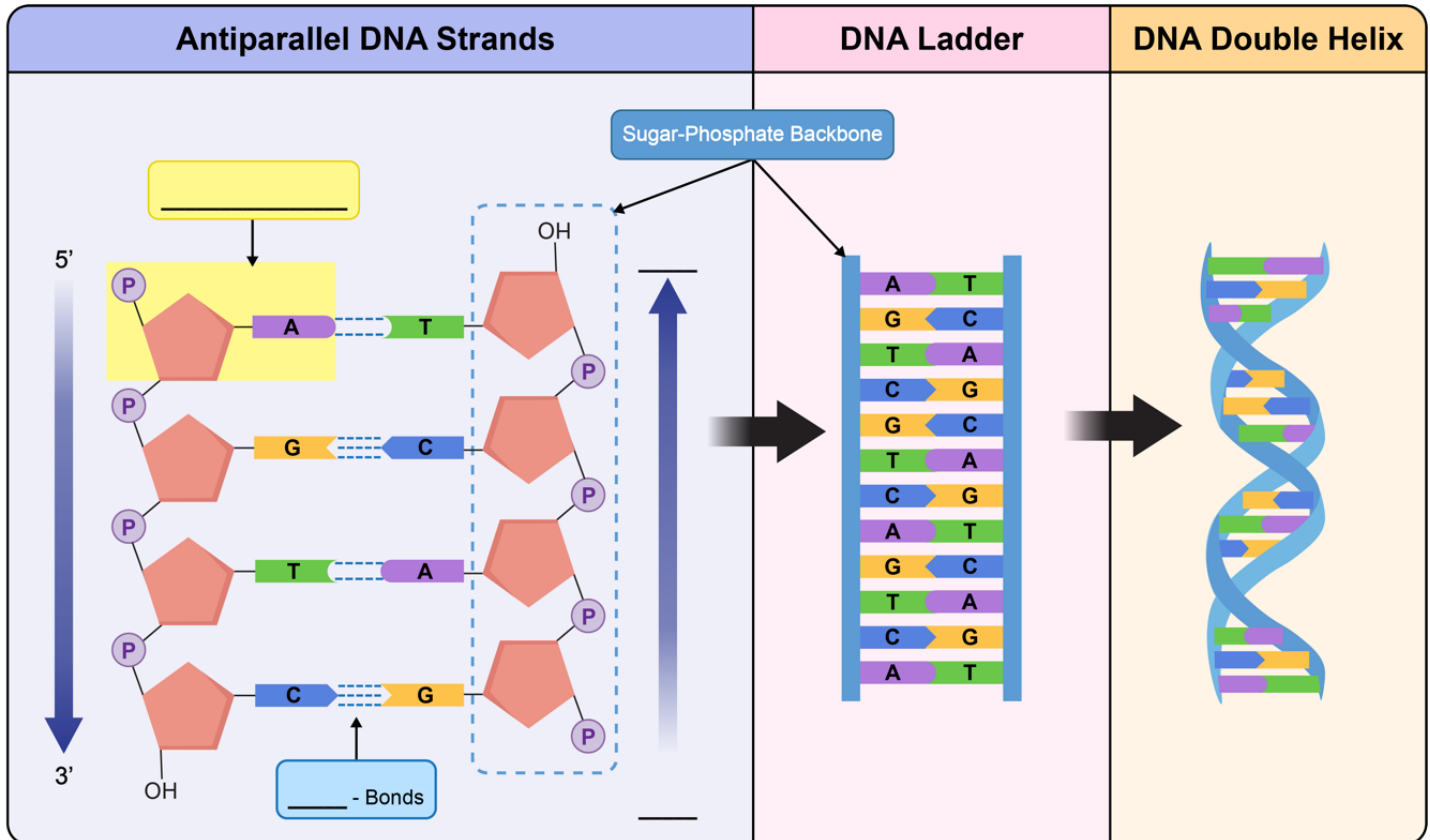


CONCEPT: DNA DOUBLE HELIX

- Rosalind Franklin, James Watson & Francis Crick are credited with helping to describe the structure of _____.
- _____ -helix with _____ *anti-parallel* strands of nucleotides.
 - **Anti-parallel:** 2 strands that run parallel to each other but with _____ directions.
- Double helix resembles a _____ ladder: phosphate-sugar backbone on the sides and bases _____.



