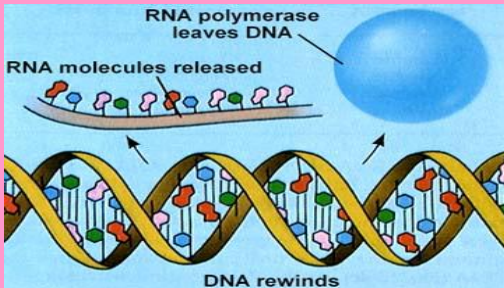


## RNA (The Other Nucleic Acid) and Transcription (Part 1 of Protein Synthesis)



IN: If the amount of adenine in a DNA molecule is 20%, then the amount of cytosine would be what percent?



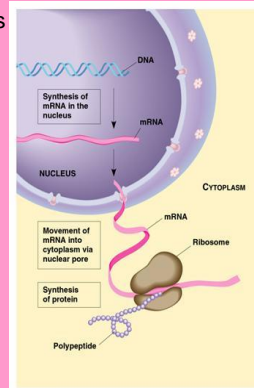
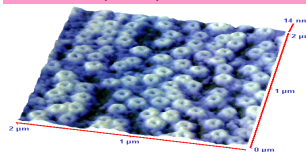
If the amount of adenine in a DNA molecule is 20%, then the amount of cytosine would be what percent?



**30%** Adenine (20%) bonds with Thymine (20%), making up 40% of the DNA. With 60% left over, Cytosine would have 30% and Guanine would have 30%

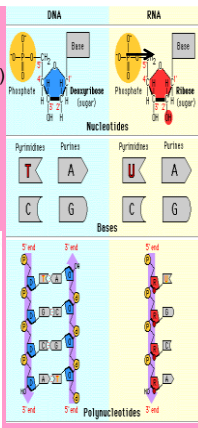
### I. Ribonucleic Acid (RNA) = makes proteins

- Ultimately, DNA determines the amino acid sequence of proteins.
- DNA molecule **cannot directly control** the sequence of amino acids.
- DNA is **restricted to the nucleus**.
- Go-between is ribonucleic acid (RNA).



### II. The Structure of RNA

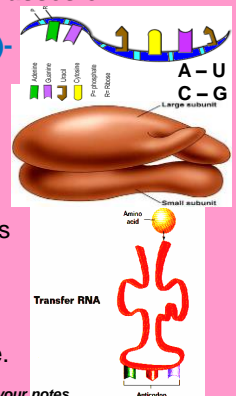
- Polymer of RNA nucleotides (Ribose sugar, Nitrogen base, PO<sub>4</sub> group)
- Unlike DNA, RNA :
  - Single-stranded**
  - Contains the sugar **ribose**
  - Contains the nitrogen base **uracil** instead thymine.



**No "T" in RNA  
A-U**

### III. There are three major classes of RNA.

- Messenger RNA (mRNA)**- takes a **message** from DNA in nucleus to **ribosomes** in cytoplasm.
- Ribosomal RNA (rRNA)**- and **proteins** make up **ribosomes** where proteins are synthesized.
- Transfer RNA (tRNA)**- **transfers** a particular **amino acid** to a ribosome.



Make a quick sketch of each into your notes.



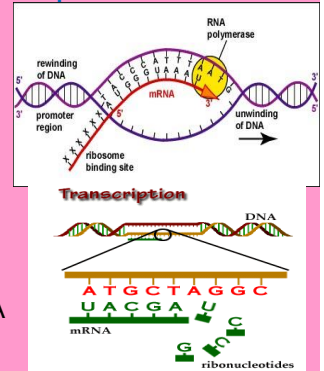
**IV. Transcription = process in which mRNA is made according to the sequence of bases in DNA**

