

Basic Concept Review
AP Biology 10/11

Name _____

The questions below are intended to help you start thinking about fundamental scientific concepts that will assist your understanding in AP Biology. You should complete these questions only after completing the assigned introductory readings from Chapters 1, 2, 3 and 4 of your textbook.

The questions are divided into three categories: Review, Recall, and Application. The review questions are intended to test your memory of concepts you should have learned in prior classes, while the recall questions ask you to simply restate important information from the text after processing it independently. The applications are the most difficult. At this point, you may not be able to answer all application questions thoroughly, but you should use them as a guideline for the type of thinking you will be required to do throughout the course.

If any extra research is necessary for you to answer these questions, DO IT! Efficient research skills are a great tool to support independent review of course topics.

Please answer all questions neatly, handwritten or typed, on a separate sheet of paper.

REVIEW

1. Reorder the following structures from smallest to largest, as they would occur in a living organism:

cell, organ, chromosome, organelle, atom, nucleotide, genome, tissue

2. What is the difference between the two “nuclei” addressed in science – that is, the nucleus of an atom vs. the nucleus of a cell. Describe the composition of both and distinguish how they vary both in structure and function.

3. Briefly compare the differences between intermolecular attractions and intramolecular ones. Where are they located? How strong are they? How are they

involved in chemical and physical changes?

4. Explain what characteristics of carbon allow it to form such a diversity of molecules. What type of bonds does carbon form and what are the other elements most commonly bonded to it to form organic compounds? What are isomers?

RECALL

5. Name the essential elements that are necessary for proper human body functioning. For future reference, you should memorize this list and be able to name these elements.

6. Name the trace elements that play important roles in human body functioning. This list should also be memorized.

7. What is the difference between hydrophilic molecules and hydrophobic molecules. Attempt to explain this beyond “water hating” and “water loving” but discuss the implications on molecular behavior in the presence of water.

8. Name and draw the six important functional groups of organic compounds. Briefly describe their functional properties.

APPLICATION

9. Review the list of essential elements in the human body. Now think further: *where* might we find each of these elements? Provide the names of specific molecules where each can be found.

10. In chapter 2 of your textbook, study Figure 2.5. What is interesting about the optimal temperature for DNA replication? (Hint: convert to Celsius)

11. Examine the document entitled “The Four Nucleotides.” Specifically examine the nitrogenous bases, which are the “rungs” of the DNA ladder. Can you see where hydrogen bonding comes into play and why it is the attraction that keeps the two strands of DNA together?

12. The use of “lipospheres” has become popular in the cosmetic skincare industry. They are lipid-based spheres that will deliver the intended ingredients to your skin. What is the biochemical advantage or intention of using lipospheres? (Hint: think about the composition of the cell membrane).

13. When gum gets stuck in one’s hair, water and soap are NOT the solution. A common homemade remedy is to smear peanut butter into the affected area and then wash with soap. Using chemistry principles, explain why peanut butter is much more effective than water.

14. While waiting at an airport, Neil Campbell, author of your textbook, once overheard this claim: “It’s paranoid and ignorant to worry about the industry or agriculture contaminating the environment with their chemical wastes. After all, this stuff is just made of the same atoms that were already present in our environment.” How would you counter this argument?

15. Some scientists believe that life elsewhere in the universe might be based on the element silicon, rather than on carbon, as on Earth. What properties does silicon share with carbon that would make silicon-based life more likely than say, neon-based life or aluminum-based life? (See Figure 2.8).