

DNA



The Genetic “Blueprint”

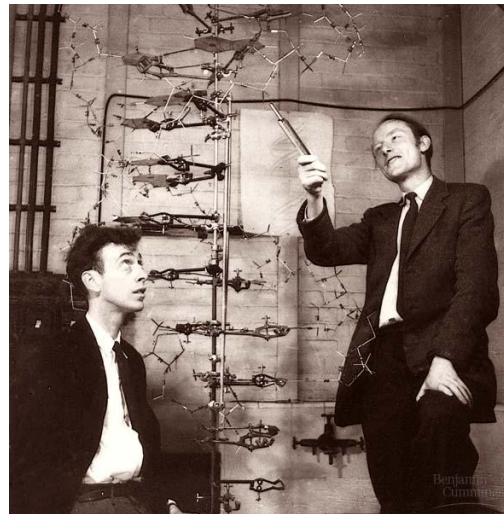
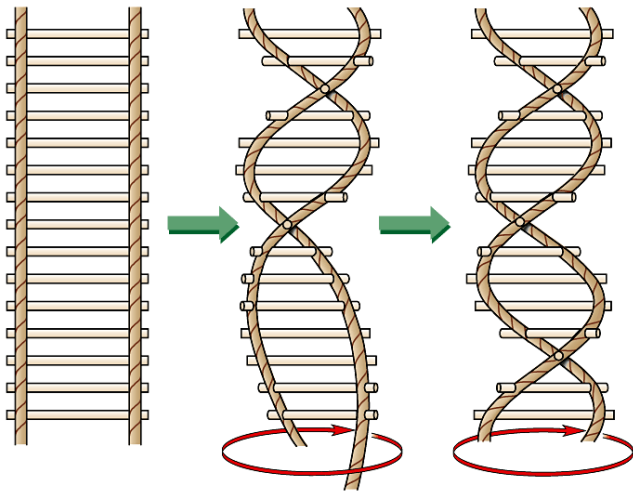


I. DNA cell **Location** = nucleus

II. DNA **Purpose** = blueprint for making the parts of living cells and organisms

III. DNA **structure** (shape) = Double Helix

- In 1953, James Watson and Francis Crick worked out the three-dimensional structure of DNA.
- They discovered that DNA consists of 2 chains twisted around each other like a “winding staircase.”



- Each DNA chain is made by connecting “building block” subunits called nucleotides

[DNA structure video](#)

