

WCU STEM CATERING

Workforce Development



THE SCIENCE OF LEARNING MP

In this activity, students will be introduced to the science behind human memory and how memories are stored and retrieved. With this foundation, students will learn about research-based study techniques that can improve the effectiveness and efficiency of studying and apply these techniques to different mock scenarios. 1-day and 3-day options!

» Grades 8-10

LIFE AS A STEM MAJOR MP

This workshop will start with undergraduate STEM majors discussing their experiences as STEM majors in college. The second part will be a Q&A, during which the "panel" of three WCU students from different STEM majors will answer questions from the audience.

» Grades 11-12

WHAT'S A STEM JOB WORTH? MP

In this STEM workforce and Financial Literacy Workshop, students will learn about the various job prospects of STEM disciplines. We will discuss the difference between a Bachelor's, Master's, and Ph.D. program. We will also discuss the difference between scholarships and loans and how student loans work.

» Grades 10-12

HOW TO USE AI MP

With the advent of AI writing tools, we are moving into a new era of assisted writing. AI writing tools will do to writing what graphing calculators did to math. AI can be an effective tool when used appropriately and ethically. In this workshop, we will review AI writing tools and discuss their strengths and pitfalls.

» Grades 9 - 12

WHAT TO DO WITH A STEM DEGREE..... MP

In this workshop, higher education and industry partners will come and discuss what life as a STEM professional is like. After a brief introduction, this workshop will take the form of a Q&A with the panel of professionals answering student questions.

» Grades 10 - 12

Anthropology



LEARNING FROM THINGS: HANDS-ON ARCHAEOLOGY, ANTHROPOLOGY . . . MP AND CONSERVATION

What is archaeology? What is anthropology? What can archaeological or ethnographic artifacts tell us about culture and experience? WCU Archaeology and anthropology students explain the discipline and what can or cannot be interpreted from cultural objects. Students have the opportunity to visit our state-of-the-art archaeology lab and work hands-on with objects from our collections, such as recording measurements or analyzing their conditions for care and management.

» Grades ???

WHAT'S THE "BIG IDEA": HANDS-ON EXHIBIT CURATION . . . MP

After a brief discussion on how curators develop a "big idea" for an exhibit and selecting artifacts that contribute to that narrative, students are provided with a box of authentic archaeological artifacts from our teaching collection, and work in teams to create a cohesive display and related narrative. Inspired by the cooking show "Chopped", this is an excellent opportunity for not only learning how museums design exhibitions, but, more broadly, how to curate one's portfolio for high school or college.

» Grades ???

Biology



THE ANT SOCIETY I . . . MP

Everyone knows what an ant is! But what most people don't know are all the secrets and fascinating diversity that surrounds these small insects, and all of this can be observed just a few steps away from you! Students will be engaged in a simplified exploration of ants, focusing on observation and basic concepts. They can watch ants through a magnifying glass, participate in ant-themed story time, and learn simple facts about ants.

» Grades 1-2

ANT SOCIETY II . . . MP

Everyone knows what an ant is! But what most people don't know are all the secrets and fascinating diversity that surrounds these small insects, and all of this can be observed just a few steps away from you! Students will collect ants (with adult supervision) and observe them under microscopes. Activities will include identifying ant body parts, learning about ant behavior, and understanding the roles of different ants in a colony.

» Grades 3-5

ANT SOCIETY III MP

Everyone knows what an ant is! But what most people don't know are all the secrets and fascinating diversity that surrounds these small insects, and all of this can be observed just a few steps away from you! Students will participate in ant collection trips (outside), learn about ant ecology and evolution, and conduct simple experiments related to ant behavior. Activities may also include discussions on the importance of ants in ecosystems and conservation efforts.

» Grades 8-10

CONTROL THINGS WITH YOUR BRAIN! MP

Learn how your neurons control your muscles and the concepts of electrical stimulation. Apply those concepts to learning about a TENS device and how it applies to prosthetic limbs.

Students will demonstrate these properties by recording their own muscle contractions and translating those signals into muscle contractions. The final activity will be playing a video game with those muscle contraction signals!

