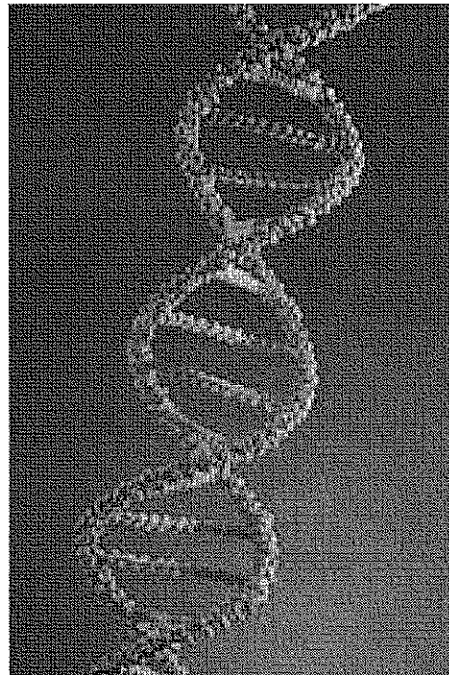
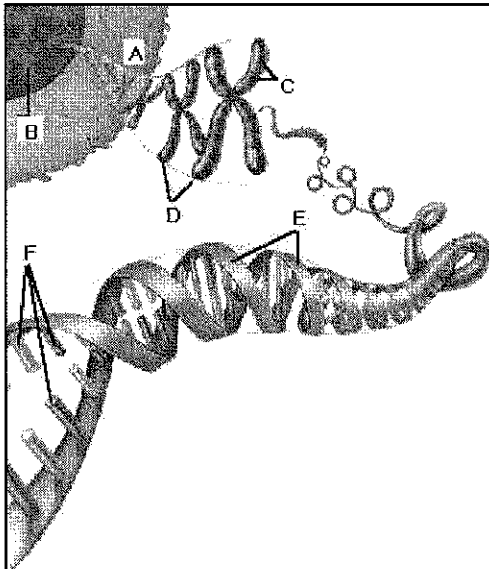


DNA

- Stands for Deoxyribose Nucleic Acid
- Every living thing has DNA
- It is too small to see, but under a high magnification it can be seen and appears like a twisted up ladder





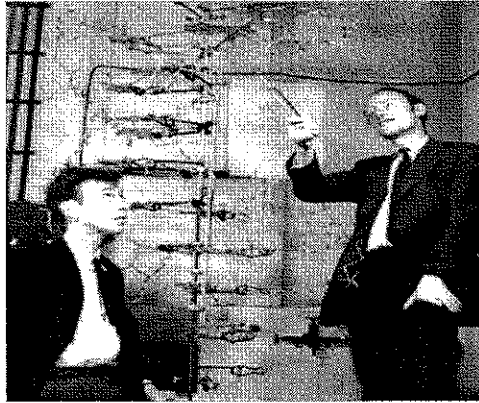
The diagram illustrates the levels of DNA organization. At the top, a single DNA strand is shown with a label 'A'. Below it, the strand is coiled into a double helix, labeled 'B'. Further down, the double helix is tightly packed into a fiber, labeled 'C'. This fiber is then coiled into a loop, labeled 'D'. The loop is further condensed into a chromosome, labeled 'E'. Finally, the chromosome is shown as a single, highly condensed structure, labeled 'F'.

- All living things are made up of cells
- Most plant and animal cells have a nucleus
- Inside the nucleus are chromosomes
- Chromosomes are made of long strands of tightly coiled DNA
 - If you stretched out the DNA from a human cell, it would be about six feet long!

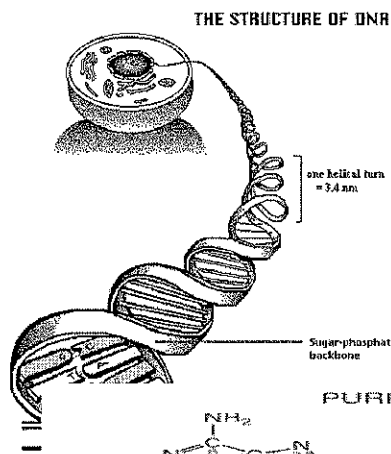
What is the connection?

So.....What is DNA?

