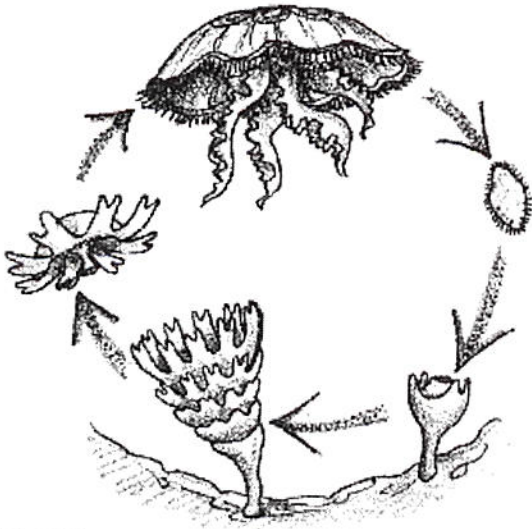
are also attached to the cell with a long string-like structure so the animal can't get away. The darts have a paralyzing chemical on the ends so the animal cannot move once it has been hit.

13. What are statocysts? Ocelli? *Statocysts are cells that are responsible for balance. They tell the animal whether they are upside down or not. We have a type of statocyst in our semicircular canals in our ears. They do the same thing for us as they do for jellyfish and flatworms. Ocelli are primitive "eyes". They do not form any type of image, but they detect the presence or absence of light, so that the animal can direct itself to the darker spots in order to hide.*
14. Describe the life cycle of a cnidarian. Explain how they reproduce both sexually and asexually. *The lifecycle of a typical jellyfish starts out as a medusa adult. These medusa produce eggs and sperm and release them into the ocean. When the sperm find the eggs, fertilization occurs, producing a zygote. The zygote develops into a free-swimming, bilaterally symmetrical larval stage. This larvae stage eventually attaches itself to the ocean floor, when it undergoes metamorphosis and becomes a polyp. The polyp produces many medusas (stacked on top of each other and upside down) which can break off and become free swimming medusa adults. Budding is also a common type of asexual reproduction shown in Hydra.*
15. What is the name of the process by which the larvae change into the adult form of the animal?
Metamorphosis
16. What does the word, gastrovascular come from? How is this word an excellent description of this cavity? *"Gastro" means stomach or intestines, "vascular" means veins and arteries. The gastrovascular cavity of Cnidaria and flatworms acts as a stomach, intestine, vein and artery all at the same time. They cavity reaches to most of the cells in their bodies, so a special vascular system is not necessary to transport nutrients and wastes (like we have).*
17. Look at the pictures in the text of the 4 different kinds of cnidarians and be prepared to identify them by their common name on the test: hydra, jellyfish, sea anemone, and coral.

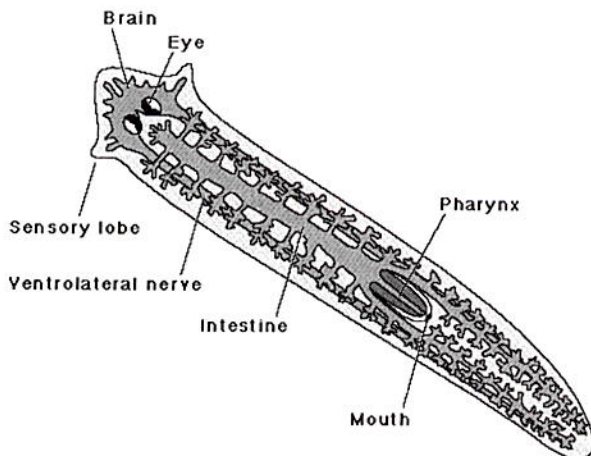
18. Label the diagram of the lifecycle of a cnidarian. Draw in the missing information.

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19. Why are coral so important to marine ecology? *Coral are the base for an entire ecosystem – the coral reefs. An unbelievable amount of life is dependent on coral in one way or another – either as a home, as food, as a place to find food or just as a resting/hiding place.*
20. What are the characteristics that unify the phylum Platyhelminthes? *Flatworms are the first animals on the “tree” to exhibit bilateral symmetry. They still have a sac body plan, but they have organ level of organization, and very basic cephalisation.*
21. What structures do Platyhelminthes share with cnidarians? *They both have statocysts, ocelli, gastro vascular cavities, respiration/excretion by diffusion.*
22. Label the diagram of *Planarian*, a representative free-living flatworm, and then describe what each of the structures do.



