

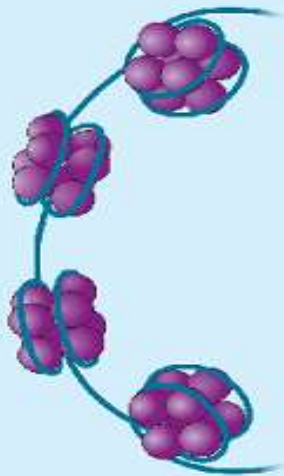
8.2 Structure of DNA

KEY CONCEPT - DNA structure is the same in all organisms.

EQ – What is the structure of DNA and how was it discovered?



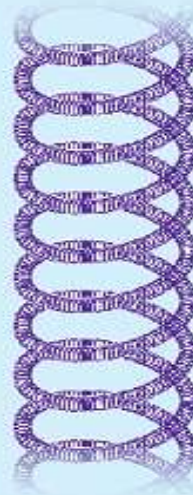
DNA double helix



DNA and histones



Chromatin



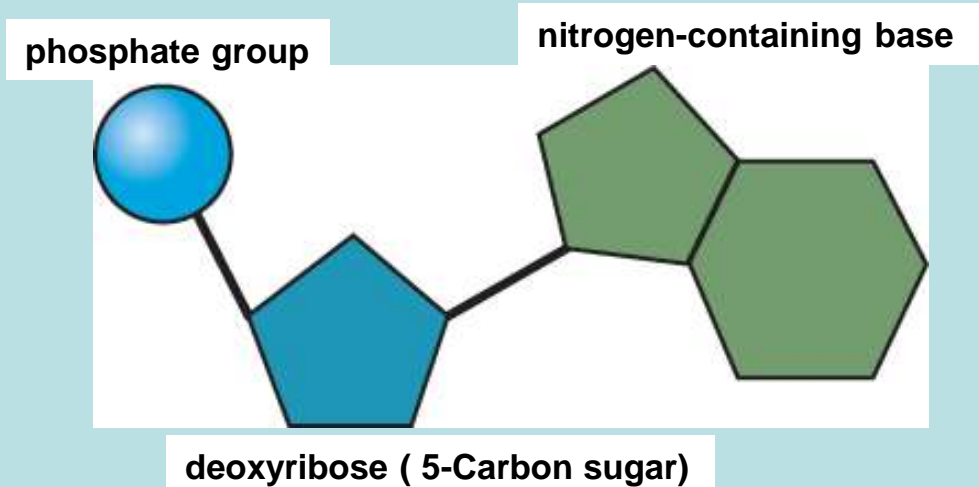
Supercoiled DNA



8.2 Structure of DNA

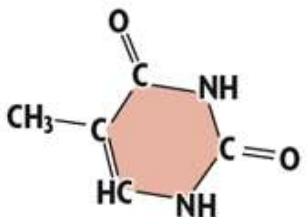

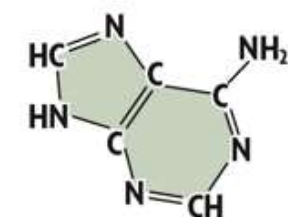

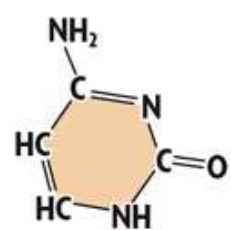



- ▶ DNA (**deoxyribonucleic acid**) is composed of **four types of nucleotides**.
- DNA is made up of a long chain of **nucleotides**.
- Each nucleotide has three parts.
 1. a **phosphate group**
 2. a **deoxyribose sugar**
 3. a **nitrogen-containing base**

Draw & Label a DNA nucleotide:



8.2 Structure of DNA

- The **nitrogen-containing bases** are the **only difference** in the four nucleotides.

PYRIMIDINES = SINGLE RING			PURINES = DOUBLE RING		
Name of Base	Structural Formula	Model	Name of Base	Structural Formula	Model
thymine			adenine		
cytosine			guanine		

