

# How to build a human

## Location

Ground floor, All About Us exhibition

## In a nutshell

What does DNA look like written down? To learn the secrets of DNA, researchers have been reading the sequence.

## What to do

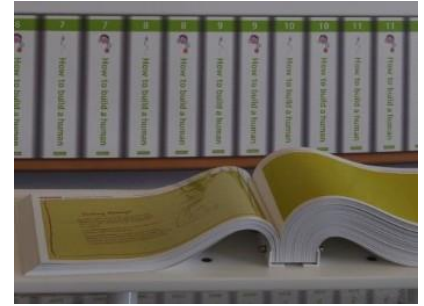
Students can look through a book containing a textual sequence of the human genome.

## Time Required

KS3 & KS4 2-3 minutes per student.

## What's happening?

Scientists write DNA code as a long string of letters. The letters stand for the chemical bases that form the rungs of the DNA ladder. The four chemicals are adenine, thymine, cytosine and guanine. In the body, DNA is coiled into packages called chromosomes. You have 46 chromosomes in most of the cells in your body. They are divided into pairs. One chromosome in each pair is from your Mum and the other is from your Dad. The pairs are numbered 1 to 22, roughly according to size (with 1 being the largest), and the final pair is called X and Y. This final pair of chromosomes varies if you are a male or a female. Girls have two X chromosomes, one from their Mum and one from their Dad. Boys have just one copy of the X chromosome from their Mum and instead of a second X they have a Y chromosome from their Dad. We decided to print out the X chromosome as both men and women have one and it was a medium sized chromosome (just over 153 million bases). The information was obtained from the Wellcome Trust Sanger Institute in Cambridgeshire; however it was up to us to find some way of fitting it all into a book. The final edition contains 1193 pages despite using a tiny font!



### Curriculum links

<b>KS3</b>	<b>Science - Inheritance, chromosomes, DNA and genes</b> <ul style="list-style-type: none"><li>- heredity as the process by which genetic information is transmitted from one generation to the next</li></ul> <b>English - Reading</b> <ul style="list-style-type: none"><li>- learning new vocabulary, relating it explicitly to known vocabulary and understanding it with the help of context and dictionaries</li></ul> <b>Mathematics - Number</b> <ul style="list-style-type: none"><li>- understand and use place value for decimals, measures and integers of any size</li></ul>
<b>KS4</b>	<b>Science - The genome and gene expression</b> <ul style="list-style-type: none"><li>- describe the genome as the entire genetic material of an organism</li><li>- explain the following terms: gamete, chromosome, gene, allele/variant, dominant, recessive, homozygous, heterozygous, genotype and phenotype</li><li>- discuss the potential importance for medicine of our increasing understanding of the human genome</li></ul> <b>Science - Inheritance</b> <ul style="list-style-type: none"><li>- explain single gene inheritance</li><li>- recall that most phenotypic features are the result of multiple genes rather than single gene inheritance</li><li>- describe sex determination in humans</li></ul> <b>Science - Variation and evolution</b> <ul style="list-style-type: none"><li>- state that there is usually extensive genetic variation within a population of a species</li><li>- recall that all variants arise from mutations, and that most have no effect on the phenotype, some influence phenotype and a very few determine phenotype</li></ul>

## Relates to:

Workshops & Theme Days	Shows	Trails	Other exhibits
<ul style="list-style-type: none"><li>• DNA Codebreakers (KS3 lower)</li><li>• DNA detectives (KS3 &amp; KS4)</li></ul>	<ul style="list-style-type: none"><li>• How my body works (KS3)</li><li>• Cell! Cell! Cell! (planetarium) (All ages)</li></ul>		<ul style="list-style-type: none"><li>• Constructing DNA</li><li>• Genome explorer</li><li>• Where is DNA</li><li>• How much DNA</li></ul>

