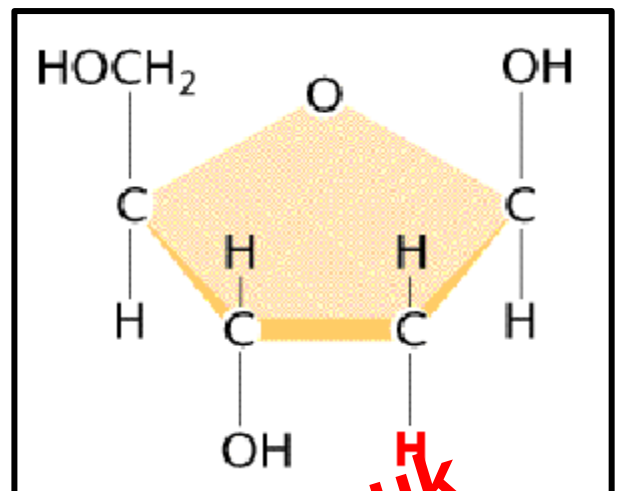
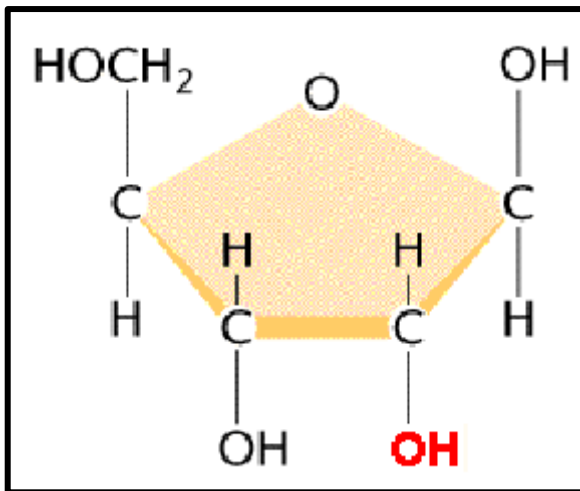


DNA, RNA and Chromosomes

- The DNA double helix is composed of **sugar-phosphate backbones with bases attached**. There are hydrogen bonds between the complementary bases that link the two strands
 - On one end, there will always be an **exposed phosphate group**, this is known as the **5' end**
 - The other end shows an **alcohol/OH group** known as the **3' end**
- The sugar, known as **deoxyribose** is a 5-carbon sugar (pentose)
 - The following shows the images of ribose sugar (left) and deoxyribose (right):



- The **phosphates are normally joined to the 5-carbon** (and so 5'). Monophosphate, diphosphate and triphosphate are common
 - This is essentially how many phosphates are bonded to the CH₂ group
 - **The phosphate makes the nucleotide negatively charged**
- **Nucleotides** refer to the structure that is a **nitrogenous base, a five-carbon sugar and one or more phosphate groups** bonded together
 - **Carbon-1 has the base attached**
 - The bases are bonded to the sugar via **N-glycosidic bonds**
 - **Carbon-2(RNA),3 have OH groups**
 - **Carbon-5 has the phosphate attached**
- The **nitrogenous** bases can be separated into 2 classes based on the number of rings they contain:
 - **Pyrimidines**
 - These have **one nitrogen-containing ring**
 - They include **C, T and U**
 - **U lacks the CH₃ group that T has**
 - **Purines**
 - These have **two nitrogen-containing rings**
 - They include **A and G**
- The **base and sugar without the phosphate are known as nucleosides**, whereas with the phosphate they are nucleotides, the nucleosides are as follows:
 - **A = adenosine**
 - **G = guanosine**
 - **C = cytidine**
 - **U = uridine**
 - **T = thymidine**