

Department: Science

Course Name: Research Methods

Course Description:

An inquiry-based science elective offering students the opportunity to research a topic of interest in science and technology. Students are encouraged to investigate real-world topics and design, plan and implement a scientific investigation to address a research question. The course explores a variety of topics such as research methodology, ethical research practices, research and data analysis tools while engaging in collaborative work with research institutions. Students work towards the completion of a research project culminating in a final research paper and oral defense presentation. Prerequisite: Biology, Co-requisite: Chemistry and approval by teacher.

Content:

Scientific Methods

Literature Review and Search

Types of Investigations

Research Design

Data Types and Data Collection Techniques

Quantitative and Qualitative Methods and Data Analysis

Statistical Methods

Laboratory Techniques

Ethical Issues

APA Writing Style

Skills:

Understand different scientific research designs and methods

Learn how to set up a research study

Understand correct ways to refer to and cite from scientific literature

Perform literature reviews

Formulate a research plan

Measurements

Problem Solving

Use of laboratory technology and tools- PCR, Spin-column and Chemical DNA extraction, Gel

Electrophoresis, CRISPR, Cell Culture, PCR purification, Custom Primers, Bacteriophage Isolation,

Electrophysiological recordings

Utilizing the features of the Learning Management System

Text and Materials

Will be provided by the teacher

Methods of Instructions

Direct Instruction

Inquiry-Based Learning

Cooperative Learning

Demonstrations

Methods of Evaluation:

Scientific Lab Journal

Team Collaboration

Literature Review

Research Project

Written Progress Reports

Scientific Paper

