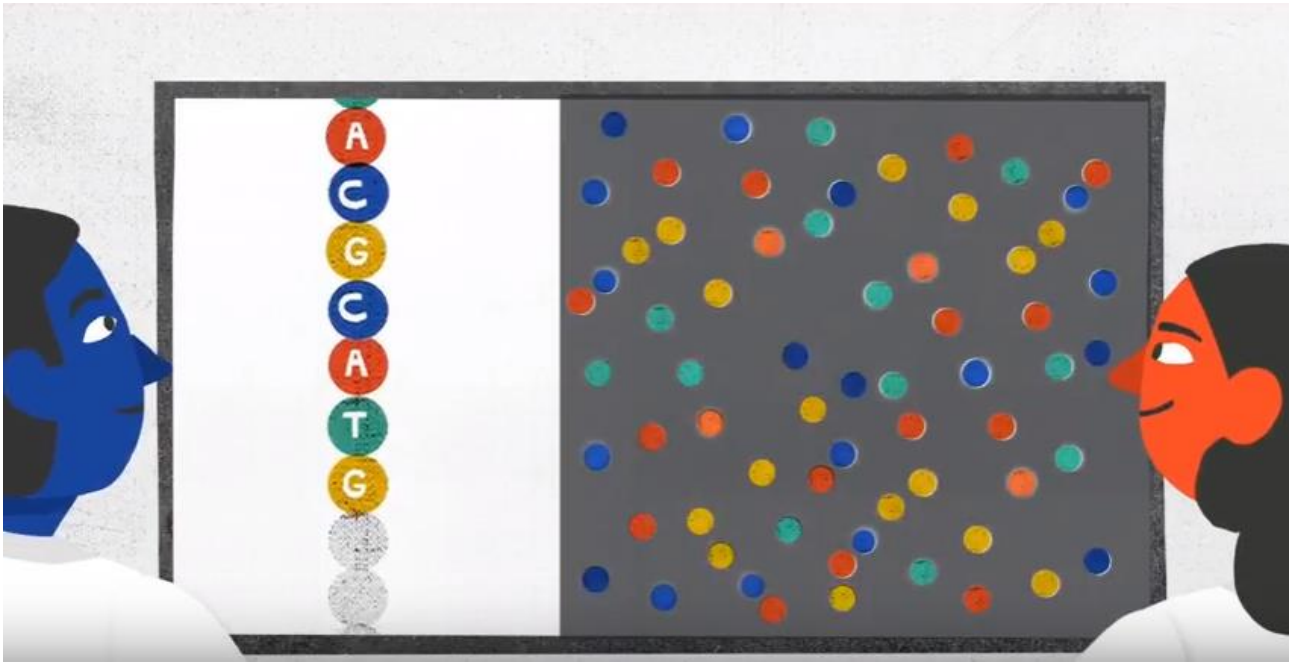
Key Stage 5 – Genotyping

Notes for teachers

At a glance

Since the Human Genome Project was completed in 2003, the technology used for genetic sequencing has progressed rapidly. Researchers at the Oxford Genomics Centre have used it to investigate how cancer appears in our bodies, how malaria is carried by mosquitoes and how diabetes works. Private companies are also using new technology to test individual's genomes for 'variants', specific changes in some bases of the DNA that are associated with different traits such as an increased risk of developing heart disease.

In this activity students research into how genetic tests are carried out and what the information from them can be used. They create an information sheet to help people make an informed decision on whether to have a genetic test.



Learning Outcomes

- Students learn the difference between genome sequencing and genotyping and how they are both used
- Students write an information sheet that contains a balanced, unbiased view of genetic testing

Each group of students will need

- Copy of student worksheet page 1
- Copy of student worksheet page 2 cut into cards
- Access to the internet
- Copy of the student worksheet page 3 on the school shared network or uploaded as a Google document (so students can click on the hyperlinks provided).

Possible Lesson Activities

1. **Starter activity**
    - Ask the class what they know about the Human Genome Project - what was discovered and how scientists today are using this information.
    - Play the class the animation 'How to Read DNA', which outlines the work on genome sequencing being carried out at the Oxford Genomics Centre.
    - Ask students to read through the information on page 1 of the student sheet. Make sure students understand the difference between genome sequencing and genotyping: genotyping is just looking at differences in specific bases of the DNA called ‘variants’.

2. **Main activity: Discussing genotyping**
    - Introduce the class to genetic testing kits. You can show them the homepage of a company that sells them (see weblinks below).
    - Ask students to work in small groups and give each group a set of cards cut from page 2 of the student sheet.
    - Ask the students to discuss the questions on the cards in small groups.
    - Discuss as a class any interesting points raised.

3. **Main activity: Writing the article**
    - Give the class their task: They will be writing an information sheet to help inform people before they buy a genetic testing kit.
    - Briefly discuss the kind of content it should contain. Discuss why media created by companies that carry out genetic testing might be biased, why their article should not be and how to do this.
    - Give students page 3 of the student sheet, which outlines what the article should contain and contains useful weblinks to information to help them.
    - Students carry out their research, plan their article and then write it.

4. **Plenary**
    - Inform the class that the results of genotyping can be used by the individual and medical professionals.
    - Ask students to work in pairs. Ask them to discuss how the results can be used by:
        - A genetic counsellor
        - A doctor when prescribing drugs
        - The individual when considering lifestyle choices

Weblinks

How to Read DNA animation https://www.oxfordsparks.ox.ac.uk/content/how-read-dna

Homepage of 23 and me, a company that sells genetic testing kits https://www.23andme.com/en-gb/