

A Project Approach to Delivery: Developing a Genomics Pipeline



The learner version of the Project Brief is available from <https://www.ocr.org.uk/qualifications/vocational-education-and-skills/cambridge-technicals-applied-science-level-3-certificate-extended-certificate-foundation-diploma-diploma-extended-diploma-05847-05849-05879-05874-2016-suite/>

The Wellcome Sanger Institute

The Wellcome Sanger Institute is one of the premier centres of genomic discovery and understanding in the world. It was founded to sequence the first human genome. The research to improve understanding of biology and disease developed later, when sequencing became more common. The Wellcome Trust Sanger Institute currently leads ambitious collaborations across the globe to provide the foundations for further research and transformative healthcare innovations. With its work in the field of genomics, the Institute seeks to deliver diagnostic and therapeutic benefits in areas such as cancer, immunology, public health and personalised treatment.

Building and running industrial-scale pipelines for DNA sequencing and computational analysis has been fundamental to operations from the very beginning and constitutes a core expertise around which many of today's research programmes are built. Developing a successful pipeline at scale involves much more than performing a lab procedure repetitively. There are unique challenges in building robust systems, organising the work in teams of scientists and technicians and managing data and data analysis.

You are to undertake an investigation into the background to, and some of the activities involved in or related to areas of research at the Wellcome Trust Sanger Institute.

The investigation will involve you:

- Demonstrating an understanding of cell division, Mendelian genetics, the biochemistry of DNA and protein synthesis.
- Explaining the process of DNA sequencing and how it can be applied.
- Producing a process map for a DNA sequencing pipeline and a method within the pipeline, incorporating feedback loops and tracking procedures to exercise quality control.
- Assessing and managing risk in the laboratory and producing a Risk Assessment.
- Designing the laboratory space so that the pipeline, or part of it, can be carried out.
- Following a protocol for one stage in the pipeline.
- Making up and standardising solutions.
- Understanding how DNA sequencing can be used in the fields of cancer and malaria research and the role that microorganisms play in our everyday lives.
- Culturing cells and organisms.
- Investigating scientific, legal, e.g. Material Transfer Agreements – MTAs – and ethical issues with the transfer of vectors and plasmids.

Some aspects of this work can be undertaken as an individual or in a team. If working within a team, learners are expected to contribute to each of the areas (and be able to provide evidence of this contribution) in order to gain the experience and knowledge required to successfully complete the Cambridge Technicals Level 3 (Applied Science) units.