Cells, Membranes and Membrane Transport Concept Questions

1. What evidence suggests that eukaryotic cells are more recent than prokaryotic cells?
2. How does the endosymbiont theory explain the progression from prokaryotic to eukaryotic cells? Make sure your answer mentions the evidence.
3. As a cell gets larger, volume increases faster than surface area. Why is this a problem?
4. Why do we use the term "fluid mosaic model" to describe the cell membrane?
5. How are glycoproteins like hockey jerseys?
6. Why is a membrane important for a cell?
7. Why is it important for the cell membrane to be selectively permeable?
8. How is the structure of the phospholipid important for its function?
9. In general, what kinds of things pass easily through the membrane and which do not?
10. Hormones are chemical messengers that travel in the blood throughout the body. Protein hormones (polar) attach themselves to receptors on the cell surface while lipid hormones (nonpolar) actually enter the cell. Explain this difference.
11. You are given food coloring and three beakers of water. Design an experiment to determine the effect of temperature on the rate of diffusion. Be sure to have a hypothesis and a control.
12. As waste products build up, homeostasis is threatened. How does diffusion help avoid this?
13. Suppose that the concentration of carbon dioxide in the fluid outside a cell became higher than that on the inside. Predict what would happen. What prevents this from happening normally?
14. How is facilitated diffusion a benefit to cells?
15. Imagine that a cell has been in a slightly hypotonic solution for some time and is now isotonic with the solution. Has the movement of water molecules stopped? Explain.
16. A dog pees on your lawn. What do you expect to observe over the next few days? Explain.
17. Why is turgor pressure not used in reference to animal cells?
18. Explain why it is not a good idea to drink distilled water or saltwater.
19. A marathon runner collapses after running on a hot day. Although the runner consumed adequate water along the route, blood testing showed that many of his red blood cells had burst. Why was this the case? (hint: on hot days, runners normally drink fluids that contain sugar and salt.)
20. Gardens always have lots of insects and these insects get onto the plants. When gardeners bring in fresh vegetables from the garden, they sometimes soak them in saltwater before rinsing them and soaking them in freshwater. Why would they do this?
21. Grocery stores spray their vegetables with water to preserve their freshness. Explain how this makes the vegetables appear fresh.