Analysis: Please answer all questions in complete sentences.

1. What are the four different nucleic acids that are involved in taking a genetic message from the nucleus and changing into a protein at the ribosomes?

_____

_____

_____

2. Briefly describe what is occurring during each of the events below, which involves the four answers you wrote in question 1.

Transcription – _____

_____

Splicing – _____

_____

Translation – _____

_____

3. List 5 similarities and also 5 differences between DNA and RNA.

Similarities	Differences
_____	I_____
_____	I_____
_____	I_____
_____	I_____
_____	I_____

4. Compare replication (as discussed in section 12.2) with transcription (discussed in section 12.3). How are these processes similar? How are the enzymes involved similar?

_____

_____

_____

_____

5. During splicing which part of the mRNA stays in the nucleus, and which part leaves the nucleus? What happens to the nucleotide strand that remains in the nucleus after splicing?

_____

_____

_____

6. How many different codons can be created from the 4 bases in mRNA? _____ How many different amino acids do these codons match up with? _____

7. Which codon is always the first to be translated?_____ What amino acid then is always the first on any of the thousands of protein chains? _____

8. How would it benefit a cell to possess a sequence of DNA that could be transcribed and then edited/spliced into several different mRNA molecules?

9. What are mutations? During which processes in question #2 could a mutation happen? (List all possible answers)

10. How is a point mutation different from a frame-shift mutation?

11. Which type of mutation from the previous question is more harmful to an organism? Explain why.

12. Explain how/why errors in the mRNA strand may not actually change the order of the amino acids in a point mutation.

Using the following DNA strand to complete the questions 13 to 16.

T A C C A T G A T T A G G A G A C T

13. What is the mRNA strand created from this DNA strand?

14. What would be the mRNA strand created by the **complimentary** DNA strand above?

15. What is the amino acid chain created by the mRNA sequence in problem 13?

16. Describe why a deletion mutation at a gene is usually not as serious a problem as a deletion mutation on a chromosome to a developing human embryo.