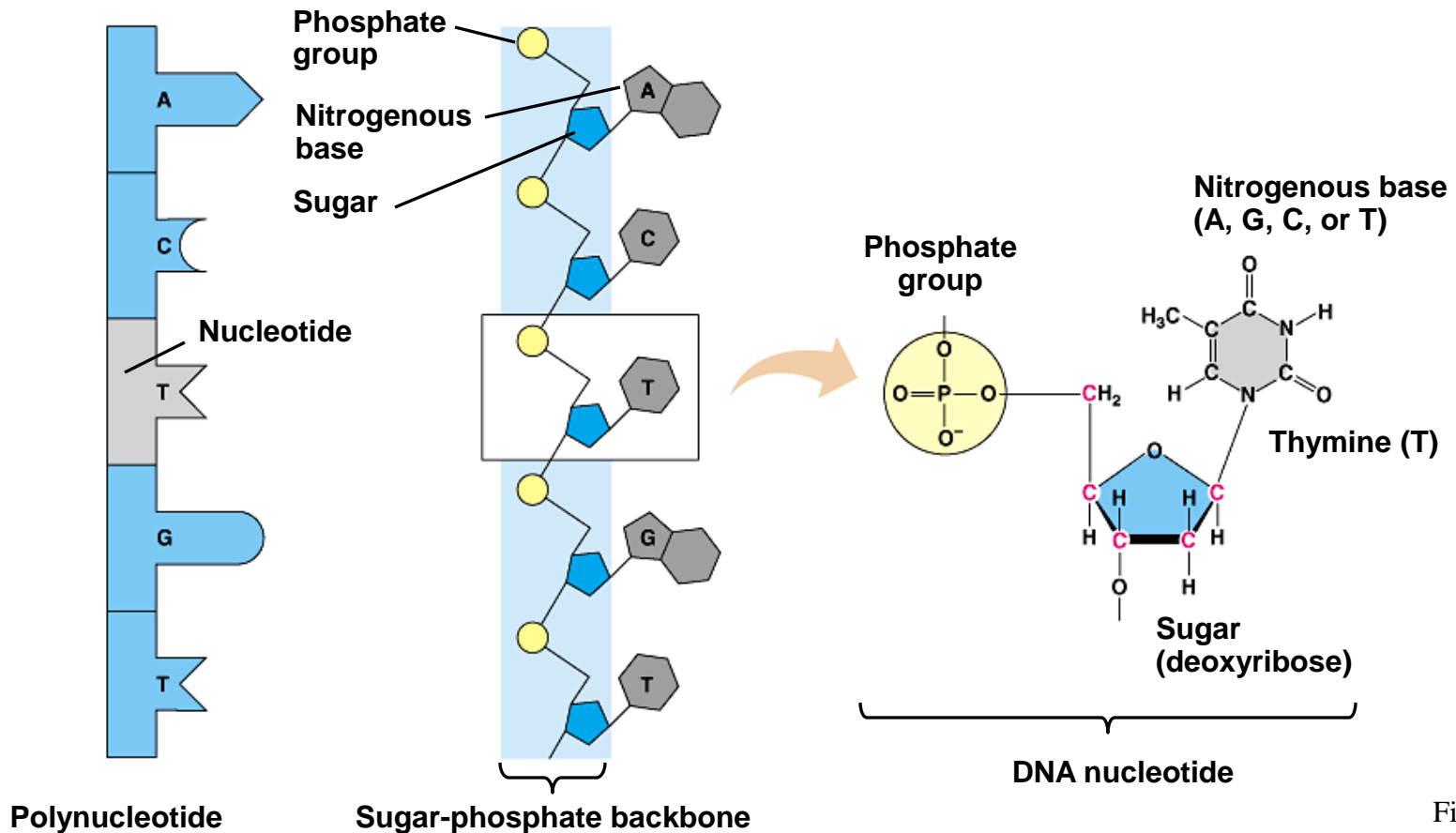
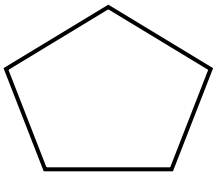
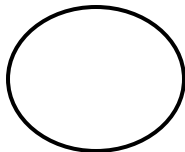


Figure 10.2A

- Each nucleotide has 3 parts that form an L-shape



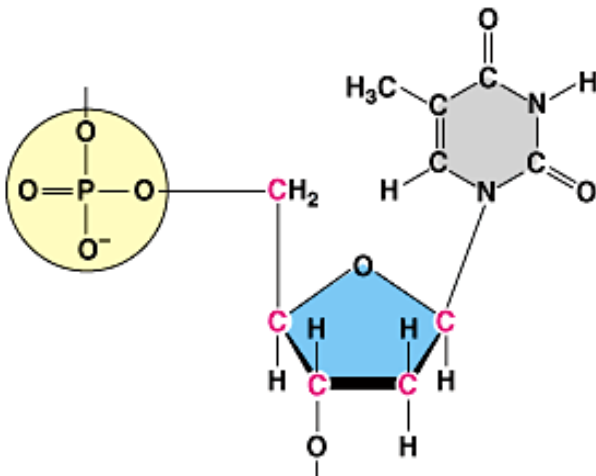
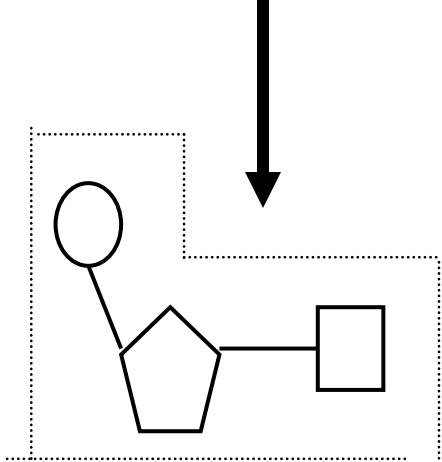
→ 5-C sugar =
deoxyribose