EXAMPLE: Predict the sequence of bases in the DNA strand that is complementary to the DNA strand shown below:

5' C—G—A—A—A—C—T—C—C—T—A 3'
 3' — — — — — — — — — — 5'

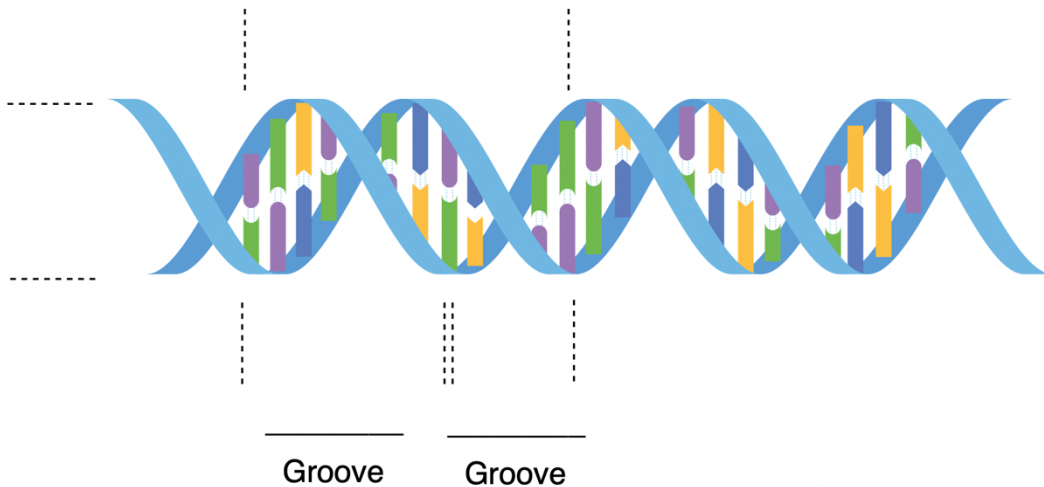
PRACTICE: Which of the following statements is false?

- The nitrogenous bases extend inward within the double helix.
- The two polynucleotide strands in the DNA double helix are identical to one another.
- Hydrogen bonding occurs between the two polynucleotide strands within DNA.
- The complementary strand of DNA segment of 5' GCATTCAT 3' would be 3' CGTAAGTA 5'.
- Phosphate groups and sugars form the backbone of the DNA double helix.

CONCEPT: DNA DOUBLE HELIX

Detailed DNA Structure

- The DNA double helix has a width of _____, with 10 base pairs per turn and within a full turn a length of _____.
 - The helical shape of DNA creates _____ grooves that are present on the exterior of its 2 strands.
 - _____ **Groove:** The _____ and _____ groove of the DNA double helix.
 - _____ **Groove:** The _____ and _____ shallow groove.



- Proteins can bind to these grooves in order to regulate RNA _____ and DNA _____.

EXAMPLE: Calculate the approximate length of a DNA segment that is composed of 171 base pairs.

- a) 340 angstroms b) 20.0 angstroms c) 581 angstroms d) 291 angstroms

PRACTICE: Clinical trials include the use of DNA-binding drugs that facilitate the breaking of double-stranded DNA in their function. A hypothetical drug used in the treatment of leukemia requires interaction with the grooves of DNA. If the minor groove is A–T rich and the major groove is G–C rich, which of the following statements can be true?

- a) The drug would more readily bind to the minor groove of DNA.
b) The drug would more readily bind to the major groove of DNA.
c) The drug would equally bind to the minor and major grooves of DNA.
d) Not enough information is given.

CONCEPT: DNA DOUBLE HELIX

PRACTICE: One turn of a DNA sequence is comprised of 30% guanine (G). Calculate the approximate number of hydrogens bonds likely to be found within this DNA sequence.

PRACTICE: One turn of a DNA sequence is comprised of 15% adenine (A). If the bonding energies of A–T and G–C are 24 kJ/mol and 18 kJ/mol respectively, calculate the approximate total bonding energy in this one turn.