

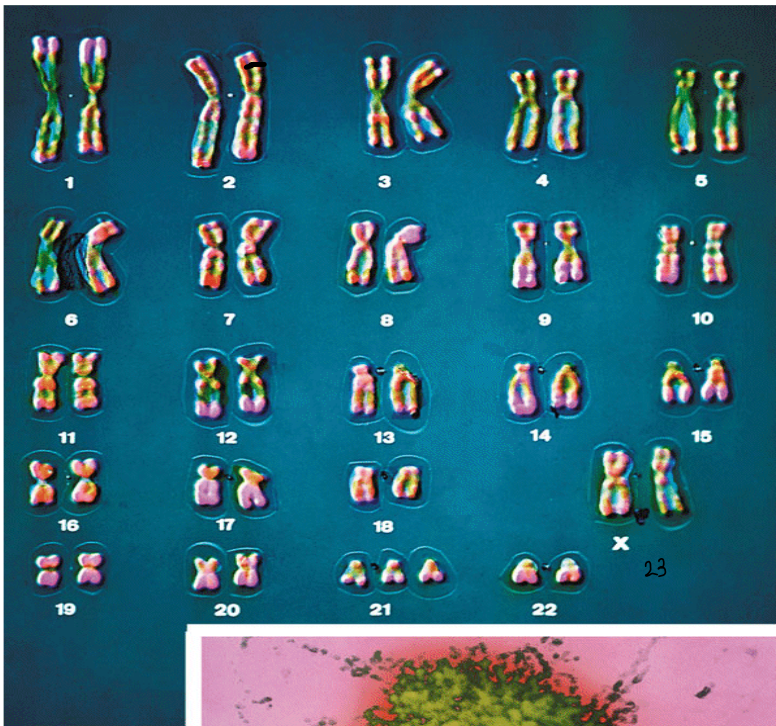
Chapter 6

A Closer Look at Cell Division

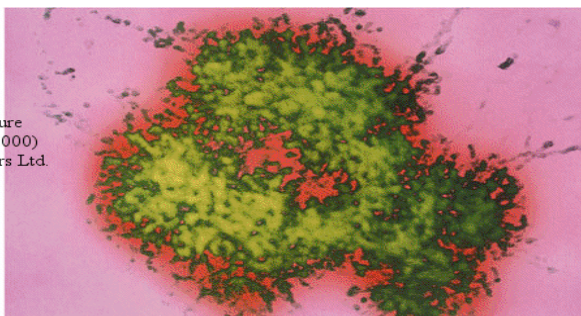
DNA: The Genetic Material

DNA is the genetic material found in the chromosomes of a cell. It contains all the information that determine how cells function and respond to their environment.

**All chromosomes are composed of the
genetic chemical called DNA
DNA stands for deoxyribonucleic acid**



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 . Nature 405, 283-284 (2000)
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• Chromosomes ^{are} exist in
 “matching pairs” in the
nucleus of a cell

• Scientists call the
matching pairs
 “homologous pairs”.

• In every human body
 cell, there are 23
homologous pairs of
 chromosomes

(total of 46
 Chromosomes)

IN HUMANS

{ Pair # 1- 22 = "autosomes"

{ Pair #23 =
"Sex chromosomes"

* XX = Girl

* XY = Boy



Figure 9-1 Biology: Understanding Life 1/e

Humans have 46 chromosomes which contain 100 000 genes and 6 billion nitrogen bases.