The brain interprets the information coming in from the sensory receptors around the body, and coordinates a response/movement. The ocelli detect the presence of light. The mouth is where food enters and solid wastes exit. The pharynx acts like teeth and a stomach combined, churning and grinding up the food. The gastro vascular cavity acts as an intestine and a vascular system digesting the food and distributing the nutrients through the body. The ventral nerve cord collect information from the sensory receptors, send it to the brain, and deliver the response from the brain to the body cells. The flame cells get rid of extra water in the body.

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23. What would happen to a freshwater flatworm if it did not have flame cells? Why? ***It would burst without flame cells. Because their body contains a solution that is hypertonic to the freshwater, water will constantly diffuse into it's body. The flame cells get rid of this extra water.***
24. Other than it's complexity, what is different about the flatworm's nerve cord and ours? ***We have a central, dorsal nerve cord (as all chordates do), but the flat worm has two lateral, ventral nerve cords.***
25. Why don't Platyhelminthes have a vascular system? ***The gastro vascular cavity acts as the vascular system – it extends throughout the body to distribute the digested nutrients to the body cells.***
26. What type of body plan does a flatworm have? ***Sac body plan, like Cnidaria.***
27. Describe what happens when a flatworm eats a piece of food. ***The food enters the body through the mouth and then is sucked into the pharynx. The pharynx crushes up the food and sends it into the gastro vascular cavity. The food is digested in the gastro vascular cavity and nutrients are distributed throughout the body. Undigested food is spit back out the mouth.***
28. How does a Platyhelminthes "breathe"? ("inhale and exhale") How does it "urinate"? (get rid of metabolic wastes) How does it "defecate"? (get rid of solid wastes). ***The flatworms are so thin, they just allow the oxygen to diffuse into its body through it's skin. Then the carbon dioxide diffuses out. So does the metabolic wastes – it just diffuses out of it's skin.***
29. What does a free-living flatworm use it's ocelli for? ***To detect the presence of light – it wants to avoid the light. It will go to where it is dark because it is easier to hide in the dark, and it won't have to worry so much about desiccation. (drying out)***
30. How do free-living flatworms differ from parasitic flatworms? Why? ***Free-living flatworms have much more developed nervous and digestive systems. If you are an internal parasite, all you have to do is get into the host and hold on! The parasitic flatworms absorb already digested food from their host. They are always in the dark. They tend to concentrate on attachment systems, and REPRODUCTION.***
31. What does cephalisation mean? ***Development of an area of the body where the sense organs gather. (we call this area our head).***
32. How do flatworms detect food? ***They have sensory organs all over the surface of their body that "tastes" and "smell" the area for food and dangers.***
33. What are blood flukes? Why are we (in N.A.) not affected by this disease? ***Blood flukes are a type of parasitic flatworm that live in the tropical regions only. They are VERY prevalent in these areas, but we don't have them up here - so we don't really know anything about them.***
34. How do humans become infected by blood flukes? ***An unsuspecting swimmer might run into the swimming larvae stage of the blood flukes' lifecycle. The larvae burrow through the skin and into the blood stream where they take a ride to the heart, lungs and liver. You might also pick this up being splashed by some water, or stepping in a puddle.***
35. How could we protect ourselves against blood fluke infection? How might we decrease the spread of blood flukes? ***We would have to avoid the water in the tropical areas where the blood flukes live. We might also always wear rubber boots in those areas. Otherwise, to control the spread, we have to have a very efficient sewage system that would treat the sewage in order to kill off the parasites from the human feces. Also, you could (though it wouldn't be very ecologically minded) eliminate their secondary host, the snails, from all water systems that were close to humans. (I think that they do actually do this in the affected regions – they poison the snails in the area.) The flukes cannot survive if they do not complete their lifecycle in their secondary host – eliminate the host, and the parasite die.***

