

Chapter 8.1-8.3

DNA Structure & Function



Section 8.1 DNA History

Scientists

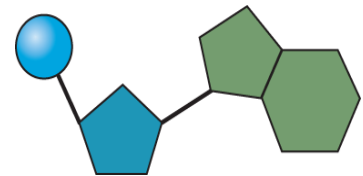
- **James** _____ & **Francis** _____ discovered the double helix shape of DNA in 1953.
- **Rosalind Franklin**
 - Used _____ diffraction to study the structure of DNA.
 - It indicated that DNA was a _____.
- **Alfred Hershey and Martha Chase 1952**
 - Studied viruses _____
 - Concluded genetic material of virus was _____ not _____.

DNA- Structure 8.2

- DNA: _____
- It's a type of _____
- What _____ (genes) are made of
- DNA consists of _____ that are arranged in a "twisted ladder" structure called a _____
- DNA is made up of long chains of _____

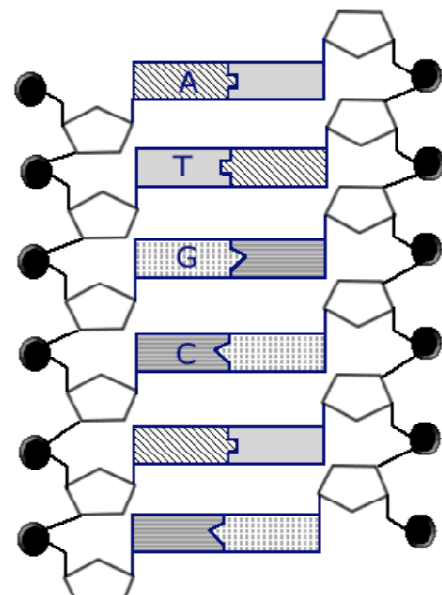
Nucleotides:

- Parts of a Nucleotide:
 1. _____ group
 2. Sugar (called _____ in DNA)
 3. _____ base



Double Helix:

- The backbone (outer strands) of DNA is made up of _____ & _____.
- The inner "rungs" of DNA is made up of _____.
 - There are 4 types of bases:
 1. _____
 2. _____
 3. _____
 4. _____
 - Each base will _____ with one other _____



Chargaff's Rules of Base-Pairing state that:

- _____ (A) always pairs with _____ (T)
- _____ (G) always pairs with _____ (C)
- Each pair is always _____ in numbers.

Example: If a DNA molecule contains 20% adenine, how much (%) thymine should it contain?

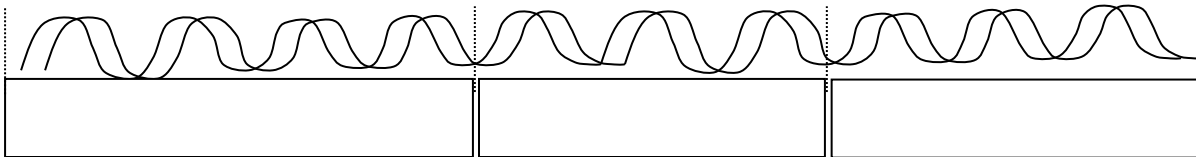
How much (%) cytosine & guanine?

DNA is Complementary

- Complementary: bases on one strand match up with the bases on the other strand (A-T and G-C)
 - Example: Strand 1- ATG GGC CTA
Strand 2- _____
- The backbone is connected by covalent bonds.
- _____ between the bases hold the two strands of DNA together

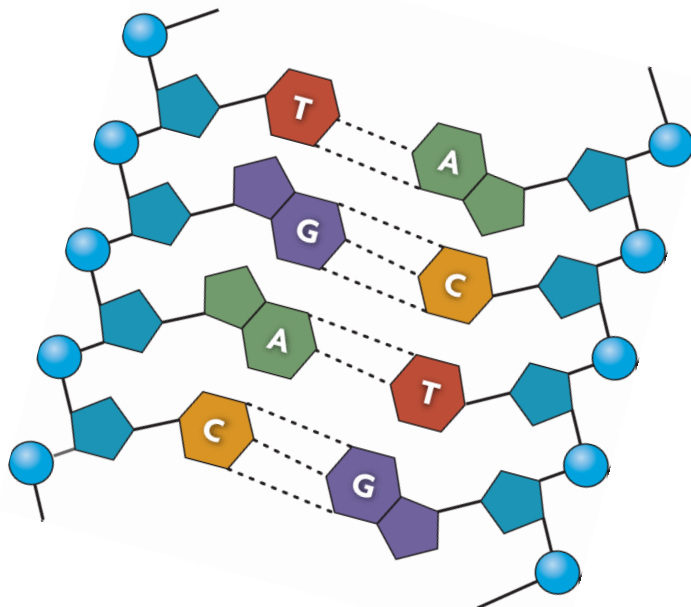
DNA FUNCTION:

- The primary function of DNA is to _____
- DNA is the _____ of an organism's _____.
- DNA contains your _____ (what you look like).



Label the diagram:

Deoxyribose
Phosphate group
Covalent bond
Hydrogen bond
Nitrogen-containing base



SECTION 8.3: DNA REPLICATION

DNA Replication

- _____ is the process in which _____ itself.
- Proteins (_____) carry out the process of _____
- The _____ DNA strand is used as a _____ to build 2 identical copies of DNA.
- Replication of DNA occurs during the _____ during the _____

Process of DNA Replication

Step 1:

- Enzymes _____ the double helix.
- _____-_____ nucleotides form _____ bonds with the template strand.

