

Proposed Sessions for Fall 2023 - The Citadel - October 28th (as of September 26th)

The Physics of Rockets

Joel Berlinghieri (The Citadel)

Students of all ages love model rockets. Launching rockets provides an opportunity for students to learn Newton's three Laws of Motion. (Inertia, Force, Action – Reaction). Attendees will participate in a series of activities which demonstrate the three laws. Instructions for rocket assembly, engine, and igniter preparation, and safe launching will be given. Weather permitting model rockets will be launched on the Summerall Field during lunch.

The Physics of the Trebuchet

Joel Berlinghieri (The Citadel)

The physical analysis of the trebuchet and its use to cause a projectile to hit a target can be divided into sections each of which can be looked at independently of each other. Further, each section can be analyzed first with a simplified model and then can be corrected to take into account effects, one by one, not handled by the simple model. This approach leads to reasonable results even with the uncorrected simplified model but more importantly, it leads to physical and fundamental understanding.

The importance of sterile techniques

Andrea Coulter (The Citadel)

In this session, participants will learn about the importance of sterile technique and its application in nursing. Participants will learn how to don sterile gloves and apply a dry sterile dressing.

The Amazing Atmosphere

Scott Curtis (The Citadel)

We live in an amazing fluid called the atmosphere, but we often take it for granted, because we are immersed in it every day and it is invisible. Fish probably think the same thing about water. In this session, we will investigate the properties of the atmosphere - that it is made up of material that has weight and presses on things around it. We will discuss how simply making air lighter and heavier leads to amazing features like wind, clouds, and even severe weather.

Decode Probability and Data Analysis

Bo Li (The Citadel)

In this workshop, we introduce hands-on examples to decode the methods in finding probabilities and extracting information from real data. We use a rolling-dice experiment to illustrate how to obtain probabilities based on the binomial distribution. We will also name some compelling applications of the distribution-driven methods. We introduce the simple linear regression model to predict the heart rate of humans based on the real data from mammals. To address an example in data analysis, we take a survey in class about the daily surfing time on electronic devices and test our research interest based on the real-time data.

Stocks Investing

Paul Meeks (The Citadel)

In this session, we will discuss the stock market, investment funds, student-managed investment funds at The Citadel, and the free online tools one can use to help get started for a student-managed investment fund club. Participants will have hands-on experience with student-managed investment funds and also learn how to set up their version of student-managed investment funds.

Spectroscopy with PASCO

Ana Oprisan and Sorinel Oprisan (College of Charleston)

Spectroscopy is the branch of science concerned with investigating and measuring spectra produced when matter interacts with or emits electromagnetic radiation. This workshop will cover the fundamental physics of emission and absorption spectra and how they are quantitatively determined using PASCO dispersion equipment. We will investigate a series of discrete spectra for hydrogen and mercury and continuous spectra for light bulbs.

Solutions via Design Thinking

Deirdre Ragan and Eva Singleton (The Citadel)

Engineering design refers to the process of creating solutions to problems or challenges using scientific and mathematical principles, combined with creativity and practicality. This activity will encourage participants to think creatively in the design process as they build a prototype to address the needs of a specific end-user. Participants will be encouraged to ask questions and gather information in order to integrate the user's needs into their design.

Math Jeopardy

Todd Wittman (The Citadel)

Students will compete in teams (assigned within the session meeting time) in a challenging Jeopardy-inspired quiz bowl featuring math problems and brain teasers. Questions will be drawn from algebra, geometry, and pre-calculus subjects. Prizes will be awarded to the winning team.

The Major Histocompatibility Complex (MHC)

Kathy Zanin (The Citadel)

For this activity, I have prepared some supplies that students and teachers can use to build a model of a hypothetical individual's MHC genes. Students will compare their chromosomes with those of classmates; this will illustrate the great variety of genotypes that are possible, and why it can be quite difficult to find a suitable donor for patients that require organ transplants.

The Chemistry of Freezing Ice Cream

Ryan Kendall (The Citadel)

We will make ice cream to demonstrate the phenomena of freezing point depression as caused by solutes in solution and to discuss the emulsification of mixtures.

Real Time Data via Apps/Microcontrollers

Maria Desbrow (Academic Magnet High School)

Participants will be taught how to collect data using onboard sensors in their telephones and onboard sensors using a simplified version of a microcontroller known as a microbit. We will explore temperature probes communication radios, sound generators, speech generators and accelerometers. Participants will have over the shoulder help from the Academic Magnet Robotics and AP Physics C Mechanics and EM students while they build their own device and we go into how to make this data relevant in the context different levels of science classes

Squid Dissection

Christine Byrum (College of Charleston)

In this session, participants will learn about the characteristics and morphology of cephalopods (squid, octopus, and nautilus) and will get to dissect a squid.

Tour of The Citadel

Current Citadel Cadets

Join current Citadel Cadets on a tour of The Citadel. Be sure to come with questions about attending and succeeding at The Citadel. Cadets will be selected from within the Swain Family School of Science and Mathematics.

Note: Additional session may be added at a later time.