College Board AP Biology

Your notes

1.6 Nucleic Acids

Contents

Nucleic Acid Structure: DNA & RNA

Your notes

Comparing DNA & RNA Structure

DNA

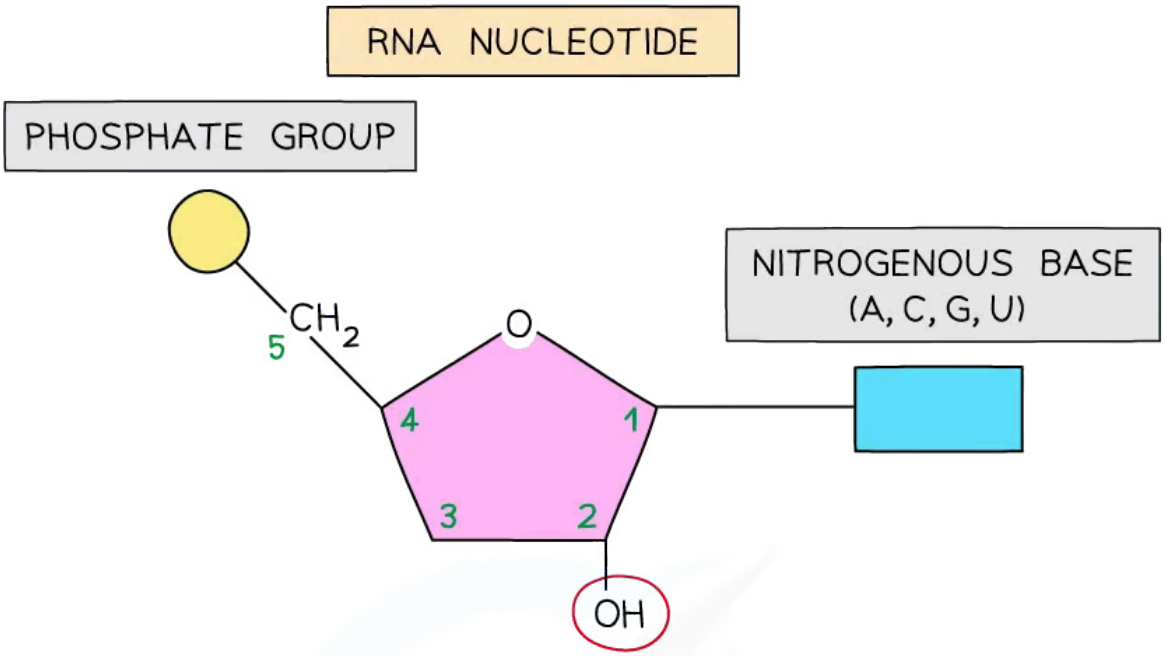
- **DNA** is a **polynucleotide** – it is made up of **many nucleotides** linked together in a chain
- **Sugar-phosphate bonds** in DNA (between different nucleotides in the same strand) are strong **covalent bonds**
- The nitrogenous bases in DNA **stick out sideways** from the sugar-phosphate backbone
- **DNA nucleotides** contain the nitrogenous bases **adenine** (A), **guanine** (G), **thymine** (T) and **cytosine** (C)
- **DNA** nucleotides contain the pentose sugar **deoxyribose**
- **DNA** molecules are made up of **2 polynucleotide strands** (they are **double-stranded**)
- **DNA polynucleotide chains** are very **long**

