

NOTES: DNA, GENES, AND CHROMOSOMES

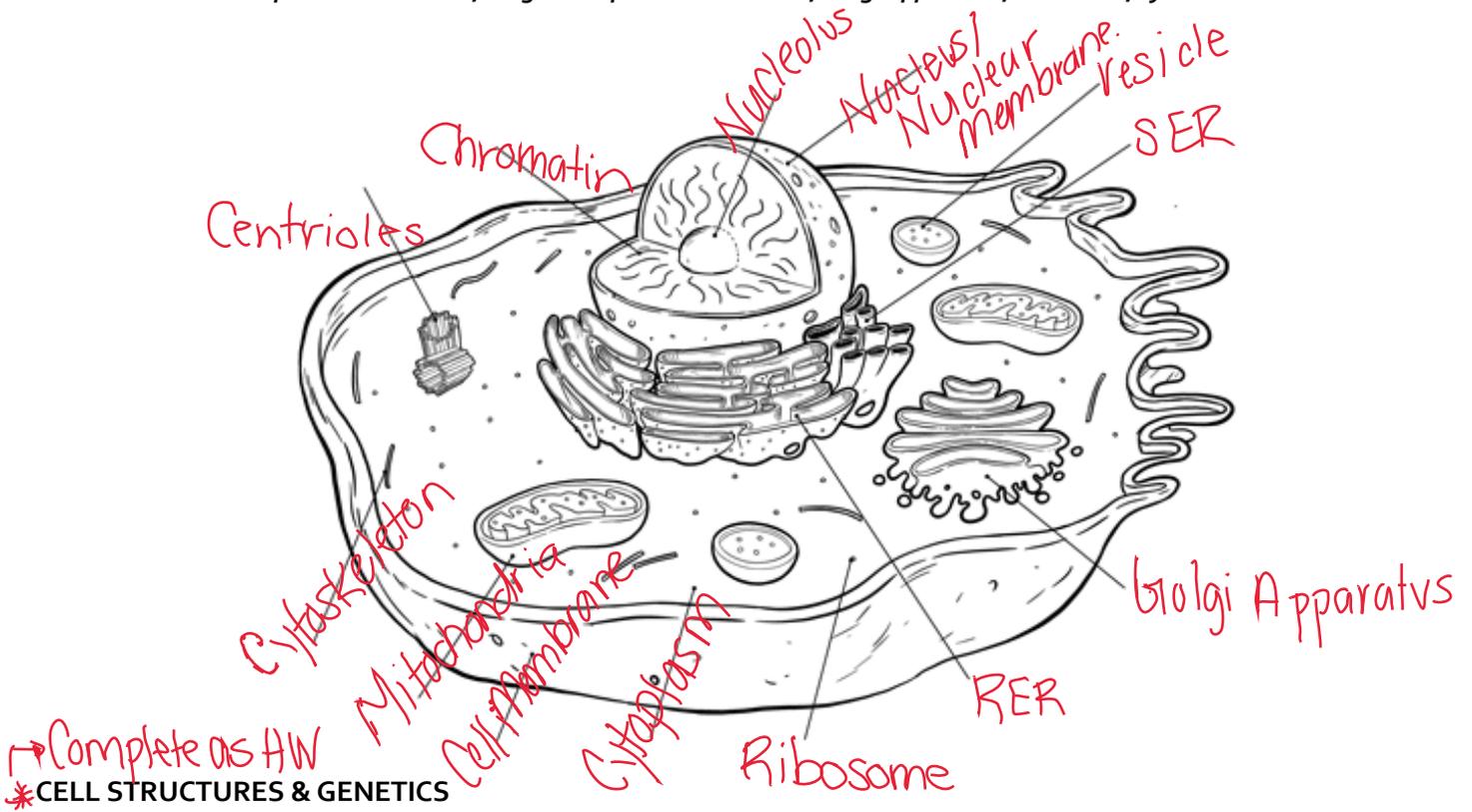
V.O.D: What is a chromosome?

<https://www.youtube.com/watch?v=lePMXxQ-KWY&feature=youtu.be>

THE CELL

The cell is the basic building block of life. All organisms are made up of one or more cells. Label the parts of the cell in the diagram below using the following terms:

Cell membrane, cytoplasm, mitochondria, nucleus, nuclear membrane, nucleolus, chromatin, ribosome, vesicles, smooth endoplasmic reticulum, rough endoplasmic reticulum, Golgi apparatus, centrioles, cytoskeleton