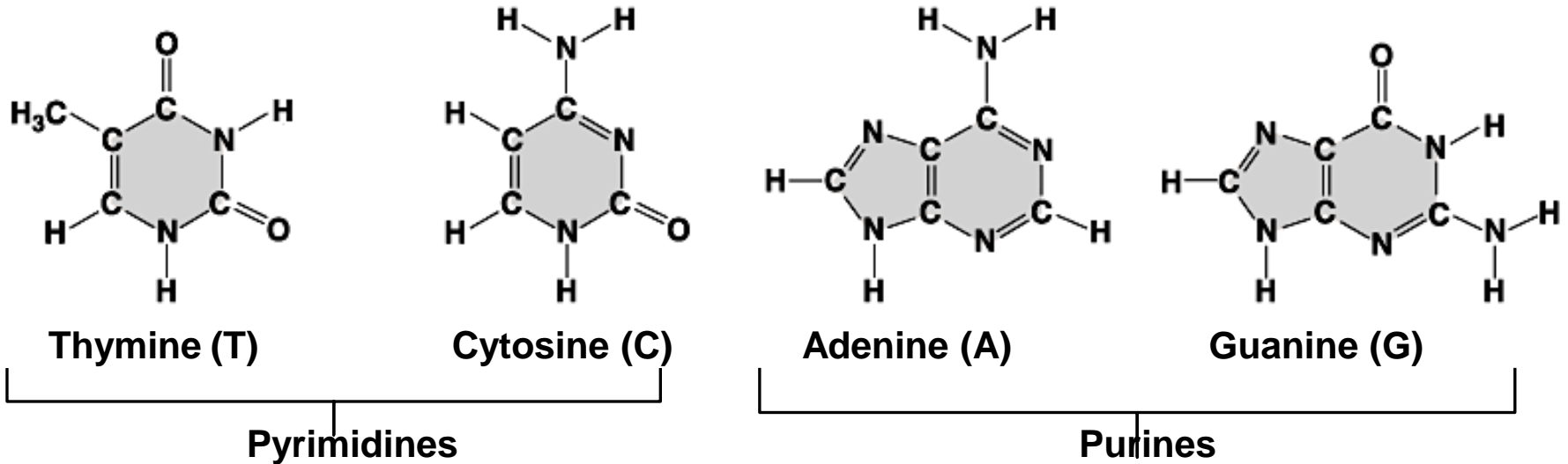
→ phosphate group (PO_4)



→ nitrogen base: 1 of 4



- DNA has four kinds of N-bases, A (Adenine), T (Thymine), C (Cytosine), and G (Guanine)



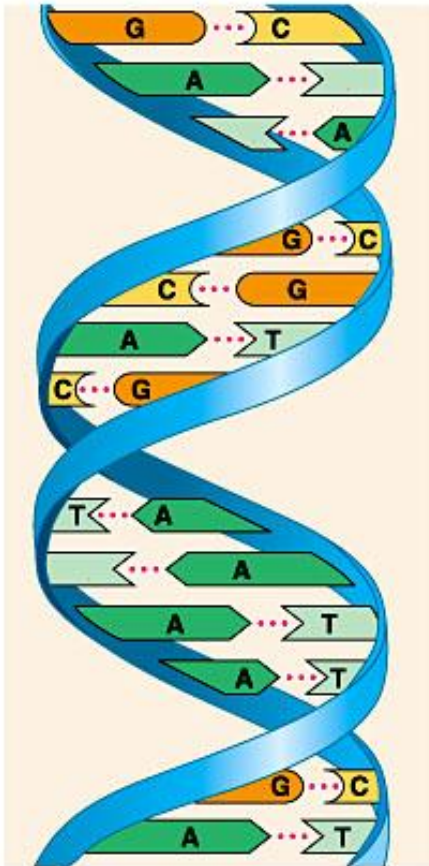
- The genetic CODE = the order of the N-base letters along one strand
- **One** human blueprint contains ~ 6 billion total N-base letters

