M5 Science Project 2

Course Syllabus - 2024 Term 2

Teacher: Science Department

Department: Science **Subject Code**: ST32208

Periods per week: 1 **Credits**: 0.5

Course Description

The purpose of this course is to provide students with a hands-on demonstration of how the world of science works through research, observation, and experimentation. The main objective of the project is for students to analyze a scientific occurrence with an investigation and to learn about science outside of books and homework. In Term 2 the content to be investigated will be chosen by the students and can be related to any scientific field that the students are interested in, provided that the research can be carried out on campus in a safe and timely manner.

To complete this project students will have to rely on skills they've learned in many areas. These skills span many disciplines, including but not limited to English reading and writing, critical thinking, maths, efficient researching, data analysis and computer science. Students also learn how to budget and organize time and resources as they work to complete projects by a deadline.

Course Content

1. Research Proposals
    - 1.1. Lessons from Project 1
    - 1.2. Scientific Research
    - 1.3. Writing a hypothesis
    - 1.4. Experimental Design
    - 1.5. Risk Assessments

2. Practical Lab Skills
    - 2.1. Planning and Budgeting
    - 2.2. Teamwork and Lab Safety
    - 2.3. Controlling and Measuring Variables
    - 2.4. Precision and Accuracy

2.5. Data Collection and Analysis

3. Report Writing and Presentation
   3.1. Statistical Analysis
   3.2. Presenting Data
   3.3. Results and Conclusions
   3.4. Scientific Evaluation
   3.5. Formal Report Writing
   3.6. Methods of Presentation
   3.7. Graphic Design

Learning Outcomes

Students will develop their understanding of:

- scientific phenomena, patterns, laws, theories and models
- how scientific theories develop over time and are tested
- scientific vocabulary, terminology, definitions, units and conventions
- uses of scientific instrumentation and apparatus
- scientific quantities and their determination
- everyday and technological applications of science with their personal, social, economic and environmental implications
- working safely in a scientific context.

Students will develop their skill and ability to:

- devise procedures and select apparatus and materials suitable for synthesising substances or producing or checking the validity of data, conclusions, generalizations and hypotheses
- use scientific instrumentation, apparatus and materials appropriately
- work with due regard for safety, managing risks
- observe, measure and record accurately and systematically
- extract data relevant to a particular context from information presented in verbal, diagrammatic, graphical, symbolic or numerical form
- evaluate qualitative and quantitative data
- recognise patterns in data
- draw conclusions and formulate hypotheses
- present reasoned scientific explanations of unfamiliar facts and phenomena, and unexpected observations
- make decisions based on the evaluation of evidence
- recognise and explain variability and unreliability in experimental measurements

Learning Resources

Teacher produced resources

Sample Lab Reports and Templates

PHS Science Labs and Equipment

Assessment Methods

Each group will have a PHS Science Teacher acting as a mentor to their project. The mentor's role is to regularly communicate with students, answer any project related queries, ensure proposed timelines and deadlines are kept, oversee safe lab work and offer practical advice, where necessary.

The mentor and one other department teacher will both be in charge of assigning a grade for the initial research proposal (20%), progress report (5%), final report (65%) and presentation (10%). The methods of presentation can include a project poster, project webpage, weekly vlogs and classroom presentation, and will be decided each year by the PHS Science Department.

Homework Policy

Details of all deadlines can be found on your Google Classroom page. If for some reason you cannot submit your work on time then you must let your teacher know at least 24 hours before the due date.

If you do not hand in your work on time then your score can be reduced by 50%. If your work is more than 2 weeks late then you will receive a zero.

If students are absent when assignments are assigned or on an assignment due date it is the responsibility of the student to contact the teacher to make arrangements for submission.

Evaluation Breakdown

Assessments ● Final Written Report	70%
Student Work ● Research Proposal ● Progress Report ● Presentation Method	30%