

# **Mount Saint Vincent University 2024 VJKF Projects**

## **Exploring the Living World:**

### **A Hands-On Journey through Ecology, Physiology, and Cell Biology**

#### **Department of Biology**

Students will be introduced to ecology, population dynamics, physiology, anatomy and cell biology through hands-on activities in our Department's teaching and research laboratories. In the ecology component, students will explore the relationships between organisms and their environments, gaining insights into topics such as ecosystems, biodiversity, and the impact of human activities on natural habitats. Physiology and anatomy modules will go into the inner workings of organisms at various levels of organization, from tissues and organs to organ systems. These experiences will not only enhance the students' academic knowledge but also prepare them for careers in research, education, healthcare, environmental conservation, and other fields where a strong foundation in biological sciences is essential.

## **Empowering Future Scientists:**

### **Hands-On Chemistry Lab for Critical Inquiry and Discovery**

#### **Department of Chemistry**

In the chemistry lab students will be working on developing skills essential for scientists through a series of chemistry demonstrations and hands-on experiments. By the end of the session students will have the confidence and competence to ask insightful research questions, backed by keen observational skills and the ability to formulate testable hypotheses. and design an experiment to test their research question. Armed with these skills, students will be well-equipped to design and conduct experiments independently, paving the way for future discoveries and innovations in the field of chemistry and beyond.

## **Games Theory Adventure & Mathematical Discoveries**

#### **Mathematics Department**

In this workshop students will learn about Combinatorial Game Theory and experience the mathematical research process. Combinatorial games are two player games with no hidden information or elements of chance. Examples of some well-known combinatorial games are Tic Tac Toe and Checkers. Students will explore different combinatorial games, including a class of games called Subtraction Games, and even try to come up with some new mathematical games of their own! In the process they will learn about sequences, and in particular, the famous Fibonacci sequence, which is found throughout mathematics and nature! The students will also investigate some famous mathematical problems and discuss how a mathematician writes a research paper after they have solved a problem.

## **Exploring Brain Activity**

#### **Psychology Department**

Students will learn about brain research through EEG, which is a test that measures electrical activity in the brain using small, metal discs (electrodes) attached to the scalp. On the first day, students will learn how an EEG system works, what it measures, and learn how to set up a recording. On Day 2, students will set up a participant and record EEG data in response to computer-based cognitive tasks. On day 3 students will learn how to analyze the EEG data, make sense of the output, and learn how this relates to brain function!