DNA is made up of a series of chemicals called nitrogen bases

Nitrogen bases: are

A - Adenine

T - Thymine

C - Cytosine

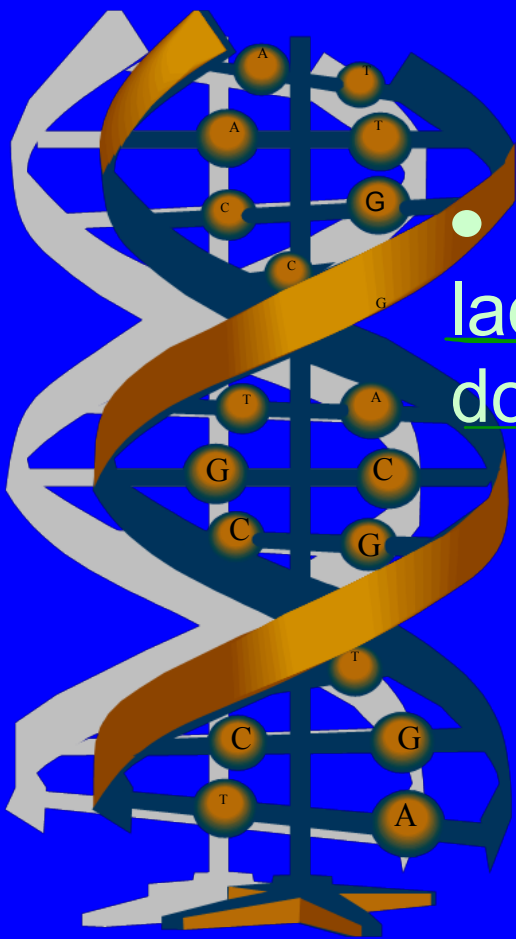
G - Guanine

Always pair together

Always paired together

DNA uses these four letter as codes to make up the nitrogen base. The order that the bases appear in is the code.

What does DNA look like?



- DNA looks like a twisted ladder, also known as a double helix. *called*

- The rungs of the ladder are composed of pairs of nucleotide bases.

A — T

- Adenine always pairs with thymine.

C — G

- Cytosine always pairs with guanine

C — G

C

G

T — A

- One side of the DNA molecule is always complementary to the other.

