**Resource 2a (KS2) Read & Reduce Activity**

**What makes us all different?**

We all look different. We look different from our birth parents, from our brothers and sisters, some of us are males and some females. This is because we have special messengers in our cells that tell our bodies how to behave; they make our hair its natural colour, our eyes, even what sex we are. Even though you do not look exactly like you birth Mum or Dad, or you sister or uncle, has anyone ever said to you things like “you have your Grandma’s nose” or “you do look like your cousin”? This is because the people related to us will have some of the same information in their cells too.

**Information in our cells**

The information in your cells is called genetic material and it is stored on very tightly coiled, long chains called chromosomes. The chromosomes are held in the nucleus of the cell. Every cell in your body has 23 pairs of chromosomes, except your red blood cells. Red blood cells do not have any chromosomes because they do not have a nucleus, to make sure there is as much room as possible to carry oxygen around your body from your lungs. The chromosomes are made of a special protein called DNA.

**What is DNA?**

Chromosomes are made of a molecule called DNA. The DNA of the chromosomes looks like a very long twisted ladder. This shape is a spiral and is called a double helix. Humans have 23 pairs of chromosomes, 46 in total. The double helix ‘ladder’ of a DNA molecule is held together by ‘rungs’ (just like on a ladder) made from special chemicals called bases. There are four types of bases, and we usually identify them from their initials A, T, G, and C. A and T always go together and C and G always go together. These make up our genes. It is our genes that dictate what our hair colour will be, our skin colour, the colour of our eyes and even if we can roll our tongue!

**How do we get our own 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 lots of differences in their DNA so they can be identified this way.

Male sperm cells have 23 single chromosomes in them (Dad) and the egg cell (Mum) has 23 chromosomes too. To make a baby a sperm cell has to fertilise an egg cell. When this happens the chromosomes from the Mum and the Dad match up to make 23 pairs in the baby’s cells. This then gives the baby its characteristics. This means the cells have been told what colour the eyes will be, the colour of the baby’s skin, if the baby will have curly or straight hair and sometimes it can mean that the baby will have a certain illness (eg. Cystic fibrosis). 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 illness is completely random.