

Name:

Date:

Science 10: DNA Structure and Replication

Every body cell contains the same organelles and the same information.

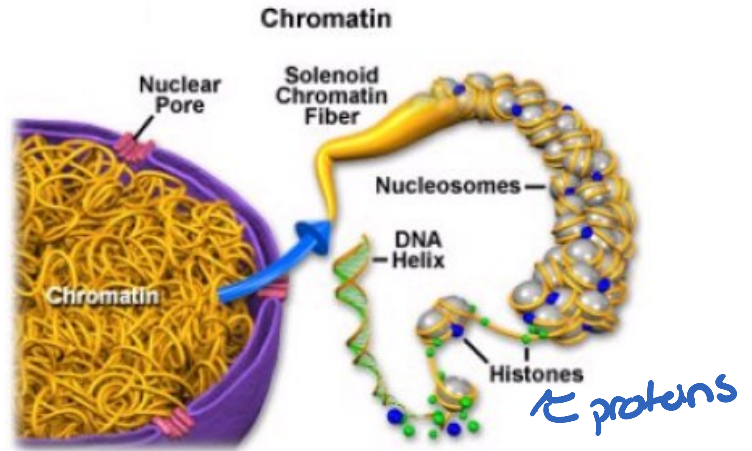
However, your skin cells have different functions than your eye cells, which have a different function than your stomach cells and so on.

It is the information stored in the nucleus that determines what each cell will end up being responsible for.

This information is stored in the do Chromatin that you have learned is in the nucleus of a cell.

Chromatin is really a strand of DNA and proteins.

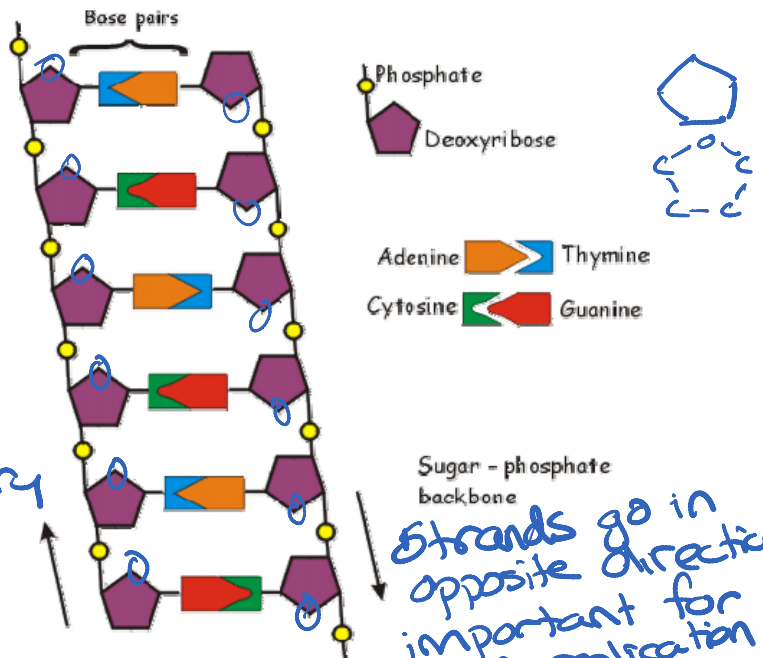
DNA is deoxyribonucleic acid.



Each molecule of DNA is made of 2 strands. These strands wrap around each other to make a double helix. It is often referred to as a twisted ladder.

The sides of the DNA are made of sugar (ribose) and phosphate.
deoxyribose

The "rungs of the ladder" are composed of four nitrogen bases. These bases are adenine (A), thymine (T), cytosine (C), and guanine (G). They always pair together in the same way. A with T and G with C. This is called complementary base pairing.



The characteristics of every living thing on the planet is dependent upon the order of these base pairs in the DNA sequence.

Q Notice that the strands are pointing in the opposite directions! This is important in DNA replication.

DNA Replication

DNA replication is a semi-**conservative** process. This means that some of the original strand stays intact which making the new strands.

There are 3 major steps to DNA replication

- i) Initiation
- ii) Elongation
- iii) Termination

STEP 1: INITIATION \rightarrow enzyme

DNA **helicase** begins to separate the strands. This is called the **point of origin**. Helicase breaks the **hydrogen** bonds between the nucleotide bases.

STEP 2: ELONGATION

DNA **polymerase** makes a new strand of DNA by reading the **nitrogen bases** on the template strand and adding one nucleotide after the other. It always add the complimentary base pair of what it reads.

DNA **polymerase** can only build from the **5' to the 3'** end. The strand that is built forward is called the **leading** strand.

The strand that must be built backwards is called the **lagging** strand. This strand must be made piece by piece, these pieces are called **Okazaki** fragments.

STEP 3: TERMINATION

DNA **ligase** comes in to fill the gaps left in the Okazaki fragments.