T — A

A — T

A — T

G — C

C — G

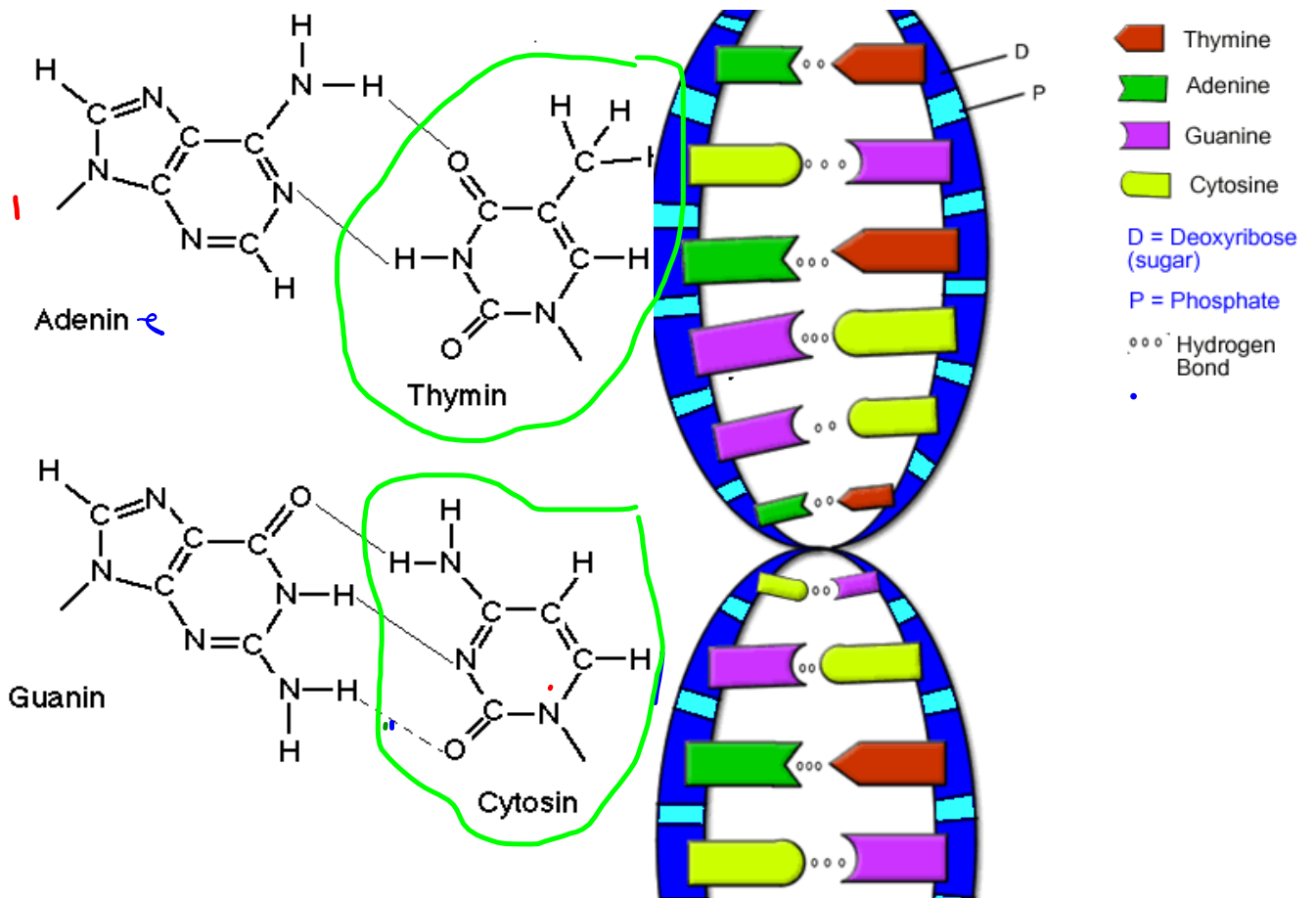
Test Question
Fill in Blanks of DNA

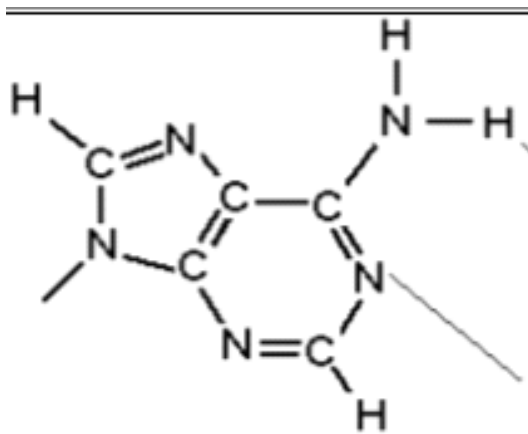
T — A

T — A

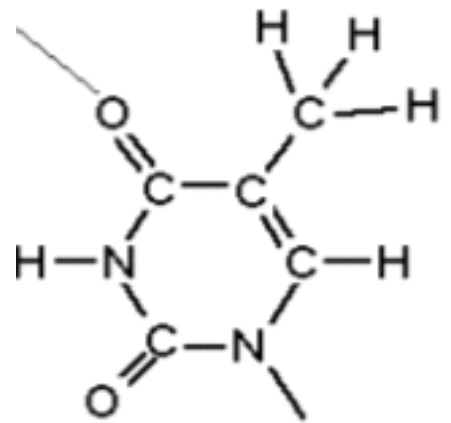
C — G

C — G

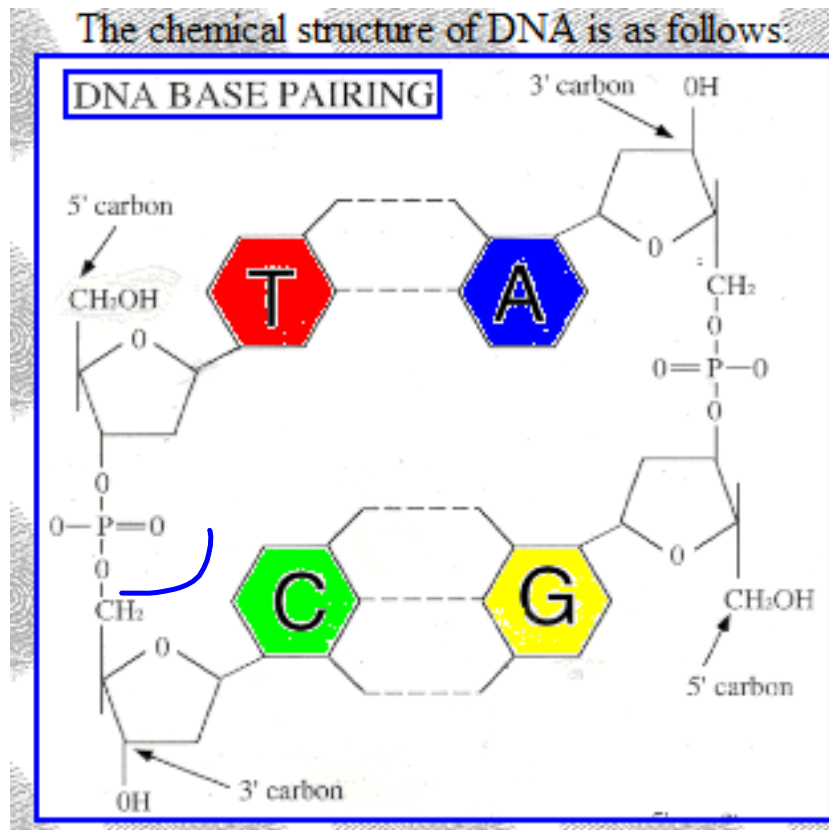




Adenin



Thymin



5' T-T-G-A-C-T-A-T-C-C-A-G-A-T-C 3'
3' A-A-C-T-G-A-T-A-G-G-T-C-T-A-G 5'

Fun Fact

- **If you unravelled all your chromosomes from all of your cells and laid out the DNA end to end, the strands would stretch from the Earth to the Moon about 8,000 times. (23)**



