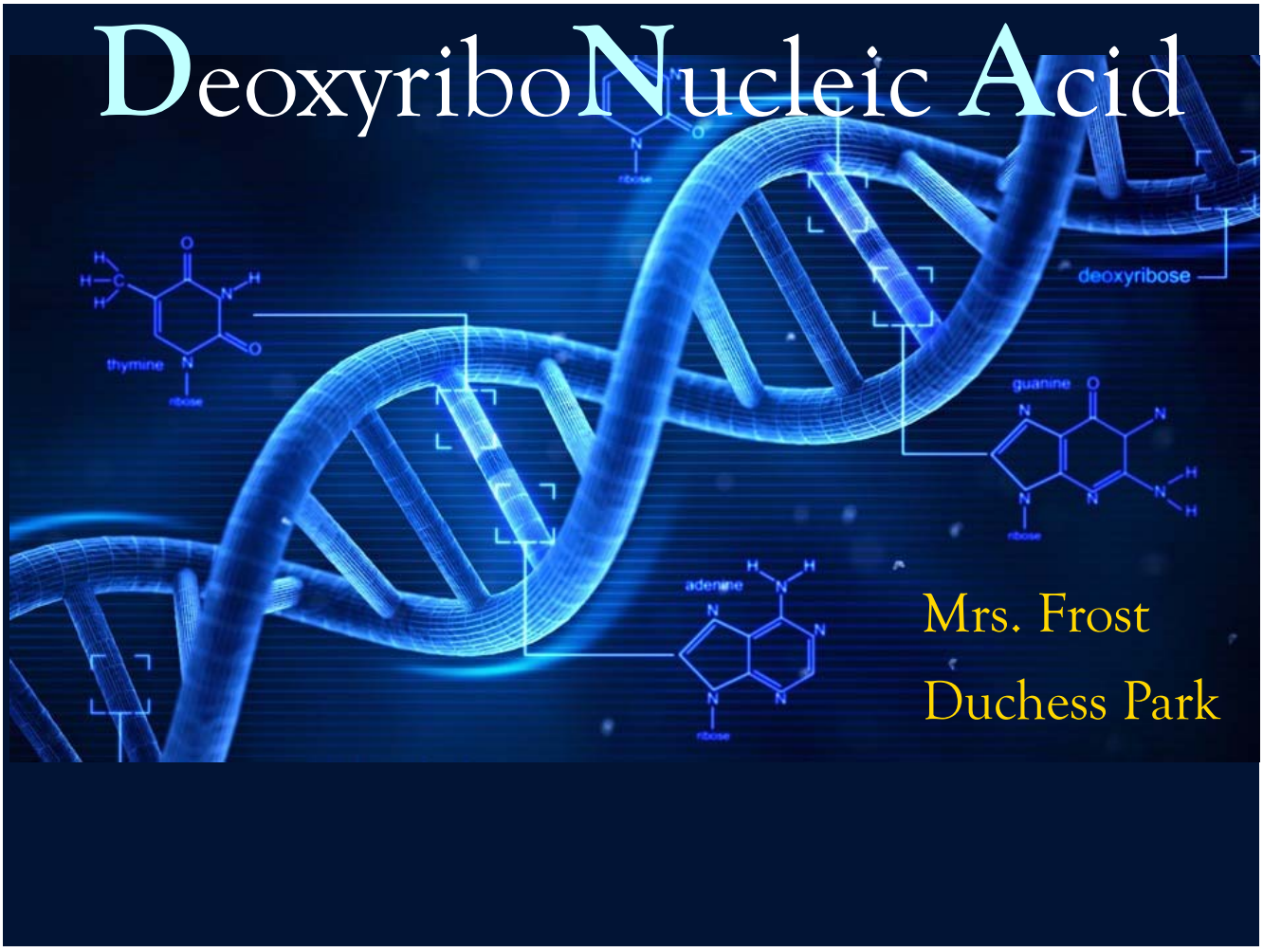
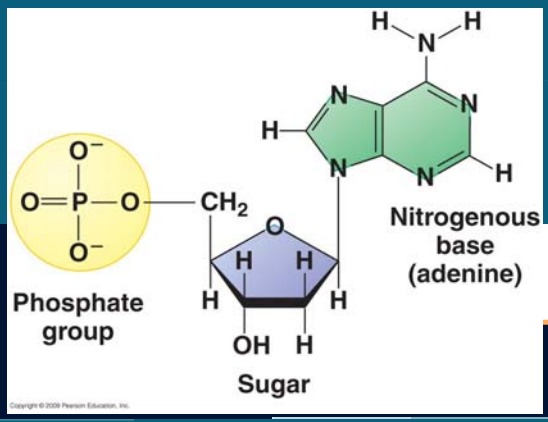

