1. Name the two main types of nucleic acids. Identify where in the cell each can be found.

2. Describe the 3 main functions of DNA.

3. Name the 4 nucleotides in DNA. Draw a sketch of each, and identify which are pyrimidines and which are purines. On one of the sketches, label the following parts of the nucleotide: nitrogenous base, deoxyribose (5 carbon sugar), 3' end, 5' end, phosphate group.

4. Describe the structure of DNA using the following terms: nucleotides, double helix, complementary base pairing, hydrogen-bonding, anti-parallel, 3', 5', sugar-phosphate backbone. Then, draw a diagram! The diagrams should be something along the lines of the diagram on the right, except much, much better!

5. a) What exactly is meant by the expression complementary base pairing? b) Why must A always pair with T and C always pair with G?

6. Rank the following in order of largest to smallest: nucleotide, DNA, chromosome, gene.

7. Explain clearly the differences between genes and chromosomes.

8. Thinking Question! Explain how the structure of DNA and complementary base pairing promotes the continuity of life.

9. a) What is REPLICATION? b) Describe DNA replication with reference to its three basic steps: unzipping, complementary base-pairing, joining of adjacent nucleotides. Use labeled diagrams to assist your explanation!

10. What is RNA? How is it structurally similar to DNA, and how is it different? Present your answer in the form of a table like the one on the right.

11. Describe the steps in the process of DNA TRANSCRIPTION.

12. List the 3 types of RNA, sketching neat diagrams of each. Next to each diagram, list the function of each type.

13. What is TRANSLATION? What three main phases is it divided into? List the main events that occur during each of these phases.

14. The sense strand on a piece of DNA reads CCGTTAGGGCAAATTCGCTATTTTTT. What amino acids does this code for?

15. Identify the roles of a) DNA, b) mRNA, c) tRNA and d) ribosomes in the processes of protein synthesis.

16. a) What are mutations? b) Define and differentiate between the two main types of mutations (chromosomal and gene).

17. What are mutagens? Give examples of four environmental mutagens which can cause mutations in humans.

18. a) Make up a DNA sequence to prove that the addition or deletion of a single DNA nucleotide can dramatically effect the structure and function of the resulting translated protein. b) How could this lead to a genetic disorder? c) Give two examples of genetic disorders, and explain what causes them.

19. Explain how a mutation could have a no effect at all on an organism.

20. What is the importance of mutations to the history and future of life on this planet?

21. Use the example of the lac operon to describe how the expression of genes can be controlled.

22. Define recombinant DNA b) Describe four uses of recombinant DNA.
23. Describe the procedure used in a) cloning a gene using plasmids and bacteria b) the Polymerase Chain Reaction c) RFLP analysis. State an advantage for each procedure.