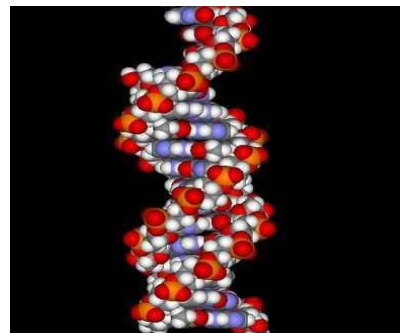


'Genetic Engineering'



Session Outline

DNA is the blueprint of an organism. Molecular biologists have discovered specialised enzymes that can cut specific genes and join together strands to build customised DNA. The manipulation of DNA has many applications, e.g. in the food and medical industries. In this session, students have the opportunity to do some genetic engineering for themselves, using restriction enzymes to cut DNA and analyse the results using gel electrophoresis. Students are provided with complementary and additional knowledge of the real-life applications of genetic engineering and also first-hand experience of laboratory equipment.



This session lasts around **3 hours**. There is a 20 minute break during the session. Due to the type of equipment and level of supervision involved in this practical **it is ideal for 20 students at KS5**, and can be adapted slightly to make the content suitable for **KS4 pupils**.

Before your visit to the museum, you may find it helpful to discuss the following Learning Objectives with your class. This will give pupils a brief idea of what to expect in the session and will provide them with a basic scaffold of information to which they can apply the knowledge they will acquire over the course of the session.

Key Points covered in this session:

- The structure, composition and function of DNA, and how scientists exploit its properties in genetic engineering.
- The use of vectors as genetic 'vehicles' for the transfer and integration of genes/DNA.
- (Restriction) enzymes; their function and action on DNA.
- The basic principles of DNA analysis using gel electrophoresis
- Real life applications of genetic engineering technology: gene therapy, insulin production, food industry and conservation

Skills/Practical Techniques

Over the course of the session, pupils will:

- Learn to measure small quantities of liquid using a micropipette
- Cut DNA by adding a restriction (cutting) enzyme to DNA samples provided, then incubating them
- Prepare an agarose gel and set up an electrophoresis tank
- Load DNA onto a gel and separate DNA samples using electrophoresis
- Learn to stain DNA specifically within the gel and visualise DNA samples
- Interpret and predict the pattern of DNA fragments on a gel following separation by electrophoresis
- Develop a greater understanding of the importance of accuracy and reliability in experimental science, including the significance of experimental controls