DeoxyriboNucleic Acid
thymine
deoxyribose
guanine
adenine
Mrs. Frost
Duchess Park

What is DNA?

DNA ... is an organic molecule found in the nucleus
... is a polymer made up of nucleotide monomers
... stores genetic information
... replicates and transmits information to offspring
... controls protein synthesis



Nucleotides: made up of 3 parts
- nitrogen-containing base
- phosphate group
- pentose sugar

-DNA is double stranded with **complementary base pairing** of nucelotides (A-T and C-G)
- Two strands are twisted to form a **double helix** (hydrogen bonding between the base pairs)

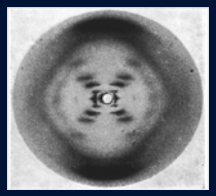
Discovery of DNA

Scientists began with the understanding that the genetic material must be able to store crucial information and be able to accurately replicate.

1865 Gregor Mendel developed laws of heredity → **Father of Genetics**

1940s Erwin Chargaff calculated amount of A=T and C=G

1951 Rosalind Franklin used X-ray diffraction to photograph DNA and determine its structure

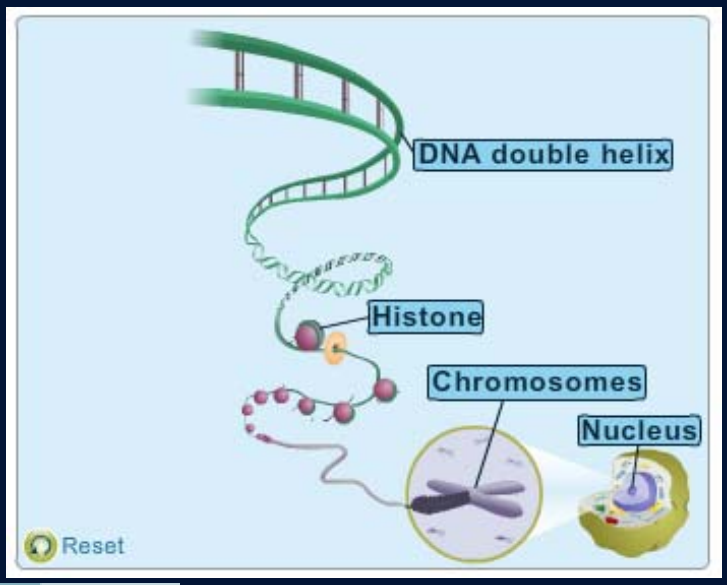


1952 Alfred Hershey & **Martha Chase** definitively proved that DNA was the genetic component of cells, not protein

1953 James Watson & **Francis Crick** used the data gathered from previous scientists to determine the double helix structure of DNA and the hydrogen bonds between paired nucleotides