DNA Replication: The Cell's Extreme Team Sport



Amoeba Sisters

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194,980

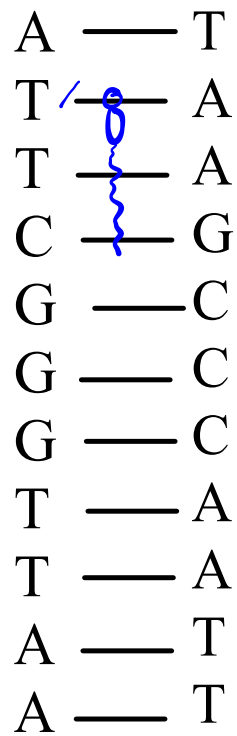
DNA Replication

- DNA molecules being composed of complementary strands allow DNA to copy itself or replicate.
- Replication creates two identical molecules of DNA.

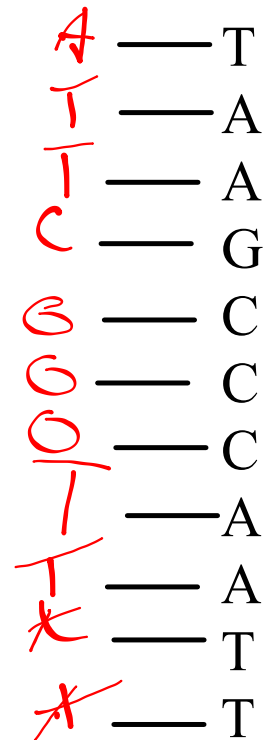
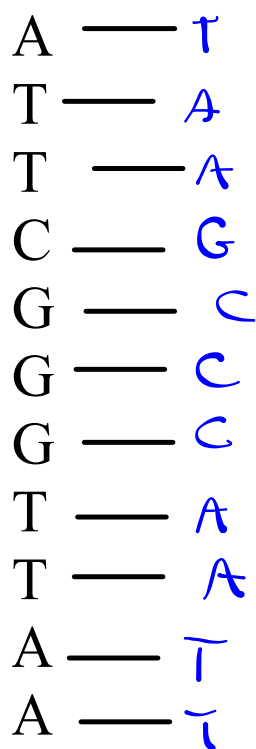
{ • DNA replication ensures that each cell will have all of the genetic information it needs to carry out its activities.