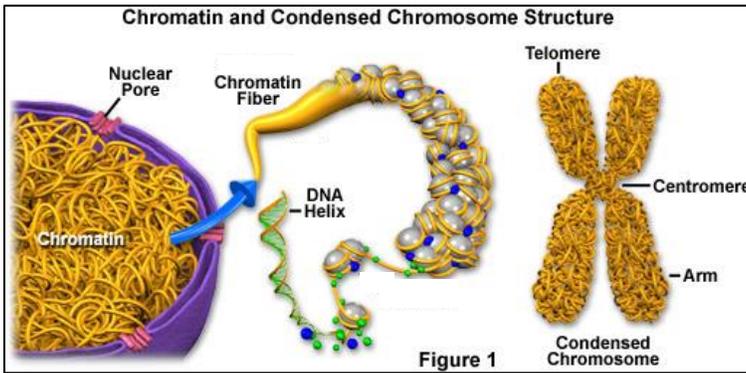
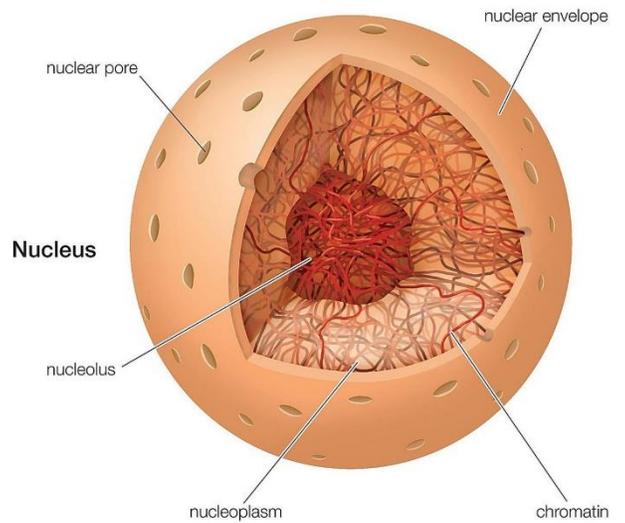
Certain cell structures are very important in the study of genetics. These cell structures are those closely involved with DNA and proteins. Describe the structure and function of each cell part below.

	<u>STRUCTURE</u>	<u>FUNCTION</u>
Nucleus		
Nucleolus		
Chromatin		
Chromosomes		
Ribosomes		

CHROMOSOMES & DNA

DNA, or **Deoxyribonucleic acid**, is the biological molecule that houses our genetic information.

- DNA is stored in the nucleus in the form of **chromatin**.
- Chromatin condenses into **chromosomes** when the cell needs to replicate. Chromosomes are easier to split to the new cell during mitosis or meiosis.



STRUCTURE OF DNA

Label the diagram using the following terms: **nucleotide, nitrogenous base, sugar-phosphate backbone, base pair**

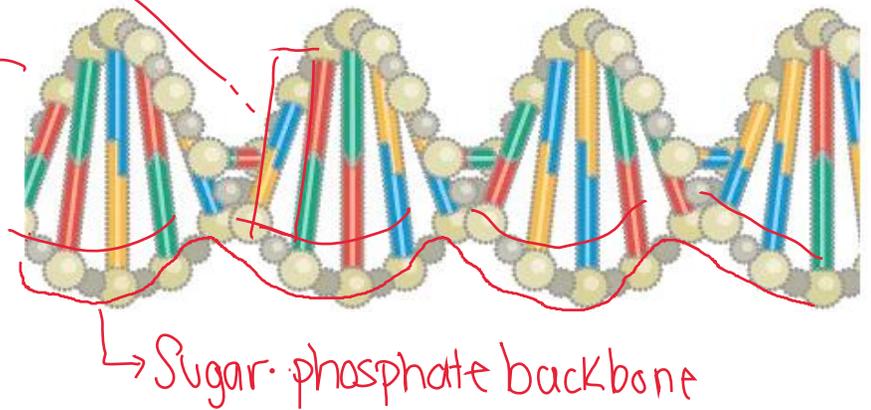
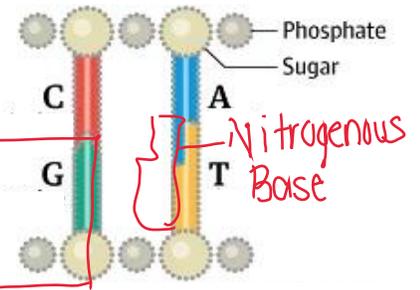
→ complete for practice

Using the terms above, describe the structure of DNA in the space below.