1962 Nobel Prize for Physiology or Medicine awarded to Watson, Crick & **Maurice Wilkins**

Packing DNA into a Cell

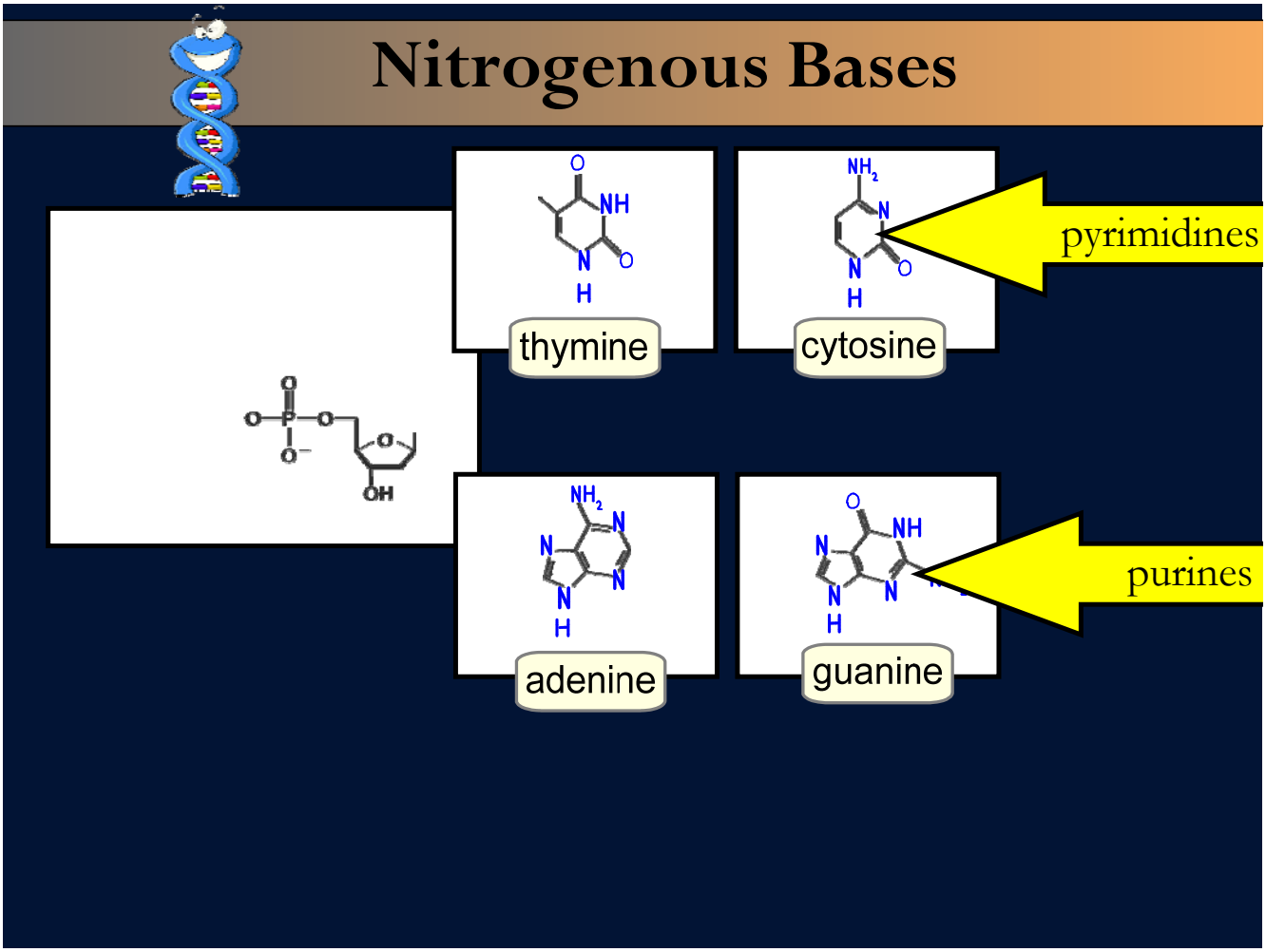


Each human cell has at least 2 meters of DNA packed into the nucleus which is about 5 um in diameter.