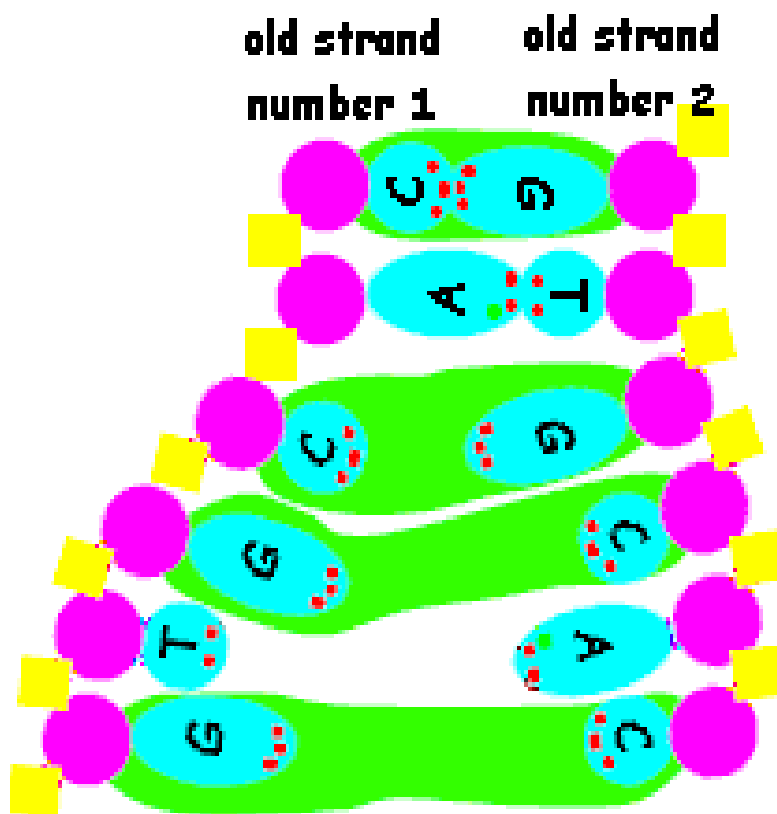
DNA Replication

- DNA replication begins when the two sides of the DNA molecule unwind and separate, like a zipper unzipping.
- The molecules separate between the paired nitrogen bases on each rung.
- Next, nitrogen bases floating in the nucleus pair up with the bases on each half of the DNA molecule: A with T and C with G.

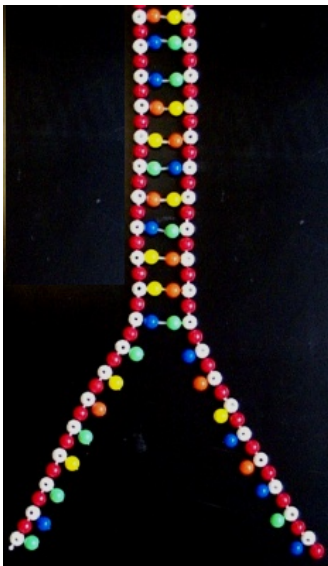


Each strand
split apart by an enzyme





<http://www.youtube.com/watch?v=hfZ8o9D1tus>



<http://www.youtube.com/watch?v=cDIKrLjRIY>