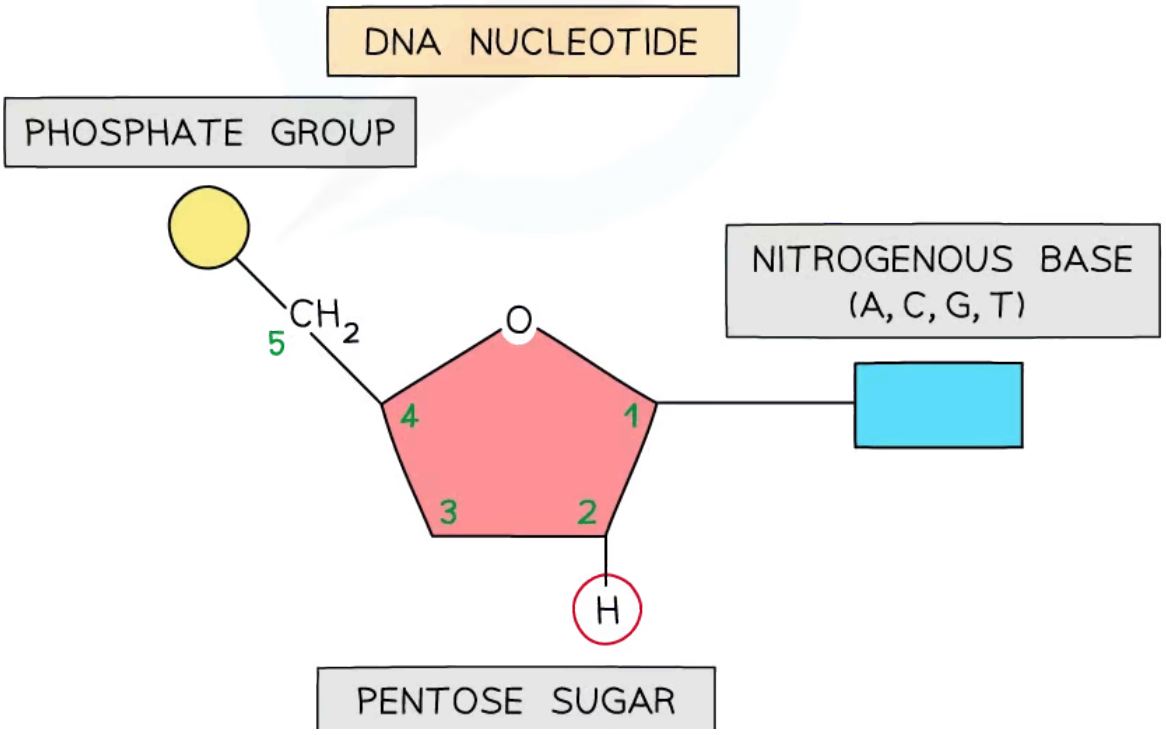
RNA

- **RNA** is also a **polynucleotide** – it is made up of **many nucleotides** linked together in a chain
- **RNA** nucleotides also contain the nitrogenous bases **adenine** (A), **guanine** (G), and **cytosine** (C)
- **Sugar-phosphate bonds** in RNA are strong **covalent bonds** as they are in DNA
- The nitrogenous bases in RNA **stick out sideways** from the sugar-phosphate backbone, the same way they do in DNA
- **Unlike DNA**, RNA nucleotides **never contain** the nitrogenous base **thymine** (T) – in place of this they contain the nitrogenous base **uracil** (U)
- **Unlike DNA**, RNA nucleotides contain the pentose sugar **ribose** (instead of deoxyribose)
- **Unlike DNA,** RNA molecules are only made up of **1 polynucleotide strand** (they are **single stranded**)
- **Unlike DNA,** RNA polynucleotide chains are relatively **short compared to DNA**

Diagram comparing DNA and RNA Nucleotide Structures

Your notes





Your notes

An RNA nucleotide (above) compared with a DNA nucleotide (below)

Nucleotide Structure Summary Table

Properties	DNA	RNA
Pentose sugar	Deoxyribose	Ribose
Bases	Adenine (A) **Thymine (T)** Cytosine (C) Guanine (G)	Adenine (A) **Uracil (U)** Cytosine (C) Guanine (G)
Number of strands	Double stranded (double helix)	Single stranded

Exam Tip

You need to know the difference between DNA and RNA molecules (base composition, number of strands, pentose sugar present).

A common error is to describe DNA or RNA as polymers of bases; more correctly, they are **polymers of nucleotides**