

Inside the Cell: Immersion into the Biology Laboratory

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In order to generate knowledge in biology, we need to understand the techniques that create information in addition to comprehending the work that has been done previously. Therefore, in addition to learning laboratory techniques, we will learn to review primary scientific literature. Every day will be a combination of multiple laboratory and classroom sessions that will help develop students' overall scientific abilities.

Students will work in small groups to perform project involving a novel research question related to how different genes could contribute to cancer formation. Over the course of the two weeks, students will utilize an array of techniques in order to clone a gene and see how their gene of interest is involved in disease progression. The program will end with students presenting their work at a research symposium open to friends and family.

Day 1 (Monday)

Morning- Lab: Bacterial Culture
Class: Scientific Measurement and the Molecules of Life
Afternoon- Class: Introduction to primary research literature
Lab: Mammalian Tissue Culture

Day 2 (Tuesday)

Morning- Class: Gene Expression and Cloning
Lab: DNA extraction and Polymerase Chain Reaction
Afternoon- Lab: Agarose Gel Electrophoresis
Class: Begin to go over primary paper
Lab: cloning

Day 3 (Wednesday)

Morning- Class: The Central Dogma of Biology /studying life at different levels
Lab: Bacterial Screening
Afternoon- Lab: Protein extraction and Polyacrylamide Gel Electrophoresis

Day 4 (Thursday)

Morning- Lab: RNA extraction and reverse transcription
Afternoon- Lab: PCR for gene expression

Day 5 (Friday)

Morning- Lab: Proliferation Assay
Afternoon- Lab: Fluorescence Microscopy

Day 6 (Monday)

All day- Class: Western Blotting
Lab: Western Blotting

Day 7 (Tuesday)

All day- Class: Scientific Paper Review
Lab: Continue Western Blotting

Day 8 (Wednesday)

Morning- Journal Club
Afternoon- Catch up Laboratory Work

Day 9 (Thursday)

All day- Class: Creating figures
Lab: Catch up Laboratory Work / Presentation Prep

Day 10 (Friday)

Morning- Final Data Acquisition / Presentation Prep

Afternoon- Research Symposium