**Chapter 13.1: RNA**

*Use the information in Chapter 13.1 (p.362-365) to answer the following questions. Bozeman also has a nice podcast called,* [*DNA & RNA Part 2*](http://www.bozemanscience.com/027-part-2-dna-rna)*.*

1. RNA, like DNA, is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that consists of a long chain of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
2. List the three major differences between RNA and DNA.
3. Most RNA molecules are involved in some aspect of protein synthesis, but each type has a different role. Complete the following chart in which you **organize** information about the three major types of RNA.

|  |  |  |
| --- | --- | --- |
|  | Abbreviation | Role in Protein Synthesis |
| Messenger RNA |  |  |
| Ribosomal RNA |  |  |
| Transfer RNA |  |  |

1. **Describe** the major events of transcription. Include where it occurs and the role of DNA/RNA/RNA polymerase.
2. **Transcribe** a strand of mRNA using the DNA template below.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| DNA: | T | A | C | A | C | G | T | T | A | C | T | A | G | G | C | T | G | C | A | T | T |
| mRNA: |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

1. **Explain** how RNA polymerase knows where to start and stop making a strand of RNA.
2. **Describe** how mRNA is processed in eukaryotic cells.

1. If the following strand of pre-mRNA has just been transcribed (introns are indicated by the grey boxes) write the sequence of the mature mRNA sequence below.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| pre-mRNA: | A | U | G | U | G | C | A | A | U | G | A | U | C | C | G | A | C | G | U | A | A |

**Chapter 13.2: Ribosomes and Protein Synthesis**

*Use the information in Chapter 13.2 (p.366-371) to answer the following questions. Bozeman also has a nice podcast called,* [*DNA & RNA Part 2*](http://www.bozemanscience.com/027-part-2-dna-rna)*.*

1. The first step in decoding genetic messages is to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ a nucleotide base sequence from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
   * This transcribed information contains a code for making \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
     1. Proteins are made by joining \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ together in long chains called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
     2. The specific \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and the order in which they are joined determine the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of different proteins.
2. **Describe** what is meant by the “genetic code” and explain how it is read.
3. **Draw** a box around each codon in the strand of mRNA shown below.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| mRNA: | A | U | G | U | G | C | A | A | U | G | A | U | C | C | G | A | C | G | U | A | A |

1. Use the codon chart on p. 367 in your textbook to **write** the sequence of amino acids that the above strand of mRNA codes for.
2. **Describe** the major events of translation. Include where it occurs and the roles of mRNA/ribosome/tRNA/amino acids/polypeptide.

**Chapter 13.3: Mutations**

*Use the information in Chapter 13.3 (p.372-376) to answer the following questions. Bozeman also has a nice podcast called,* [Mutations](http://www.bozemanscience.com/mutations).