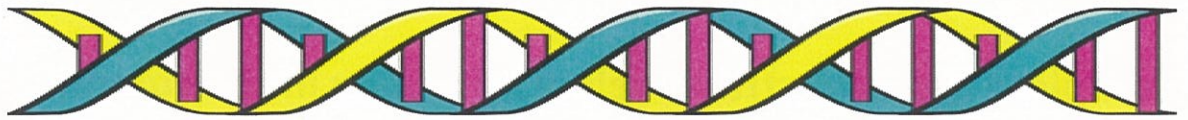


## Recap....



DNA is found in the

nucleus and is important for controlling the function of the cell.

DNA is in shape of a:

Double Helix.

This structure allows for large amounts of genetic information to be stored in a small amount of space.

Nucleotides are made of the following structures:



Phosphate

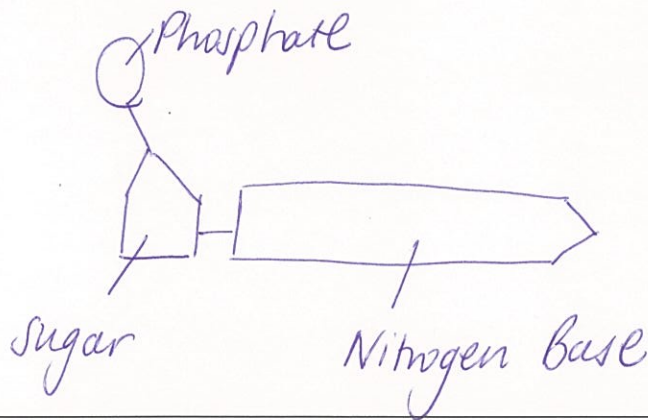


Sugar



Nitrogen Base (One of a pair)

Draw a nucleotide in the space below:



There are **four different** types of nitrogen bases. Each base has a complementary base which it partners with.

Name the nitrogen bases and their partners below:

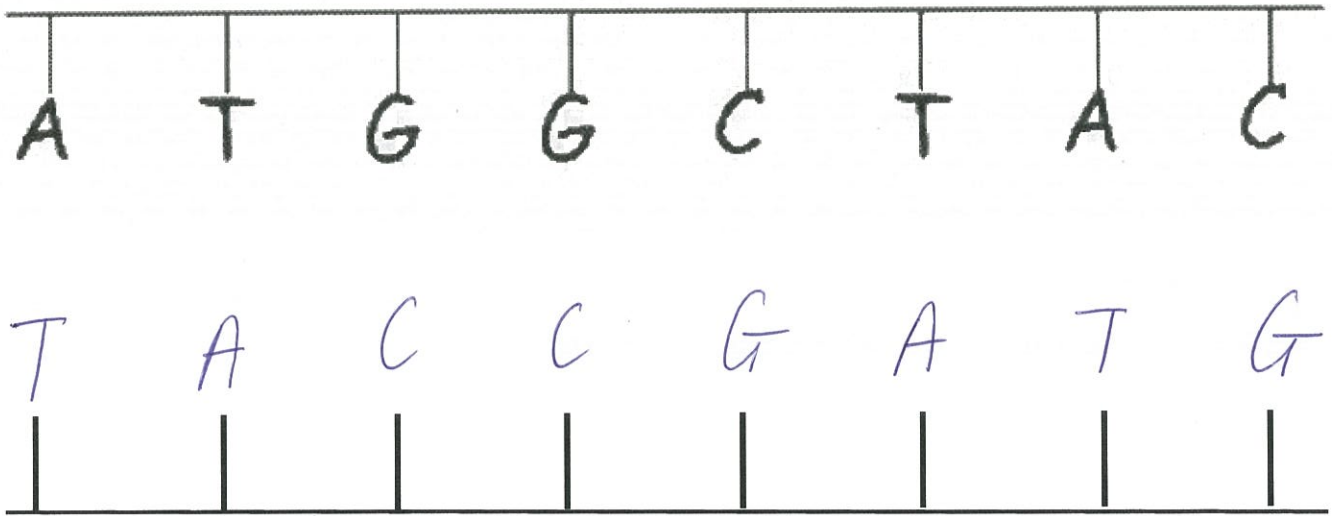
A denine bonds with T hymine

C ytosine bonds with G uanine

The bond that connects the base pairs together is a relatively weak hydrogen bond.