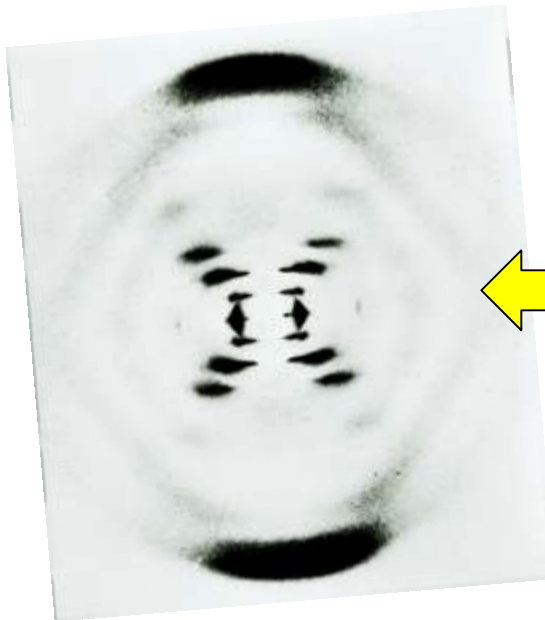
8.2 Structure of DNA

- ◉ **Watson and Crick** determined the three-dimensional structure of DNA by **building models**.
- They realized that DNA is a **double helix** that is made up of a **sugar-phosphate backbone** on the outside with **bases** on the inside.



8.2 Structure of DNA

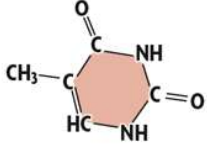

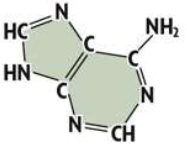

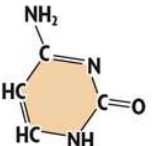



- Watson and Crick's discovery built on the work of **Rosalind Franklin** and **Erwin Chargaff**.
 - Chargaff found adenine and thymine occurred in equal amounts and cytosine and guanine occurred in equal amounts, thus **A=T** and **C=G**.
 - Franklin's x-ray images suggested that DNA was a **double helix of even width**.



Rosalind Franklin's x-ray diffraction image of DNA – showed DNA had a uniform width

8.2 Structure of DNA

- ▶ Nucleotides always pair in the same way.
- The **base-pairing rules** show how nucleotides always pair in DNA.
 - **A pairs with T**
 - **C pairs with G**
- Because a **pyrimidine** (single ring) pairs with a **purine** (double ring), the helix has a uniform width.

PYRIMIDINES = SINGLE RING			PURINES = DOUBLE RING		
Name of Base	Structural Formula	Model	Name of Base	Structural Formula	Model
thymine			adenine		
cytosine			guanine		

