Transcription: DNA 🡪 RNA

**DNA strands are antiparallel**

DNA strands in a double helix are oriented in opposite directions.

The numbers 5’ and 3’ refer to

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

The 5’ end has a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, the 3’ end has a

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Label the 4 ends of the DNA strands shown as 5’ or 3’

Polymerases: Enzymes that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What direction do DNA and RNA polymerase work? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**DNA Replication Enzymes**

|  |  |
| --- | --- |
| **Enzyme** | **Function** |
| Helicase |  |
|  | Makes a new DNA strand complimentary to a template strand by joining nucleotides together. |
| DNA Ligase |  |

**Transcription**: The process of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Nucleic Acid Functions

|  |  |
| --- | --- |
| DNA | RNA |
|  |  |

**Central Dogma**: Add the names of the molecules in the circles, and the processes with the arrows:



**DNA vs. RNA Structure**

|  |  |  |
| --- | --- | --- |
|  | **DNA** | **RNA** |
| # of strands |  |  |
| Sugar used |  |  |
| Bases used |  |  |

Why can RNA molecules have so many different structures and functions? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Types of RNA**

**mRNA (messenger RNA)** is a single stranded nucleic acid molecule that

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 There, it is used by ribosomes as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ for building a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ molecule.

**tRNA** and **rRNA** are used to build proteins during the process of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Polymerases**: enzymes that make \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

DNA strands are often referred to as the **template strand** and the **coding strand**.

The template strand is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

The coding strand \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Promoter**: A sequence of DNA preceding the gene to be transcribed where \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and other proteins attach \_\_\_\_\_\_\_\_\_\_\_\_\_ transcription begins.

**The direction of transcription**: The template strand is read in the \_\_\_\_\_\_\_\_\_\_\_\_\_ direction, therefore the new mRNA strand is built in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ direction.

**PRACTICE**: What is the sequence of bases in an mRNA molecule produced by transcription of the DNA molecule shown?

DNA:

Coding Strand: 5’ ATG – CTC – GAG – TTA – TAT 3’

Template Strand: 3’ TAC – GAG – CTC – AAT – ATA 5’

mRNA molecule: 5’ \_\_\_\_ - \_\_\_\_ - \_\_\_\_ - \_\_\_\_ - \_\_\_\_ 3’

**Reverse transcriptase** is an enzyme found in retroviruses, like HIV. What do you think it does? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_