Complete the DNA strand below by adding in the complimentary bases:





# Relationship between DNA, Chromosomes and Genes

Human cells have between 2 – 3 metres of DNA in their nucleus. In order to fit this much genetic material in a small space the DNA is in the form of a double helix. The DNA strands are coiled around proteins called **histones**. This coiled DNA is called **chromatin**.

**Chromosomes** are DNA molecules carrying genetic information in the form of **genes**. Chromosomes are condensed 'super coiled' structures which become visible during cell division.

We have 23 pairs of chromosomes (46) in total.

The first 22 pairs (44) of chromosomes are called **autosomal chromosomes**. These are also called body/non-sex chromosomes.

The last pair of chromosomes (2) are called **sex chromosomes**. These determine the sex of the individual.

A **Karyotype** is a picture which shows all the chromosome pairs matched up from largest to smallest.

Sections of chromosomes (or DNA) contain specific instructions (genetic code) for structure and activities coordinated by the cell. These sections are called **genes**. We all have genes which code for the same traits, however our specific genetic codes vary. For example: We all have the gene for eye colour, however people have blue, brown or green eyes. These differences in genes of a population contribute to **genetic variation**.

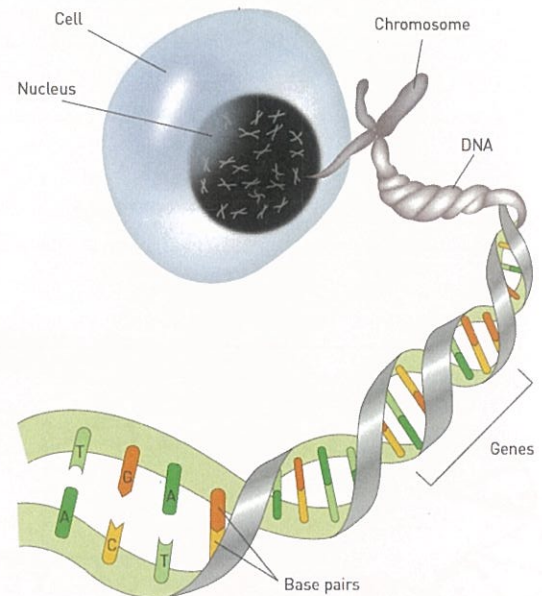
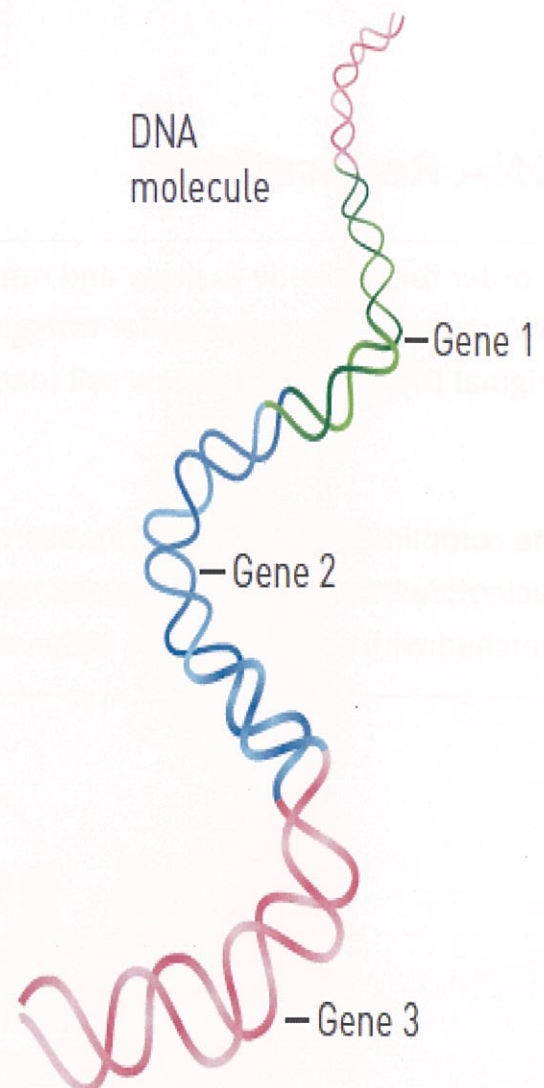
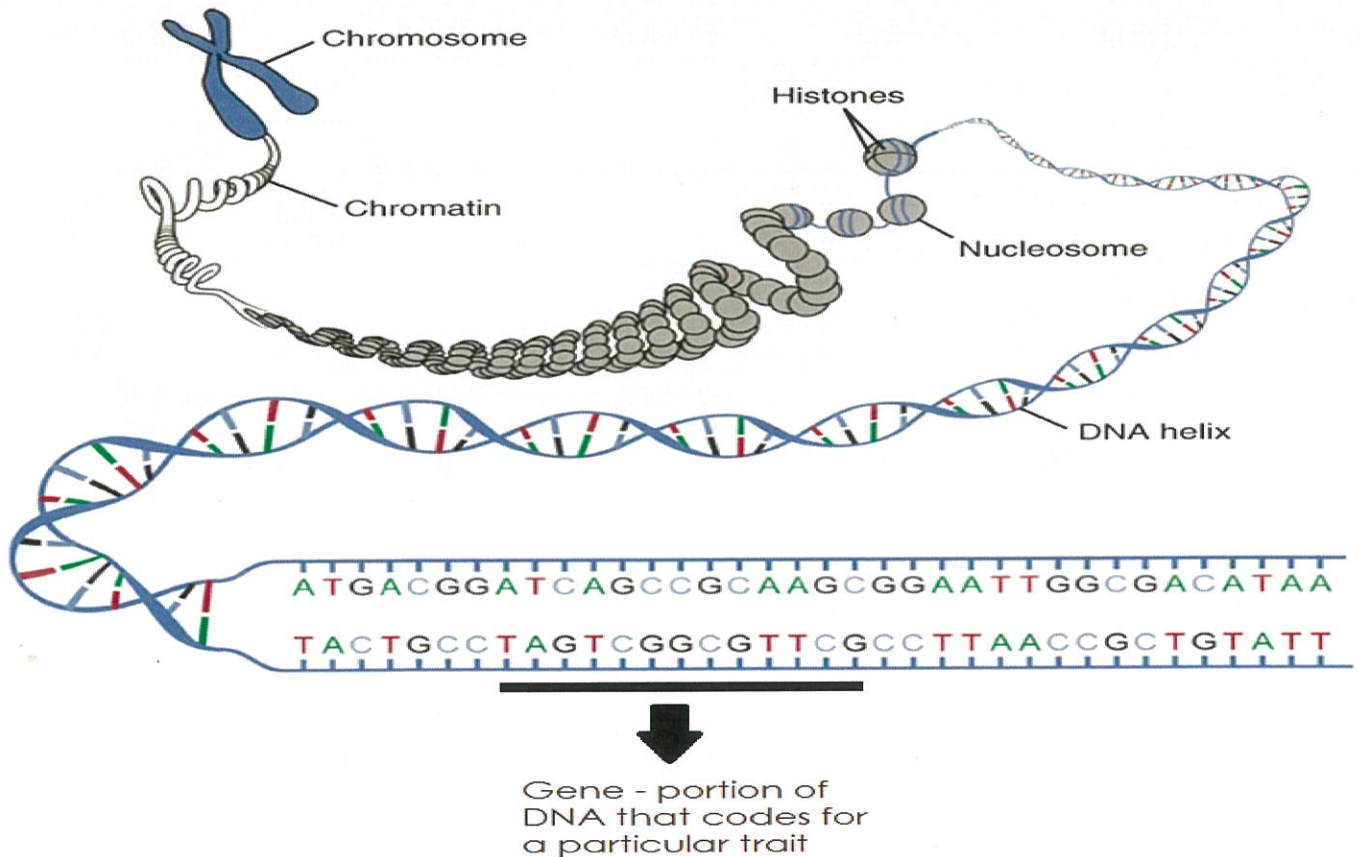


Figure 1.10 The relationship between DNA and chromosomes.





## DNA Replication

In order for our body to grow and repair damaged cells we need to undergo DNA replication. DNA replication is required for **mitosis** to occur. In Mitosis we need an **identical copy of the original DNA** so that the new cell (daughter) can be exactly the same as the original (parent).

The complimentary base pairs make this process easy. The DNA first **unzips** (separates at the nucleotides) by breaking the weak hydrogen bonds between the bases. Each strand is then matched with complimentary bases to make a new double stranded DNA molecule.