- Hydrogen bonds between N-bases hold the 2 DNA strands together
 - Each base always pairs with a complementary partner = Base-Pairing Rules:
 - A pairs with T (2 Hydrogen bonds)
 - G pairs with C (3 Hydrogen bonds)

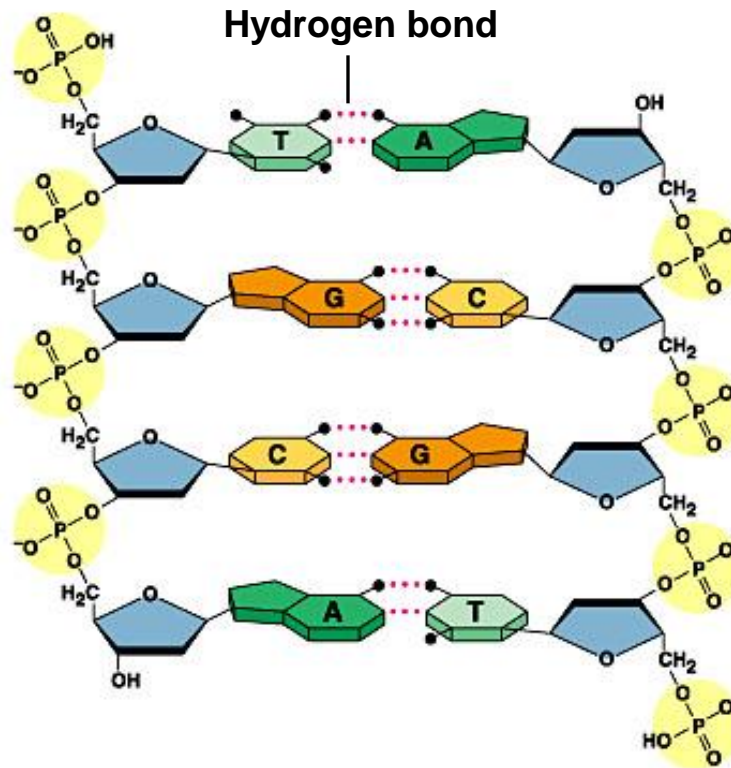
Given 1 DNA strand = A T C A G T

Fill in new strand → T A G T C A

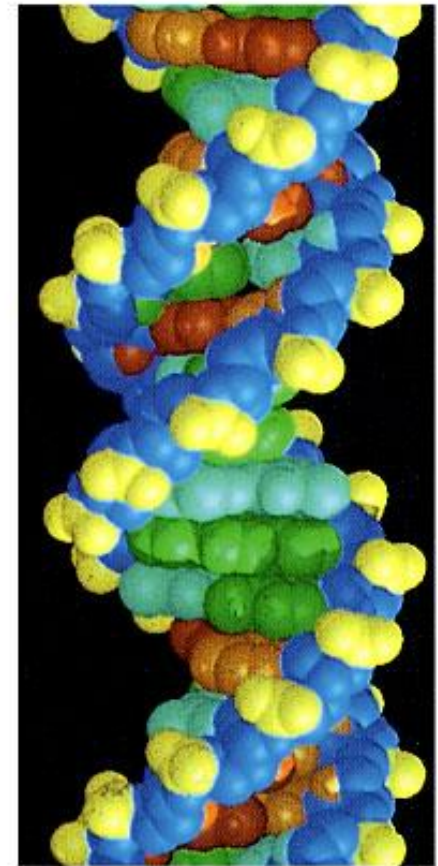
- Three representations of DNA



Ribbon model



Partial chemical structure



Computer model

- DNA diagram skills:
- ✓ Outline 1 **nucleotide**
- ✓ Label some **covalent** and **hydrogen** bonds
- ✓ Circle the sugar-P **backbones**

