

**Name:**

### **Living Systems Part 1 Questions**

1. What is it called when organisms maintain a steady or stable internal environment (such as maintaining a relatively constant body temperature)?
2. Your eyes are an example of a \_\_\_\_\_. Your muscles are an example of an \_\_\_\_\_.
3. What is an operon?
4. How is the trp operon an example of negative feedback? The genes of the trp operon control the production of the amino acid \_\_\_\_\_.
5. True or False: If body temperature was regulated by positive feedback, then as the body temperature increased, it would continue to increase even more. But, of course, body temperature is regulated by negative feedback.
6. Explain what you think happens during ripening to make it an example of positive feedback:
7. Diabetes was explained here. Choose one of the other 3 examples given and explain how they are caused by a disruption to a feedback mechanism. (You can look up info.)
8. What is the relationship between a ligand & receptor?
9. The lizard, bear and chimpanzee all share a common ancestor that produced amniotic eggs. What trait is shared by a common ancestor of the sunfish, newt, lizard, bear and chimpanzee?
10. Which would have this trait (of keeping the stomata closed sometimes) – aquatic or terrestrial plants? Why?
11. Which organism is an example of extracellular digestion and which is an example of intracellular digestion?
12. The roundworm, segmented worm (earthworm), and grasshopper shown here are examples of organisms with increasingly complex digestive systems. They are complete and one-way, as there are two openings. Name some of the digestive organs used by these organisms, and what these organs do.
13. Put the organs in order, showing the pathway of food through the digestive system:
14. Where are the following macromolecules digested? proteins, carbohydrates, fats, nucleic acids
15. What do an insect's air sacs, fish gill filaments, and the alveoli of the human lungs have in common?
16. Which 2 macromolecules produce waste products containing nitrogen?

17. Humans produce \_\_\_\_\_ which is released in urine. A snake produces \_\_\_\_\_, which is released as a solid, white substance.
18. Like a plant cell, a bacterium has a plasma membrane and a cell wall. When placed in a hypertonic solution the membrane pulls or shrinks away from the cell wall. This is called plasmolysis. Why does this occur?
19. Protists, such as this paramecium, are freshwater-dwellers and face an influx of water into their cells on a daily basis. Luckily, they have a \_\_\_\_\_, an organelle that pumps water out.
20. Fish that live in marine saltwater environments have the opposite problem. What is their problem and what strategies do you suppose they use to maintain homeostasis?
21. In humans and other mammals, it is the job of the \_\_\_\_\_ to filter the blood. Functional units, called nephrons, accomplish this filtration process by returning needed materials to the body and removing toxins, urea, and excess water from the body in the form of \_\_\_\_\_, a liquid waste product stored in the urinary bladder before exiting the body through the urethra.
22. Which type of circulatory system do vertebrates have – open or closed?
23. Name one difference between the circulatory systems shown above.
24. What does the picture of the moth illustrate about thermoregulation?
25. Based on what you know about circulatory adaptations, describe at least one reason why penguins' feet don't freeze after spending so much time on the snow and ice.

### Living Systems Part 2 Questions

1. Look at the pictures on the previous slide and see if you can identify them by matching each picture with the best terms or descriptions below. Each picture matches to 2 items.
- |                 |                 |
|-----------------|-----------------|
| A: _____, _____ | B: _____, _____ |
| C: _____, _____ | D: _____, _____ |
2. Why might tardigrades be called extremophiles? What other organisms have you heard called extremophiles?
3. What is the effect of increased thirst?
4. Is this an example of positive or negative feedback? Explain.
5. Plant pathogens include which of the following:    a. viruses    b. bacteria    c. fungi    d. protists    e. all of above
6. If chitinase is a PR protein that breaks down fungal cell walls, the cell walls of fungi must contain what complex carbohydrate? (You could look up examples of complex carbohydrates.)
7. Look up apoptosis – What happens during the process? Explain how it could help the plant, as described on the previous slide.

8. If they use RNAi, the plant cells must have enzymes that will respond to the viral genome. What would the plant cell be doing to the viral RNA?
9. What effects do you associate with the inflammatory response? (If you have a wound or injury that is inflamed, how would you describe the way it feels or appears?)
10. What effect might a fever have on invading pathogens? (Think about what heat can do to an organism and its molecules.)
11. Describe what the cytotoxic T cell is doing to the target cell.
12. Normally, antigens alert the immune system to the presence of foreign cells that could be harmful. However, sometimes a non-self molecule that is generally harmless will bind to mast cells, causing the release of histamines and subsequent inflammation. The non-self molecule may come from food or the environment (for example, on the surface of a pollen grain). This type of reaction is called an \_\_\_\_\_.
13. What does it mean to say that antibodies and antigens display specificity? (What do you notice about their shapes/structures?)
14. If a person received the flu vaccine this year, their immune system started producing antibodies to that particular strain of flu virus. Those antibodies are present in their bloodstream. Later, if a sick friend sneezes around them and they come in contact with the flu virus, they will have a secondary immune response. How would you describe their immune response (both in time and intensity)?
15. One function of the dendritic cell is to serve as an antigen-presenting cell (APC) that will alert helper T-cells. What is it presenting or displaying on its surface for the helper T-cells to detect?
16. Cytokines are an important chemical signal in the immune system. What is one function of the cytokines in this scenario?
17. By looking at these cartoons, why do you suppose quorum sensing is important in bacteria?
18. What is an example of a surprising (and maybe unfortunate) place biofilms are found?
19. An example of a case in which information about position is very important is the development of the hand because there is a specific position and direction for each finger. Therefore, morphogens play a key role in this process. True or False?
20. Sometimes people wonder why hormones only affect their target cells and not any of the other cells they come in contact with as they travel through the bloodstream. What do you suppose a target cell has that allows it receive a signal from a specific hormone? (Think back to the cell signaling diagrams you looked at in Part 1.)
21. If someone has the condition hyperthyroidism, what does that indicate about their thyroid activity level? How about hypothyroidism?

22. What is the first difference you notice about the way the steroid hormone interacts with the cell? (Think about what is happening to the steroid compared to the protein hormone at the cell membrane.)
23. What cell response is the steroid causing? What cell response is the protein hormone causing?
24. Because the protein hormone cannot enter the cell, it relies on receptor proteins in the membrane and \_\_\_\_\_ messengers inside the cell.
25. The concept that structure reflects function is an important one in biology. How does the structure of a neuron help it accomplish its function?
26. What is the effect of myelination on the speed of nerve impulse transmission?
27. Multiple sclerosis (MS) involves an abnormal response of the body's immune system directed against the central nervous system (CNS), which is made up of the brain, spinal cord and optic nerves. Within the CNS, the immune system attacks myelin as well as the nerve fibers themselves. How might this affect someone suffering from MS?
28. The Na<sup>+</sup>/K<sup>+</sup> pump helps maintain this balance. This pump is an example of \_\_\_\_\_ transport.
29. What do the blue structures in this diagram represent? How about the green & purple structures?
30. What is happening in this diagram?
31. What is happening in this diagram?
32. What is the role of the stimulus in this graph?
33. What happens to the membrane potential (in terms of voltage) as the action potential progresses through depolarization and repolarization?
34. Choose 3 of the neurotransmitters above. Use the Internet to find out their functions and summarize them briefly here.
35. It has often been said of the human body that the whole is greater than the sum of its parts. Give one example of how various parts of the human body work together for a higher-level function. Your example could be from this self-study, but does not have to be.
36. Check out the Survival Guide posted with the summer assignment. What are 2 strategies you plan to use during AP Bio this year?