Note... the human body is made of 37.2 trillion cells

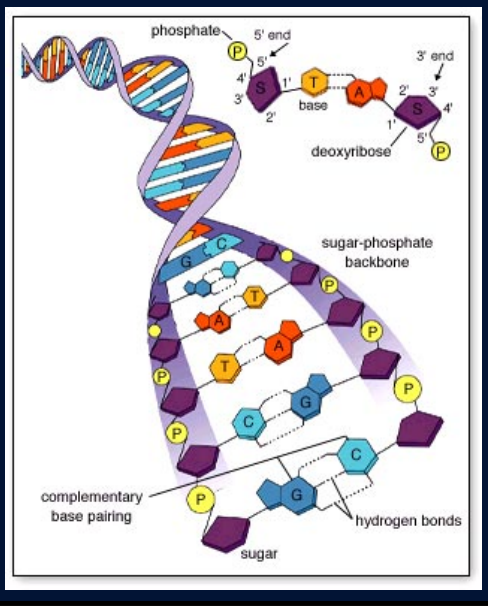
Chromatin (DNA wrapped around histones) condenses into chromosomes only during cell division.

Chromosome numbers... humans (46), corn (20), crayfish (200)


Nitrogenous Bases
thymine
cytosine
pyrimidines
adenine
guanine
purines

Bonding within DNA

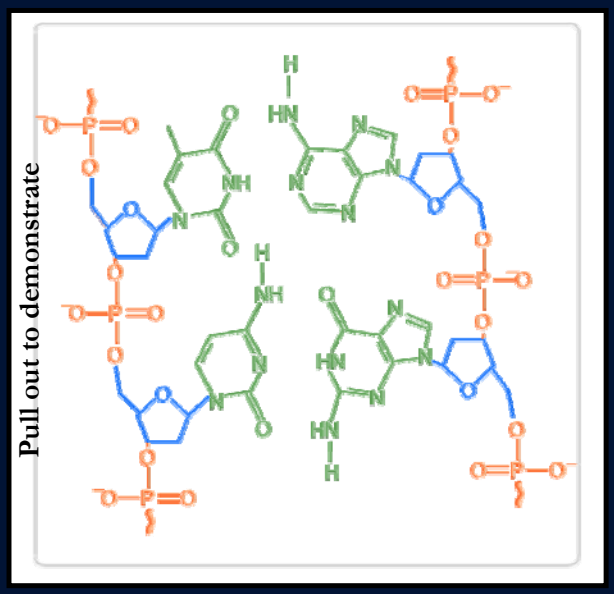
Nitrogenous base bonded to sugar by covalent bond ("glycosidic")



Bases bonded to each other using hydrogen bonds

A-T = 2 bonds
C-G = 3 bonds

Notice that the strands run *antiparallel*



End of 4.1

TED
Ideas worth spreading

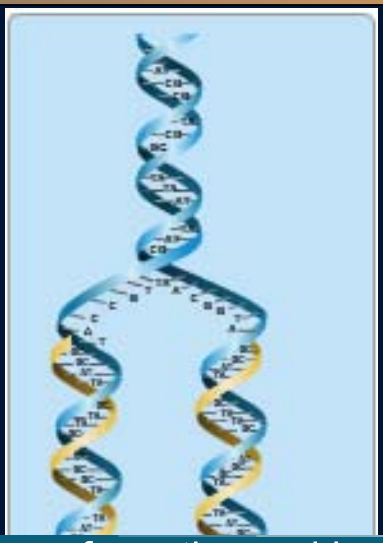
2011 Drew Barry
Biomedial Animator

Complete booklet Section 4.1

Replication of DNA

Textbook page 116

"Semi-conservative"



Replication is the process of creating an identical copy of DNA and is important for cell division, in which each of the two cells created from a single cell need a copy of the DNA. DNA replication is accomplished by enzymes in the nucleus called DNA polymerases.