- Each strand of the double helix is oriented in the opposite direction = Antiparallel

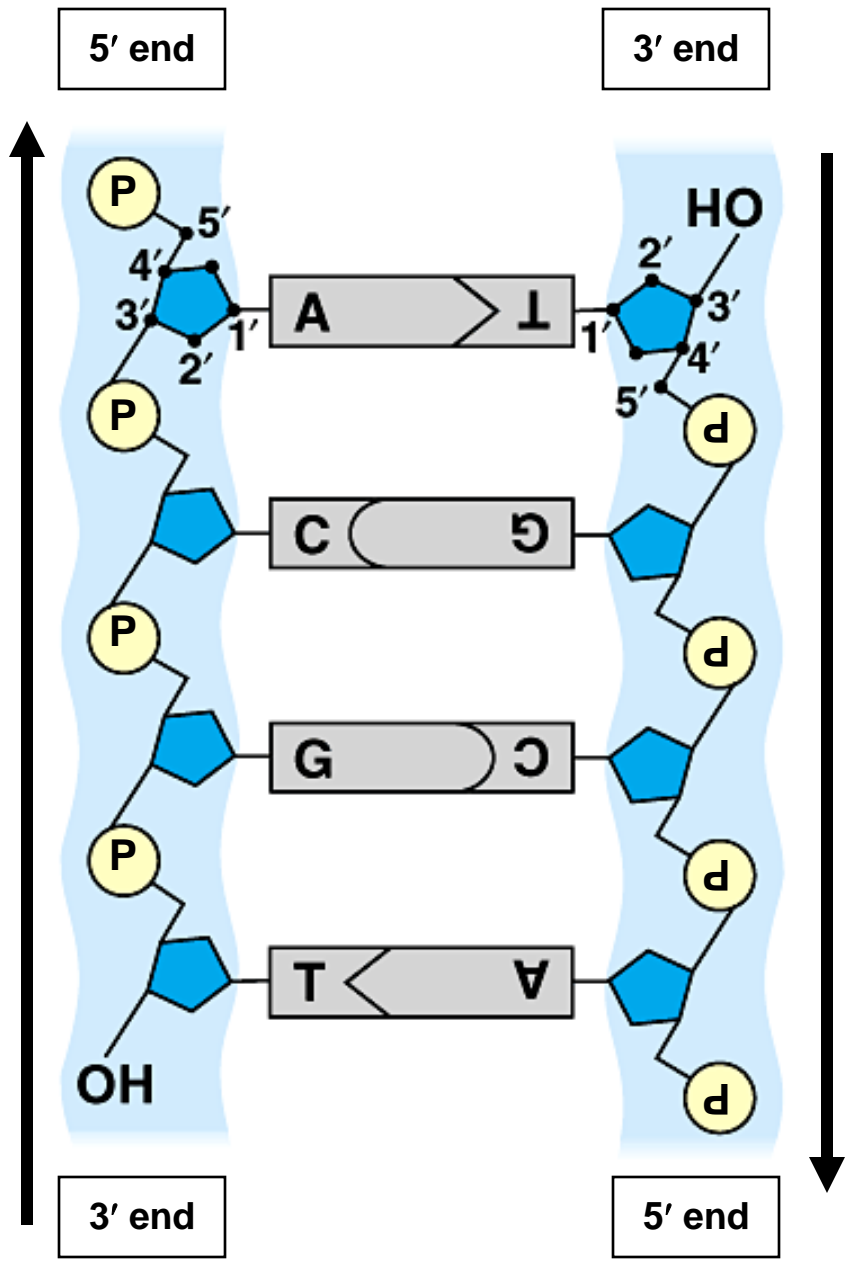


Figure 10.5B