twist = double helix

base pair

Nucleotide

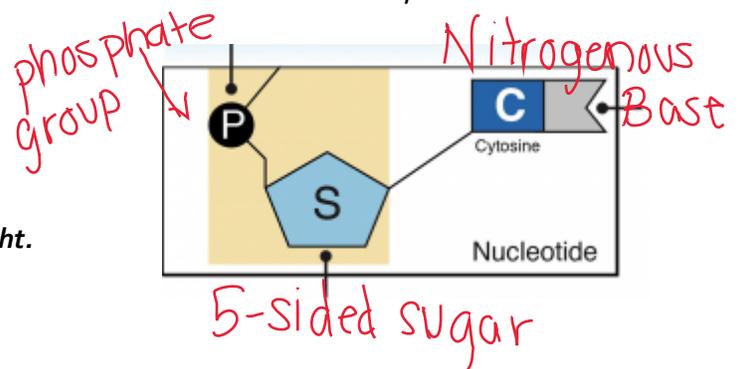


NUCLEOTIDES

DNA is made up of many **nucleotides** connected together. A nucleotide is the basic unit of DNA, and includes the following components:

- 5-sided sugar (deoxyribose)
- Phosphate group
- Nitrogenous base

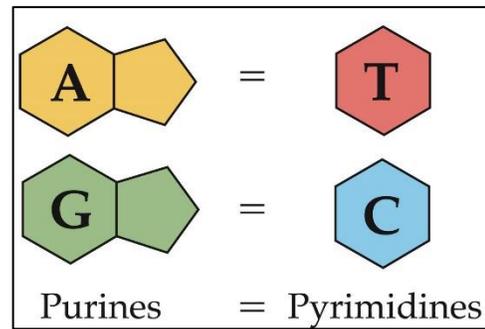
Label the three parts of the nucleotide in the image to the right.



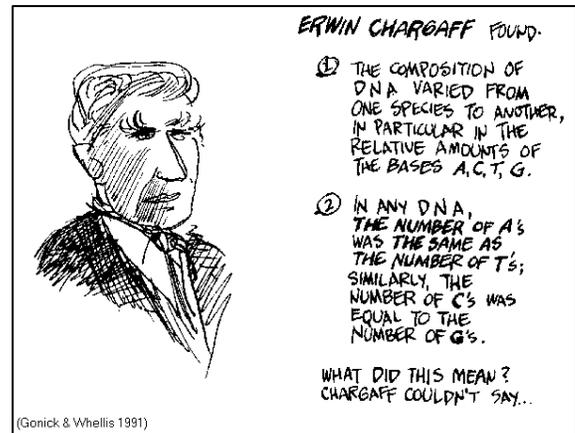
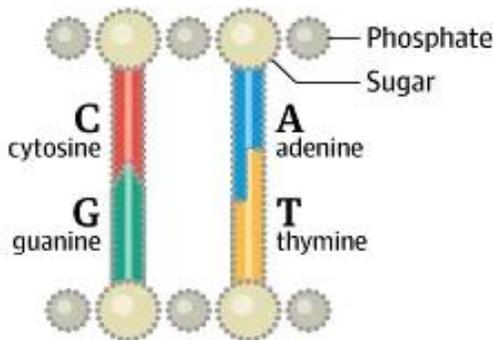
NUCLEOTIDES (CONT.)

There are four nitrogenous bases that can occur in a nucleotide:

_____ Adenine
 _____ Thymine
 _____ Cytosine
 _____ Guanine



These nitrogenous bases bond with each other and form "pairs" according to **Chargaff's Rule**:



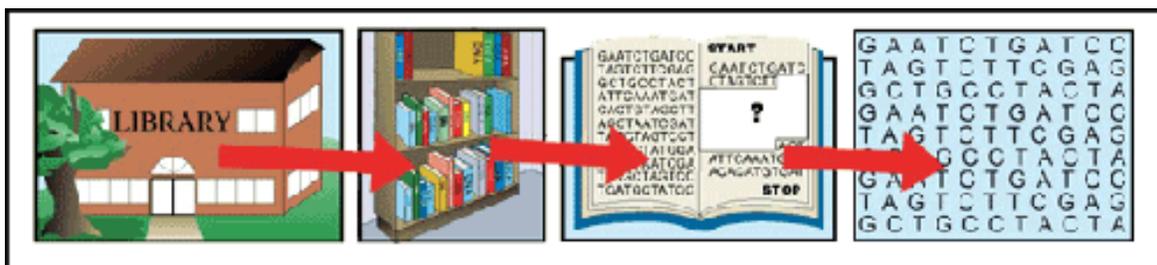
DNA, GENES, AND CHROMOSOMES

How does our DNA control who we are and how we look?