» Grades 5+

Biomedical Engineering

THE CLAWWW!: MUSCLE SIGNAL CONTROLLED PROSTHETICS MP

Students will be introduced to the electrical activity of muscles and how these electrical signals can be used to control external devices. After discussing the physiology of skeletal muscle contraction, students will visualize their muscles' activity and observe how the measured electrical signal depends on how much effort they exert. Students will then control the opening/closing of a robotic claw using the signals from their muscles. Students will learn about electrophysiology, prosthetics, and engineering design. Students will use EMG signals to control a robotic claw, and make design decisions about improvements.

» Grades 9-10

DON'T BREAK YOUR (GRAND)MOTHER'S BACK! MP

Students will be introduced to the structure, function, and strength of bone and how diseases such as osteoporosis can affect them by examining foam blocks that replicate the density and behavior of healthy and osteoporotic bone. Students will then create compression fractures in these samples using a mechanical testing system to compare the amount of force "healthy" and "osteoporotic" bone can withstand. Students will learn about bone anatomy and physiology, the use of models in STEM, and mechanical characterization. Students will perform density measurements and compressive mechanical tests of foam blocks representing trabecular bone

» Grades 10 - 11

Chemistry

INSTANT LIGHT MP

Illuminate minds with our Instant Light demonstration! Watch as chemistry comes to life before your eyes with this mesmerizing display of chemiluminescence. Perfect for engaging young learners, this hands-on demo sparks curiosity and excitement as students witness the magic of light production through a simple chemical reaction. Topics like fluorescence and kinetics will be discussed, allowing students to delve deeper into the science behind the spectacle. Prepare to captivate your audience and ignite a passion for science.

» Grades 7-8

OSCILLATING REACTIONS MP

Dive into the fascinating world of oscillatory reactions with our Oscillating Clock demonstration! Delve deep into the rhythmic dance of molecules as colors shift and patterns emerge in a mesmerizing display of chemical kinetics. This captivating demo not only entertains but also educates, offering a glimpse into the intricate mechanisms governing chemical reactions. Topics like redox reactions, stoichiometry, and kinetics will be discussed, providing students with a comprehensive understanding of the underlying principles at play. Get ready to mesmerize your students and leave them in awe of the wonders of chemistry.

» Grades 9-10

Computer Science

CODING WITH SMART ROVERS MP

The WCU Center for STEM Inclusion has partnered with Deloitte's Believers Program to bring applied coding to the classroom with a coding curriculum based on Smart Rovers. These rovers are powered by a Raspberry Pi micro-computer and can be controlled and programmed using Python coding language. Students in these workshops will learn how to get LEDs to blink and respond to light or dark environments, have the rovers move toward or away from certain colors, as well as recognize human faces.

» Grades 9-10

Earth & Space Science

RADAR BOXES MP

Students will learn how scientists use radar to create topographic maps of unseen surfaces like the ocean floor or the surface of Venus. Students will create a map of their own mystery surface.

» Grades 7-8

ROCKS, MINERALS & FOSSILS

Students will learn about the different rock families, comparing and contrasting the characteristics of various samples. Students will also explore minerals and fossils.

» Grades 7-8

Nanotechnology



ALL THAT GLITTERS IS NOT GOLD MP

What happens to materials when they become very small? In this workshop, students will learn about how the size of materials can change their appearance. They will synthesize gold nanoparticles and learn about their applications, such as in pregnancy tests.

» Grades 8-10

THE PARABLE OF THE PEACHES & THE PANTS MP

In this workshop, students will go through an exploratory journey to the development of waterproof pants. They will learn the connection of waterproofing to nanoscience and how this was inspired by particular plants and fruits. The concept of scientific discovery will be the underlying theme of this workshop.

» Grades 8-10

Mathematics



THE FOUR COLOR THEOREM

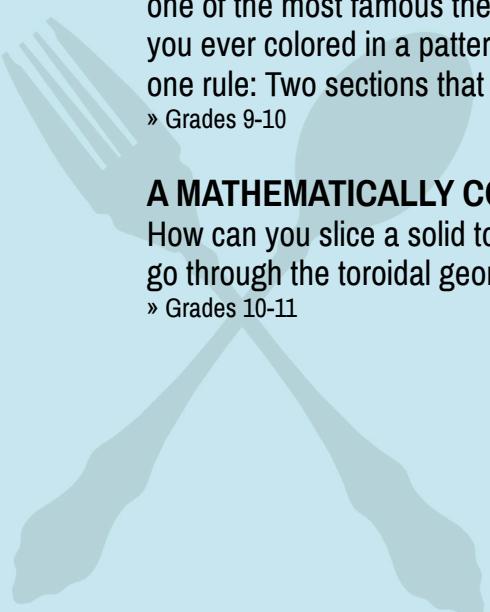
This activity is about coloring, but don't think it's just play time. This investigation will lead to one of the most famous theorems of mathematics and some very interesting results. Have you ever colored in a pattern and wondered how many colors you need to use? There is only one rule: Two sections that share a common edge cannot be colored the same!

