**Resource 2b (KS3) Read & Reduce Activity**

**What makes organisms different?**

Organisms differ because they have different genes. Humans have human genes, gerbils have gerbil genes and bananas have banana genes (interestingly we share 50% of our DNA with bananas. Nobody else in the wold has the same DNA as you. All human cells have 46 chromosomes, 23 pairs. Different living things will have a different amount. Chromosomes are held inside the nucleus of the cell. All cells (except red blood cells) have a nucleus. Chromosomes are made up of a string of smaller parts called genes. Different genes control the development of different characteristics by issuing instructions to the cell. Characteristics are things about us eg. Our hair colour, eye colour, if we can roll our tongue and sometimes if we have a disease or not.

**What is DNA?**

Chromosomes and their genes are made of a molecule called DNA. DNA stands for deoxyribonucleic acid. The DNA molecule looks like a twisted ladder. This shape is a spiral and is called a double helix. Each chromosome is a very long molecule that is very tightly coiled together. Humans have 23 pairs of chromosomes, 46 in total. The double helix ‘ladder’ of a DNA molecule is held together by ‘rungs’ made from pairs of chemicals called bases. There are four types of bases, and they are usually identified by their initials.

**What are alleles?**

Alleles are different versions of the same gen and depending on which ones you have makes you look or have certain characteristics. An allele can be either dominant or recessive. For example eye colour is dictated by an allele. Brown eyes are dominant so if you have 1 or 2 alleles for brown eyes you will have brown eyes. However if you have blue eyes, because the allele for blue is recessive you have to have two alleles for blue, otherwise your eyes will still look brown. This means that two brown eyed birth parents can have a blue-eyed child. Some disorders, such as cystic fibrosis, are also recessive disorders.

**How do we get our own genes and DNA?**

Nobody in the world has the same DNA, even if you are an identical twin. It used to be thought that identical twins had exactly the same DNA but recently it has been found that even though they may look the same there are differences in their DNA so they can be identified this way.

Sperm calls and eggs cells contain a single set of the chromosomes and when the sperm fertilises the egg the chromosomes match up. This then gives the baby its characteristics. Depending on the genetic make up of the two birth parents the different alleles will be either dominant or recessive and the baby will have certain characteristics. This is why we look similar to our birth parents, but not the same, and why we can look very different from our brothers and sisters. Which chromosome ends up in which sperm or egg is totally random and therefore the way you look, if you have a certain disorder or characteristic is completely random.