

## SOLUTIONS TO THE STUDY GUIDE FOR MODULE #12

1. a. Exoskeleton – A body covering, typically made of chitin, that provides support and protection
  - b. Molt – To shed an old outer covering so that it can be replaced with a new one
  - c. Thorax – The body region between the head and the abdomen
  - d. Abdomen – The body region posterior to the thorax
  - e. Cephalothorax – A body region composed of the head and thorax fused together
  - f. Compound eye – An eye made of many lenses, each with a very limited scope
  - g. Simple eye – An eye with only one lens
  - h. Open circulatory system – A circulatory system that allows the blood to flow out of the blood vessels and into various body cavities so that the cells are in direct contact with the blood
  - i. Statocyst – The organ of balance in a crustacean
  - j. Gonad – A general term for the organ that produces gametes
  - k. Complete metamorphosis - Insect development consisting of four stages: egg, larva, pupa, and adult
  - l. Incomplete metamorphosis - Insect development consisting of three stages: egg, nymph, and adult
2. Exoskeleton, body segmentation, jointed appendages, open circulatory system, and a ventral nervous system are the common features of arthropods.
3. a. antennae b. antennules c. cephalothorax d. abdomen e. telson f. uropods g. swimmerets  
h. carapace i. walking legs j. chelipeds
4. a. eye b. brain ganglia c. stomach d. gonad e. heart f. pericardial sinus g. intestine h. anus  
i. nerve cord j. digestive glands k. sternal sinus l. mouth m. esophagus n. green gland
5. Blood collects in the pericardial sinus, and it enters the heart through one of three openings in the heart's surface. Each opening has a valve that closes when the heart is ready to pump. Once it absorbs the blood and closes these valves, the heart pumps blood through a series of blood vessels that are open at the end. These vessels dump directly into various body cavities. Gravity causes the blood to fall into the sternal sinus, where it is collected by blood vessels that are open at one end. Unlike the blood vessels that dump the blood into the body cavities, these vessels carry the blood back towards the pericardial sinus. On its way there, the blood is passed through the gills where it can release the carbon dioxide it has collected and pick up a fresh supply of oxygen. The blood also passes through green glands, which clean it of impurities and dump those impurities back into the surroundings. Once the blood has passed through the gills and the green glands, it then makes its way back to the pericardial sinus to begin the trip all over again.

6. It cleans the blood of impurities.
7. The swimmerets and maxillae are important. Without them, fresh, oxygen-rich water would not enter the gill chambers.
8. The injury gets sealed off to prevent bleeding, and then a new limb regenerates.
9. They are attached to the swimmerets.
10. They molt because their exoskeletons get too small for their growing bodies.
11. The antennules and antennae are responsible for taste and touch.
12. Four pairs of walking legs, two segments in body, no antennae, book lungs, four pairs of simple eyes.
13. Some species of spider build a sheet web, which is a single, flat sheet of sticky silk. Some spiders spin tangle webs that have no real discernible pattern. Some spin orb webs consisting of concentric circles of sticky silk that are supported by “spokes” of non-sticky silk.
14. No, some spiders spin silk to make trap doors, and some even fire their silk like a projectile.
15. The lung has many thin layers that look like the pages of a book.
16. Three pairs of walking (or jumping) legs, wings, three segments in body, one pair of antennae.
17. Insects do not need respiratory systems because of a complex network of tracheas that allow air to travel throughout the body.
18. The pupa stage only exists in complete metamorphosis.
19. membranous wings, scaled wings, leather-like wings, and horny wings.
20. a. Orthoptera  
b. Hymenoptera  
c. Diptera  
d. Coleoptera  
e. Lepidoptera