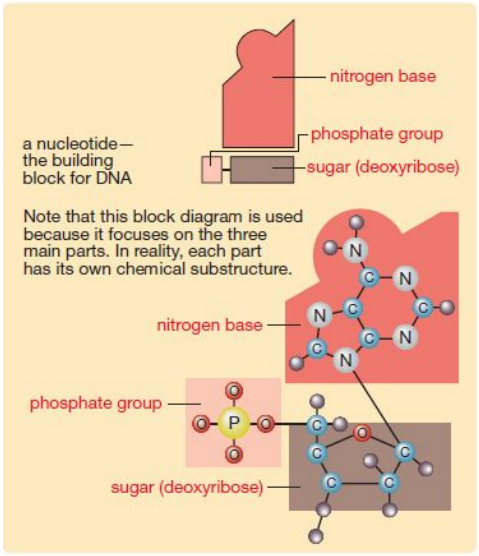
Science 30	Unit A: Biology
Lesson 12 - DNA	84 mins

Structure of DNA

- A twisted ladder or chemicals called nucleotides
- Made up of a nitrogen group, a phosphate group and a sugar (deoxyribose)

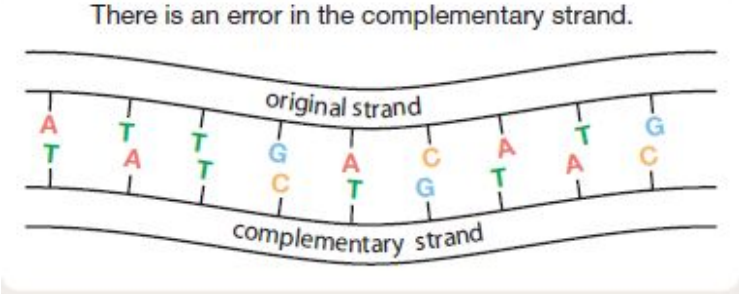
- A T C and Gs
- Adenine. Thymine, Cytosine, and Guanine

Basic structure of a Nucleotide



- Nucleotide only attach to each other's **base pair**
- A - T or T - A
- C - G or G - C

- With this pairing the DNA is just two long paired up chains, one chain being the original strand and the other being the complementary strand



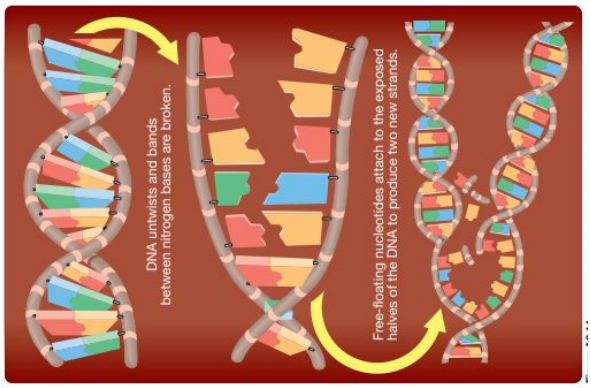
- EXTREMELY long… 2 meters, packaged up in histones to protect and organize the DNA

- Like a extension cord or garden hose spool

DNA Replication

- Making new DNA for cell division
- DNA is unzipped at the nucleotide pairs making two half strains of DNA
- New nucleotide pairs take the place of the opened DNA, making two DNA strands out of one.

- First step of meiosis and mitosis

Protein Synthesis

ATCGs code for proteins. Only one side of the DNA codes for those proteins Each triple pair codes for an amino acid. ATG is an initiator triplet code and also codes for the amino acid methionine. TAA, TAG, and TGA are terminator triplet codes.	The complementary strand is the opposite copy of the DNA and codes for the proteins. Page 13 of data booklet

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Name: _____

1) Write the base sequence that makes up the complementary strand for the nucleotide sequence of each provided strand.

AAATGTCGCCT _____	TAGTCTA _____	GATTGATTCCGGGCTAA _____

2) List the amino acid sequence that would be produced from the following base sequence found on a gene segment.

ATAAAGCGACTTCCC TAT/TTC/GCT/GAA/GGG Tyrosine - phenylalanine - alanine - glutamate - glycine	AGAGGGGGTCTAGCC _____ _____ _____	GTATTAGATTACGTTACA _____ _____ _____

3) Write a DNA sequence of bases that coded for the production of the following amino acid chains.
   a) Tryptophan-Phenylanine-Tyrosine
      Corresponding DNA Strand _____
      Original Sequence _____
   b) Methionine-Glutamate-Aspartate
      Corresponding DNA Strand _____
      Original Sequence _____
   c) Glutamate-Methionine-Cysteine
      Corresponding DNA Strand _____
      Original Sequence _____

4) Indicate whether each of the following statements is true or false. If a statement is false, explain why.
   a) A DNA triplet code is made up of three amino acids
      _____ - _____
   b) A DNA triplet code may code for the same amino acid as another DNA triplet code.
      _____ - _____
   c) Adenine bases can only bond to cytosine bases.
      _____ - _____
   d) A double helix is similar in shape to a spiral staircase.
      _____ - _____

e) Genes provide the instructions to make proteins.

_____ - _____

f) There are ten different amino acids. g. Histone is one of the four base pairs found along the DNA molecule.

_____ - _____

g) Alternating phosphate and deoxyribose sugar make up the backbone of a DNA strand with the base pairs attached in the middle.

_____ - _____

h) During replication, the DNA breaks into small pieces and re-forms as two smaller halves

_____ - _____

i) A DNA molecule has three strands of nucleotides braided together.

_____ - _____

5) Use the "DNA Triplet Codes and Their Corresponding Amino Acids" table to determine which of the following DNA sequences would code for the production of valine-alanine-asparagine.

a) AAAAGAATA

b) CATCGCACA

c) GTGGCTAAT

6) Complete the following table that compares protein synthesis to making a cake from a recipe.

Making a Cake	Protein Synthesis
• a library of cookbooks	• a karyotype of all the chromosomes for one individual
• a cookbook of recipes	
• a recipe for a particular cake	
• the words of the recipe	
• ingredients that go into the cake	
• the finished cake product	