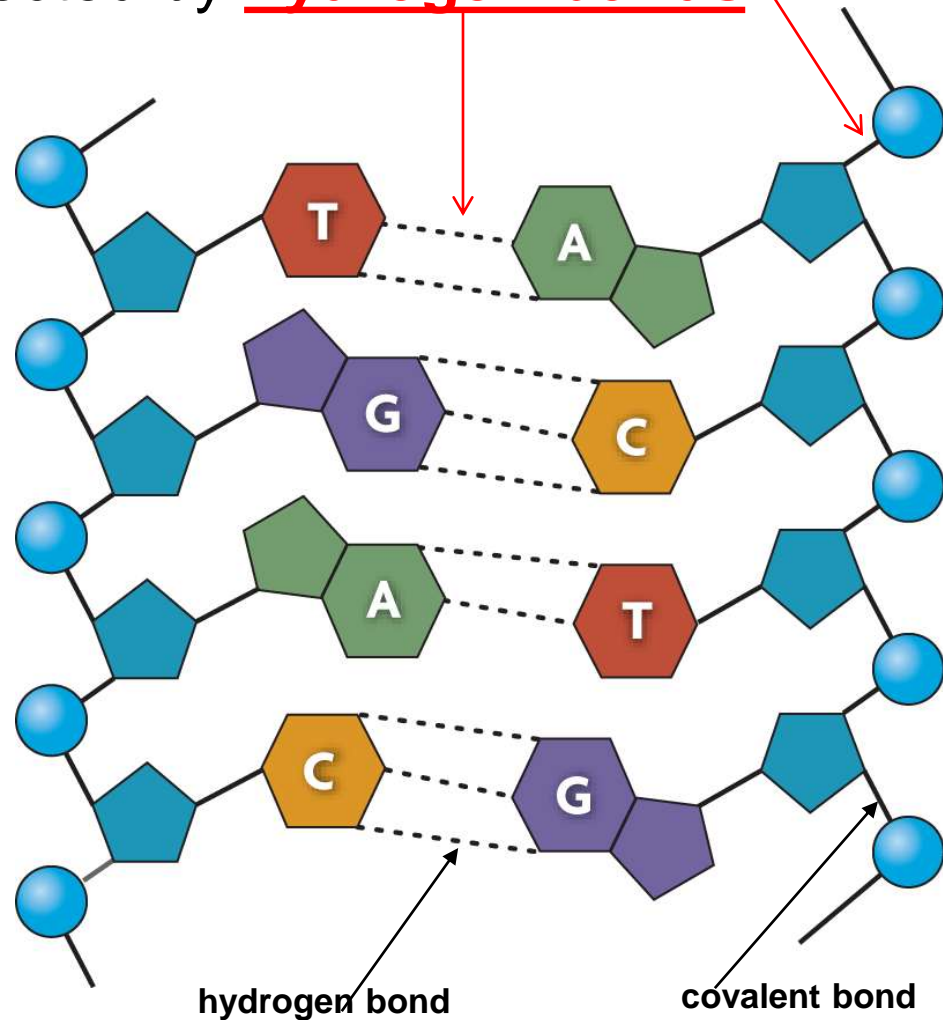


8.2 Structure of DNA

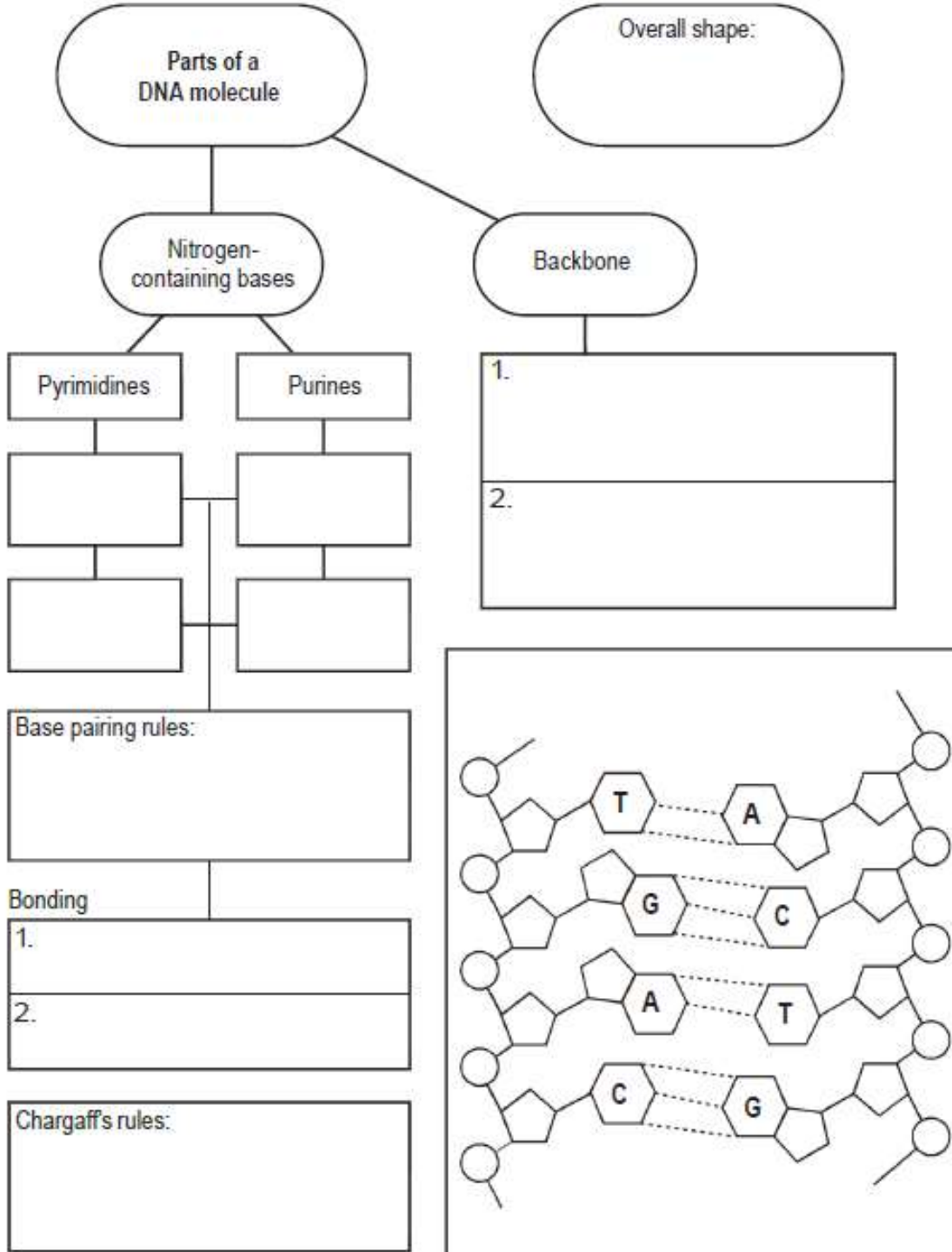
- The backbone is connected by **covalent bonds**.
- The bases are connected by **hydrogen bonds**.

REVIEW:

Which bonds are the strongest and the weakest?



5.2 Mitosi



5.2 Mitosis