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36. How are the lifecycles of flatworm and roundworm parasites different than other parasites? *Parasitic flatworms and roundworms often have very complicated lifestyles, involving multiple hosts and multiple larval stages. Most animals have relatively simple lifecycles.*
****some flatworms, like sponges, have INCREDIBLE regenerative abilities. They can use this as a form of asexual reproduction – one type of worm simply falls apart and then regenerates into a whole bunch of new worms.**
37. What are the two main structures in a tape worm? *The Scolex (a modified head with hooks and suckers) and the proglottids (reproductive structures that break off and release numerous fertilized eggs in the feces of the primary host).*
38. Describe the life cycle of a tape worm step-by-step. *Fertilized eggs are released from the primary host through feces. Contaminated (tapeworm eggs) food or water is ingested by the secondary host. The eggs are not digested, and they hatch inside. They eventually will burrow into the muscle tissue of the secondary host (not a pleasant feeling) and form a cyst. If a human happens to eat some meat that has the cysts in it, and the meat is not cooked enough to kill the cysts, then the human (the primary host) will nurse the cysts in their intestines. The cysts hatch into the “tapeworm” adult, attach to the side of the intestinal wall with their scolex, and start building proglottids. (essentially, they become egg factories using your digested nutrients) They human will loose weight and feel cramps, get diarrhea, and feel weak from the loss of nutrients and from the irritation of the bowels.*
39. What systems in a tapeworm are very simple? Very developed? (because they are parasitic!) *the digestive systems and the nervous systems are very simple (they don’t need them!) but their reproductive systems are very efficient and highly developed compared to the other systems.*
40. In what way might we consider free-living flatworms to be more “advanced” than free-living roundworms? *Free-living flatworms have a “brain” – free-living roundworms have a few ganglia in the anterior portion of it’s body, but we really can’t call it a “brain”.*
41. How would humans become infected by tapeworms? *By eating contaminated meat that was not cooked enough to kill the cysts.*
42. How could we help prevent tapeworm infection, or control the spread of tapeworms? *Proper sewage systems are very important. We should not allow feces to contaminate the water supply. Also, we could ALWAYS eat very well done meat, but many of us do not like it prepared that way.*
43. What are the characteristics that unify nematodes? *Roundworms have a tube-within-a-tube body plan. They are pseudocoelomates.*
44. How do roundworms “breath” and excrete metabolic wastes (urate)? *The same way as flatworms – diffusing through their skin.*
45. Describe the life cycle of the parasitic roundworm *Ascaris*. How do humans become infected with this parasite? *Humans ingest the Ascaris eggs through contaminated food or water. The eggs hatch in the small intestine and the resulting larvae enter the circulatory system and travel to the lungs. They travel up the respiratory tract and you swallow them (unknowingly) when they reach the pharynx (the area just above the trachea and the esophagus). The larvae metamorphose into the adult roundworm that lives in the intestines, absorbing your food and producing fertilized eggs that travel out the intestines with the feces.*
46. How do humans become infected with hookworms? Why are they called hookworms? *Hookworms use their sharp teeth and hooks to burrow through the skin and get into the blood stream. They are found in the soil in the south and tropical areas. (good reason to wear shoes in the tropics!)*
47. What is *Trichinella*? How do humans become infected with *Trichinella*? Describe the life cycle of *Trichinella*. *Trichinella is another parasitic round worm that affects humans. Humans contract the*

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worm by eating uncooked pork that has cysts in the tissue (the cysts are too small to see, but can be killed by cooking the meat properly. This is why you are NEVER asked if you would like your pork chops rare!) The cysts grow into the adult worm in the intestines and mate. Then the females burrow into the intestinal wall, carrying the fertilized eggs. (again, not comfortable). The female releases larvae, which travel to organs in the bloodstream. They burrow through the organs (not comfortable) and eventually, the larvae curl up in the muscle tissue and create a cyst, waiting for a new host to eat them in the meat.

48. What is a coelom? What types of animals do not have coeloms? What animals have pseudocoeloms? A coelom is an internal cavity that is completely lined with mesoderm. It is a separate cavity than the gut. Molluscs, annelids and all other higher animals have coeloms. The nematodes have a pseudocoelom (a coelom that is partially lined with mesoderm) and the flatworms are acoelomates.