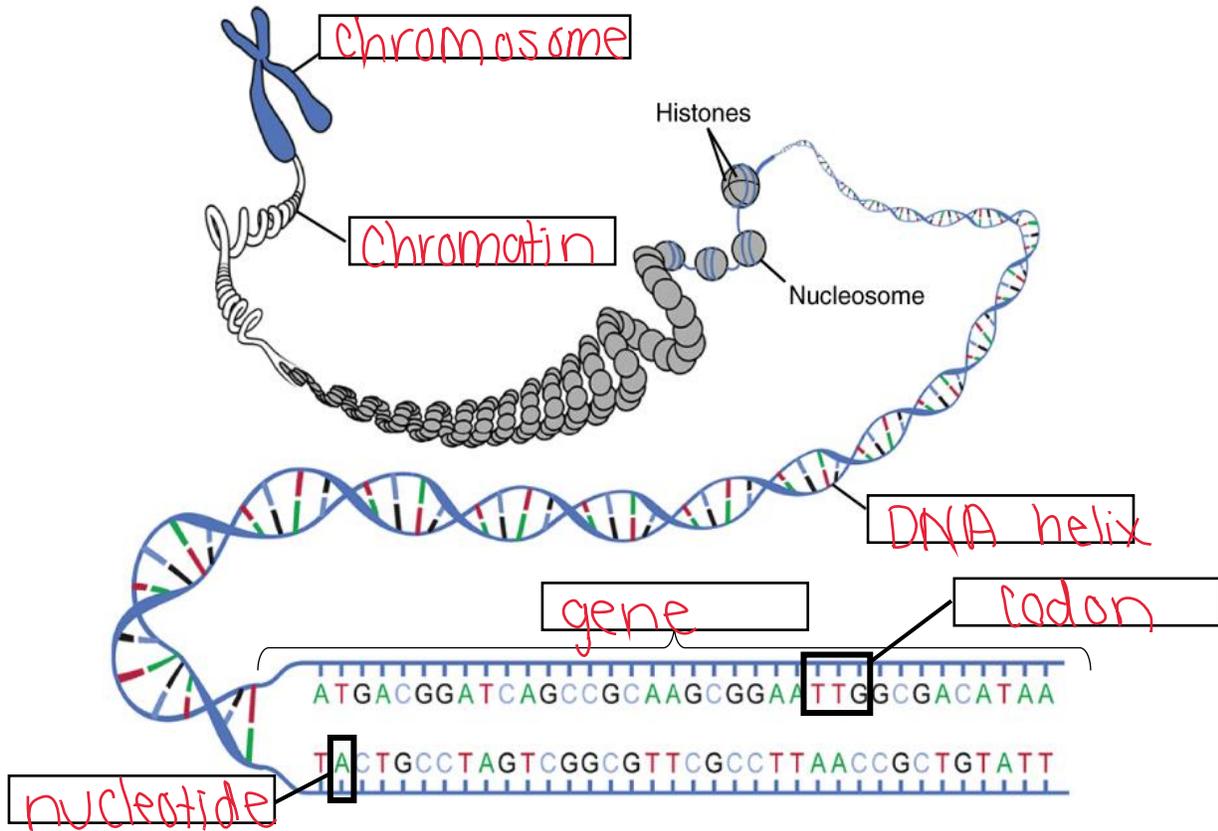
The **sequence** of bases in DNA is very important, just like the sequence of letters in a word or sentence is very important! Certain sections of DNA contain specific sets of instructions that control how we look and function!

DNA, Genes and Chromosomes: An Analogy

The nucleus is like a library for how to make a human.
 Inside the library are books. These books are like chromosome.
 Each book contains printed text. The text is like chromatin.
 The text is organized into chapters. Chapters are like genes.
 The chapters contain sentences made of words. The words are like codons.
 Each word is made up of letters. The letters are like DNA.

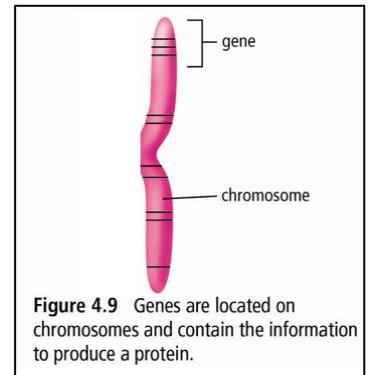


In the diagram, label the following: **chromatin, chromosome, codon, DNA helix, gene, nucleotide.**



Now use those same terms to fill in the blanks below:

The bases in a gene that are grouped in sets of three	codon
Small components that make up DNA	nucleotide
Sections of DNA that control particular characteristics	gene
Molecule containing genetic information of an organism	DNA
DNA wound into a thin threads	Chromatin
Chromatin that has been condensed	chromosome



CHROMOSOMES IN ORGANISMS

All organisms on earth store their genetic information in the form of chromosomes

- Every organism has a different number of chromosomes.
 - o Cows: 60
 - o Dogs: 78
 - o Worms: 36
 - o Mulberry plants: 28
- Chromosomes exist in pairs
- In each pair, one chromosome came from a female parent, and the other came from a male parent.
- Humans have 46 chromosomes (23 pairs)
- **Each chromosome stores different genes**

Source: S. Langlios Edited by B. Vissers

Chromosomes of a human cell