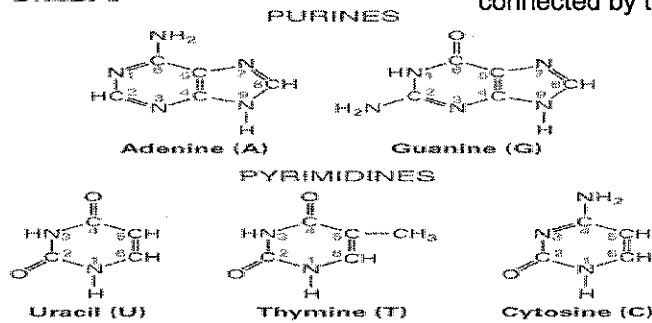
- DNA is hereditary material
- Genetic material codes for proteins, which lead to the expression of traits
 - Ex. DNA codes for a protein that makes your eye color (a genetic trait)
- Genetic material reproduces and is passed down from one generation to the next
- DNA mutates infrequently



- Watson and Crick's inquisitive working style ultimately allowed them to determine the DNA structure first, in 1953
- An achievement that led to their Nobel Prize in 1962.
- Meanwhile, Franklin passed away in 1958 from cancer.



- Each spiral strand is composed of a sugar phosphate backbone and attached bases
- The bases are connected to a complementary strand by hydrogen bonding
- There are four types of nitrogenous bases found in DNA
 - Adenine and thymine are connected by two hydrogen bonds
 - guanine and cytosine are connected by three.



DNA Replication

Q. What is DNA Replication?

A: How DNA makes an exact copy of itself

Q. Where does DNA replication occur?

A: Nucleus

Q. When does DNA replication occur

A: S phase of Interphase

Q. Why does this occur?

A: so that when cell replication occurs (mitosis), the new cells will have an exact copy of the original dna

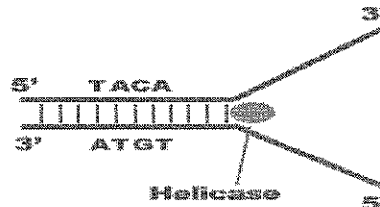
How do we replicate the following DNA?

DNA	ATGCGGCTTATATA
	TACGCCGAATATAT

Honors cont..

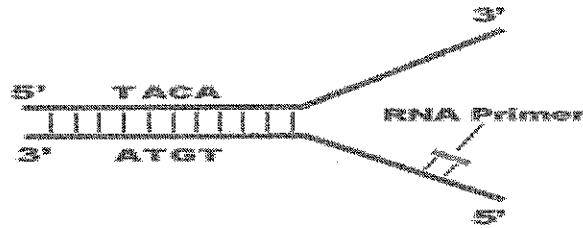
- DNA replication can be broken into 4 steps

1st



- Helicase (enzyme) unwinds the DNA double helix
- RNA primase picks a point on the DNA to start replication
- Dna replication can only add nucleotides to a free 5' end

2nd

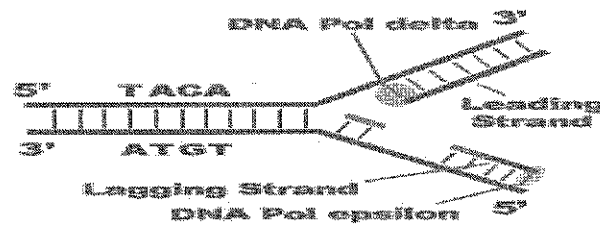


- DNA polymerase binds to one strand of the DNA and adds bases in the 5' to 3' direction.
 - As it moves along the original strand, it uses it as a template to build a leading strand

3. Making the lagging strand

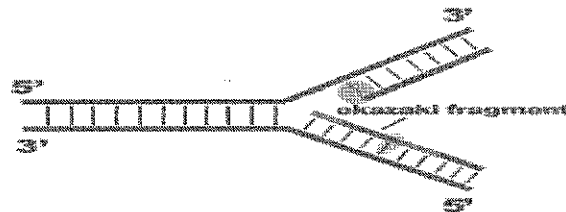
Another type of DNA polymerase binds to the other strand of DNA

- Bases are added in the opposite direction in which helicase is moving
- This is slower
- This molecule assembles DNA fragments called Okazaki fragments



4.

- DNA ligase, stitches together these fragments to make the lagging strand



Semi-conservative replication

- In the end you end up with two double helices
- Each with one original strand and with one new strand

