

Key Stage 4

Testing your DNA

Student worksheet

The human genome

Your DNA is unique to you (unless you are an identical twin). You have 3 billion base pairs in your DNA, which make up your genome. 99.9% of the genome is the same for all humans - it is the tiny 0.1% that makes you unique.

The human genome was first sequenced in a huge collaborative project called the Human Genome Project which took 13 years (finishing in 2003) at a cost of around \$300 billion.

Fast-forward to the present day, and, thanks to advances in techniques, a whole human genome can be sequenced in 1-2 days for less than \$1000.

Sequencing the genome



Scientists at the Oxford Genomics Centre use a technique called 'Illumina Next Generation Sequencing' to find the sequence of bases in a given piece of DNA.

They've used this to investigate how cancer appears in our bodies, how malaria is carried by mosquitoes, how diabetes works, and tracked human migration.

Genotyping

Our genomes offer an amazing insight into our past, present and future: have you ever wondered where your ancestors came from or if you are at a higher than average risk of developing a certain disease? Because of the information gained from sequencing, companies can study your genome looking for 'variants', specific changes in some bases of the DNA that are associated with different traits. This technique is called genotyping and is a quicker and cheaper way of studying the genome compared to sequencing.

Your task

You can buy genetic testing kits in shops or online. You send a sample of DNA to a lab, usually in your saliva. Scientists carry out genotyping and give you a report on your DNA and what this means.

You will be creating a video clip, article or information sheet to help inform people before they buy a kit.

- Include scientific language but make sure it is accessible. Assume that the person reading has a science GCSE or equivalent.
- Make sure that it gives balanced, unbiased information.



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Planning sheet

1. Introduction: what is genotyping and what can it show?

www.23andme.com/en-gb/dna-health-ancestry/

2. The science behind how it works www.23andme.com/en-gb/genetic-science/

3. Analysing the data:

Ancestry: youtu.be/TIb72IFWfwk

Health: youtu.be/ZpznQuwIpoU

4. Conclusion: Include some of the possible benefits and drawbacks of using genotyping to the individual.

www.sciencefocus.com/feature/genetics/high-street-genetic-tests-%E2%80%93-dr-michael-mosley-reports

<https://www.oxfordsparks.ox.ac.uk/content/how-read-dna>



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