» Grades 9-10

A MATHEMATICALLY CORRECT BREAKFAST

How can you slice a solid torus (bagel) into two linked halves? In this workshop, students will go through the toroidal geometry, pushing past the basic x,y,z coordinate space.

» Grades 10-11



Political Science

WHAT DOES IT MEAN TO BE A CITIZEN? MP

Through a political science lens, student will focus on conducting policy analysis in the United States, students will dissect contemporary issues such as gerrymandering, freedom of speech, food security, polarization, TickTock , or other relevant topics. The primary objective of this activity is to encourage students to critically examine the responsibilities of citizenship with real-world policy challenges.

» Grades 7-8

WHAT DOES IT MEAN TO BE A GLOBAL CITIZEN? MP

Using a political science lens focused on global issues, students will analyze a global policy, such as immigration, comparative voting models, or other relevant topics. This exploration will foster an understanding of global citizenship and enhance critical thinking skills through applying the Five International Levels of Analysis. The primary objective of this activity is to empower students to think globally, critically analyze policy areas, and promote a sense of global citizenship.

» Grades 9-11

Physics

THE SCIENCE OF MUSIC MP

Through a series of hands-on activities and demonstrations, students will learn about vibrations, waves, and sound waves. They will also explore how the shape, size, and hardness of an object can be manipulated to create a specific sound, leading to a discussion of how musical instruments are designed and created.

» Grades 3-4, 7-8 or 9-10

LIGHTS, COLOR, ACTION! MP

Students will learn about light waves, what color "is," the physiology of the human eye, as well as color mixing, and how display technologies such as computer screens work.

» Grades 8-10



Photonics and Quantum Information



QUANTUM INFORMATION INTRODUCTION MP

Quantum computing is a fast-growing field at the intersection of physics and computer science. As this field promises to have revolutionary capabilities far surpassing “classical” computation, significant government and industry investment has emerged over the last ten years. Getting a grip on the science behind the hype can be tough, as its foundation lies in quantum mechanics, whose concepts are notoriously enigmatic. Students will learn about the basic phenomena that underpin this field and, with interactive activities, will see how these concepts can be used to take our computing power beyond anything even the best supercomputer can do.

» Grades 9-10

PHOTONICS BASICS WORKSHOP MP

Light can be used to light a room, heat your food, and transmit information. Photonics is a field where we manipulate light to do serve desired functionalities. In this basic photonics workshop, students will learn how to control the path of a laser and set-up a light interferometer to see what happens when light splits and then comes back together, which is the basics of a technique known as interferometry. The students will do experiments and learn what sort of information can be gathered with this technique.

» Grades 9-11, 12 students max per workshop

QUANTUM OPTICS MP

It's one thing to learn about single photons and quantum control. It's another thing to experience it. In this 2-3 day intense and immersive workshop, students will explore Quantum Optics and investigate the quantum properties of light first-hand. They will create and manipulate single photons in open space and learn how these quantum states of light behave. In addition, students will manipulate proton spin to create a one-qubit quantum register. Students will learn the basics of quantum superposition states, which are vital for quantum information. Due to the complexity of the equipment/experiments, we can only accommodate four students.

» Grades 11-12 and Undergraduate Students. ONLY Four Students Per Workshop



Psychology



A SENSE OF OUR SENSES MP

Our five senses allow us to interact with everything around us. But, did you know that your brain is actually in charge of all of this sensory processing? It is not just determined by our eyes, ears, tongue, nose, or skin! The way that our brains process sensory information determines what we perceive, which greatly impacts our everyday behaviors. In this workshop, students will learn about the role of our brain in sensory processing and how changes in perception can change our human behaviors. Students will experience how small changes in our visual processing can change what we see in front of us and how we behave with our surroundings.

» Grades 9-11