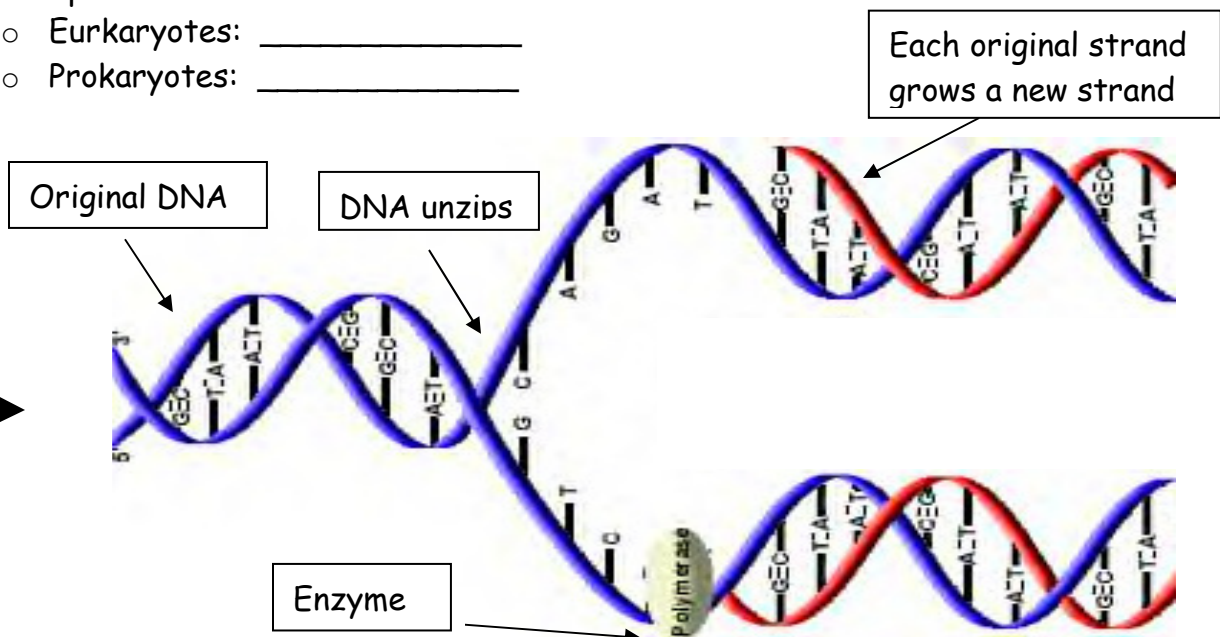
Step 2:

- DNA _____ enzymes bond the _____ nucleotides to the original DNA strand.

Step 3:

- Two new DNA molecules are formed, each with one _____ strand and one _____ strand → This makes DNA replication a _____ process

- Occurs at _____ of replication along a chromosome (making it fast)
- DNA polymerase "_____ " the new strand and _____ any incorrect nucleotides and _____ them with correct ones (accurate)
- DNA replication occurs in:
 - Eukaryotes: _____
 - Prokaryotes: _____



Directions:

For each strand of DNA, show the three steps to demonstrate that you could “replicate” the DNA correctly. See the example for details if you don’t recall how.

Example:

TCCTG ACCCC GCCGG GATAT CCTTC TACCT CCAAA TGTAT

Solution in two parts:

A. *Fill in the complementary strand.*

Original DNA: TCC TG ACCCC GCCGG GATAT CCTTC TACCT CCAAA TGTAT

Complementary: AGGAC TGGGG CGGCC CTATA GGAAG ATGGA GGTTT ACATA

B. *Split the DNA and fill in the complementary strands to create two complete double helix strands.*

T CCTG ACCCC GCCGG GATAT CCTTC TACCT CCAAA TGTAT (original)

AGGAC TGGGG CGGCC CTATA GGAAG ATGGA GGTTT ACATA (new)

TCCTG ACCCC GCCGG GATAT CCTTC TACCT CCAAA TGTAT (new)

AGGAC TGGGG CGGCC CTATA GGAAG ATGGA GGTTT ACATA (original) comp. from example A



1. A. Original DNA: CCTAT ATCTC TCTAT ATCTC TCATA CTGTG TGTCT CTATA

Complementary DNA: _____

B. Make identical strands of DNA

CCTAT ATCTC TCTAT ATCTC TCATA CTGTG TGTCT CTATA (original)

_____ (new)

_____ (new)

_____ (compl. From 1A)

2. A. Original DNA: CCGGA TTTTA ATTAG CTA CTACT ATCGT ACTAC GTTGG TGCTA

Complementary DNA: _____

B. Make identical strands of DNA

CCGGA TTTTA ATTAG CTA CTACT ATCGT ACTAC GTTGG TGCTA (original)

_____ (new)

_____ (new)

_____ (compl. from 2A)

3. A. Original DNA: TGCTG ATCGA TCGAT CAGTC AAACG CTGTT TCGAT ACTCG

Complementary DNA: _____

B. Make identical strands of DNA

TGCTG ATCGA TCGAT CAGTC AAACG CTGTT TCGAT ACTCG (original)

_____ (new)

_____ (new)

_____ (compl. from 3A)