A. Occurs in the **nucleus**.

B. Begins when **RNA polymerase** (enzyme) binds to a DNA molecule. **(Unzips the DNA)**

C. **Complementary RNA** nucleotides pair with **DNA** nucleotides.

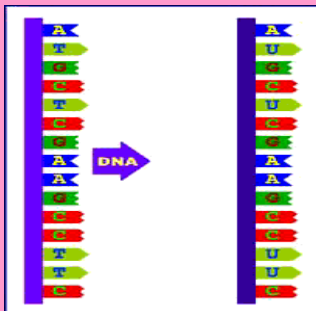
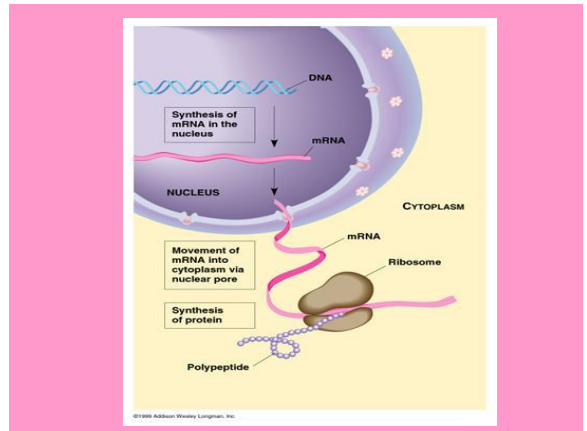
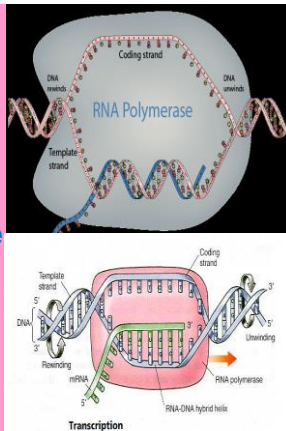
(Only **one side**; DNA acts as a **template**)



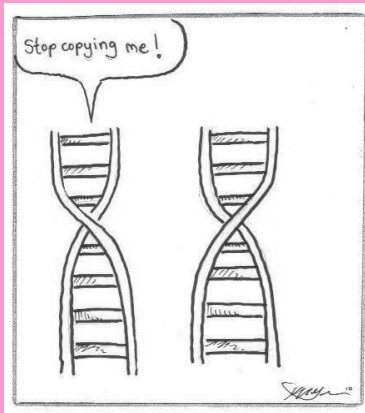
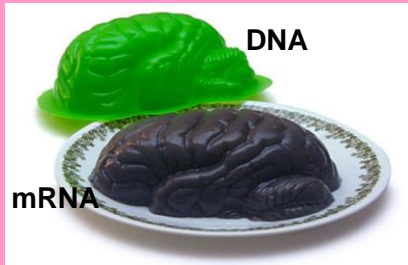
D. RNA polymerase joins the **RNA nucleotides** together.

E. Terminator sequence causes **RNA polymerase** to stop.

F. DNA strands **rejoin**.



DNA is like a mold or template for making mRNA



1. The "big picture" goal of transcription is to:
  - a. Create mRNA
  - b. Create tRNA
  - c. Create amino acids
  - d. Create a protein

### Answer

1. The "big picture" goal of transcription is to:
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  - b. Create tRNA
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2. The first step in transcription is:
  - a. mRNA exits the nucleus
  - b. DNA is "unzipped" by special enzymes in the nucleus
  - c. DNA re-winds into a double helix
  - d. mRNA is created by complimentary base pairing to a single DNA strand

## Answer

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  - DNA is “unzipped” by special enzymes in the nucleus**
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3. The final step in transcription is:
- mRNA exits the nucleus
  - DNA is “unzipped” by special enzymes in the nucleus
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  - mRNA is created by complimentary base pairing to a single DNA strand

## Answer

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4. Transcription occurs in which part of the cell?
- The ribosome
  - The nucleus**
  - The endoplasmic reticulum
  - The cell membrane

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## Answer

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6. What would be the sequence of bases on the complimentary DNA strand?

AACGACTTAGCTTAG

- a. AACGACUUAGCUUAG
- b. UUGCUGAAUCGAAUC
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- a. Transcription
- b. Translation
- c. Replication
- d. Cellular Respiration

## Answer

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- b. Mendel and Warren
- c. Crick and Watson
- d. Newton and Hall

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12. DNA is physically described as

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- b. A single helix
- c. A short strand
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13. Proteins are made of monomers called

- a. Nucleotides
- b. Amino acids
- c. Monosaccharides
- d. Polysaccharides

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OUT: Complete the nucleic acid concept map.

