STEM Programme Catalogue

STEM ENRICHMENT SOLUTIONS

ADM EDUCATION
LIMITED LIABILITY PARTNERSHIP

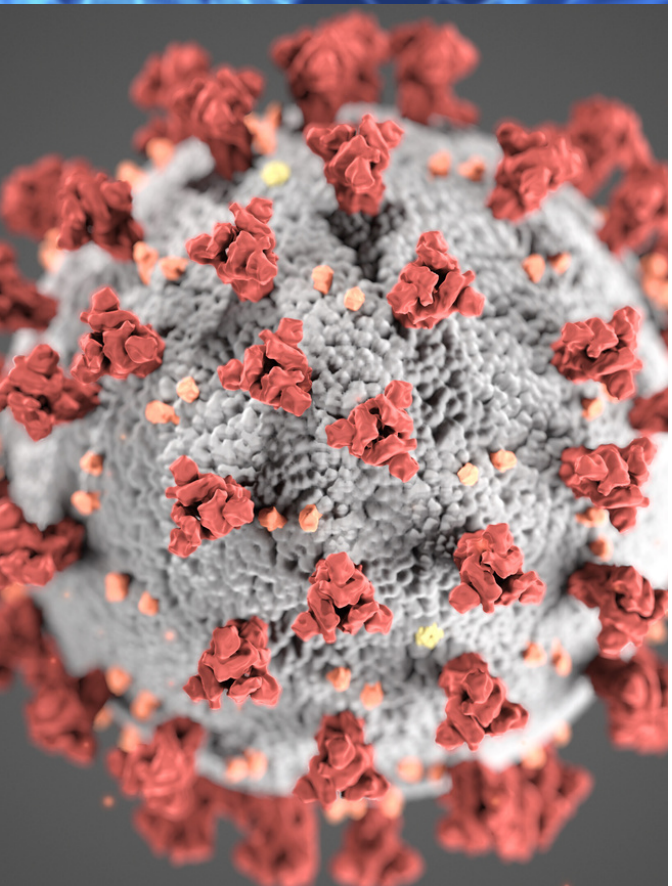
REGISTRATION NO.
T20LL0652J

EMAIL:
admin@adm-education.com

CONTACT:
9186 0756

Life Sciences Programmes

HANDS-ON INVESTIGATIONS IN INQUIRY-BASED EXPERIMENTS THAT DEMYSTIFY BIOTECHNOLOGY



DNA EXTRACTION

This fun and easy lab workshop shows your students what real chromosomal DNA looks like and allows them to extract DNA from onions, strawberries or bananas. Students will also learn to construct a double helix model of DNA.

IDENTIFICATION AND CHARACTERIZATION OF BACTERIA

In this workshop, students will learn slide preparation, cell staining, and microscope observation to examine the size, shape, arrangement, and gram status of different types of bacteria for identification.

HOW DOES AN INFECTION SPREAD?

In this workshop, students will simulate the spreading of a disease in the classroom by transmiting a simulated infectious agent between classmates. The pattern of transmission and primary source will be documented.

MOLECULAR BIOLOGY

In this workshop students will be introduced to the concepts that include genetic code, single and three letter amino acid abbreviations, and the characteristics of amino acids by playing Bingo and other classroom games.

Forensic Science Programmes

EXPERIENCE HANDS-ON FORENSIC ACTIVITIES WITH REAL-WORLD APPLICATION

FORENSIC HANDWRITING ANALYSIS

In this hands-on experiment, students will use principles of forensic handwriting analysis and paper chromatography to examine writing samples from 4 potential suspects.

FINGERPRINT & HAIR ANALYSIS

A single hair left behind at a crime scene can be used to identify a criminal. In this experiment, your students will compare hair samples under the microscope, and learn to detect and analyze fingerprints to solve a classroom crime.

BLOOD GROUP TYPING & BLOOD SPATTER ANALYSIS

In this experiment, students will act as detectives to examine blood spatters and trajectory, and apply the concept of blood type-based screening for potential suspect(s) present at a crime scene.

FORENSIC TOXICOLOGY & ENZYMOLOGY

In today's forensic science laboratory, scientists identify drugs and toxins in samples collected from crime scenes, victims, and potential suspects. In this workshop, students will analyze simulated crime scene samples for the presence of drugs.

Health Sciences Programmes

STUDENTS WILL LEARN ANATOMY, MICROBIOLOGY, GENETICS, PHYSIOLOGY, AND BLOOD ANALYSIS

CLINICAL DIAGNOSIS OF DIABETES

Over 380 million people worldwide are afflicted by diabetes mellitus, a chronic disease that leads to high blood sugar. In this workshop, students will diagnose diabetes in three patients using the urine glucose test.

INVESTIGATING HUMAN HEALTH USING THE ELISA

In this experiment, students will perform an Enzyme-Linked Immunosorbent Assay (ELISA) by using antibodies to determine the status of simulated scenarios, including pregnancy testing, early detection of heart attacks, and identification of gluten in food products.

MORPHOLOGY OF CANCER CELLS

Cancer cells in culture grow in an uncontrolled way and forms tumors in the body. This experiment allows students to see the differences between normal and cancer cells in both their growth and cell types.

BLOOD-BASED CANCER DIAGNOSTICS

Cancer cells differ from normal cells by the combinations of proteins that are present on their surfaces. In this simulation workshop, students will demonstrate the reaction of cancer cell markers to diagnose types of cancers.

Bioengineering Programmes

STUDENTS CREATE ARTIFICIAL LIMBS AND DESIGN SOLUTIONS TO ADDRESS DISORDERS

CREATING MODEL LUNGS & HEARTBEAT RECORDER

In this workshop, students explore the inhalation/exhalation process that occurs in the lungs and create a model pair of lungs. Students will also learn about how they can measure their heart rate under different circumstances.

THE ARTIFICIAL BICEP

Students learn more about how muscles work and follow the engineering design process to create their own biomedical device to aid in the recovery of a strained bicep and learn the importance of rest to muscle recovery.

KIDNEY FILTERING

Students will filter different substances through a plastic window screen, different sized hardware cloth and netting to show how the thickness of a filter in the kidney is imperative in determining what is filtered out and what stays in the blood.

PROTECT THAT PILL

Students reinforce their knowledge of the different parts of the digestive system and explore the concept of simulation by developing a pill coating that can withstand the churning actions and acidic environment found in the stomach.

Environmental Sciences Programmes

UNDERSTAND THE NATURE AND MITIGATION OF HUMAN IMPACT ON THE ENVIRONMENT

TESTING THE IMPACTS OF POLLUTION

In this inquiry-based workshop, students plan and perform a plant bioassay to determine the effects of common point and non-point source pollutants on living organisms.

UNDERSTANDING CLIMATE CHANGE

In this colorful workshop, students explore the global carbon cycle and climate change by creating personal and class atmospheres to examine, calculate, and “emit” each student’s carbon footprint.

HOW CLEAN IS CLEAN?

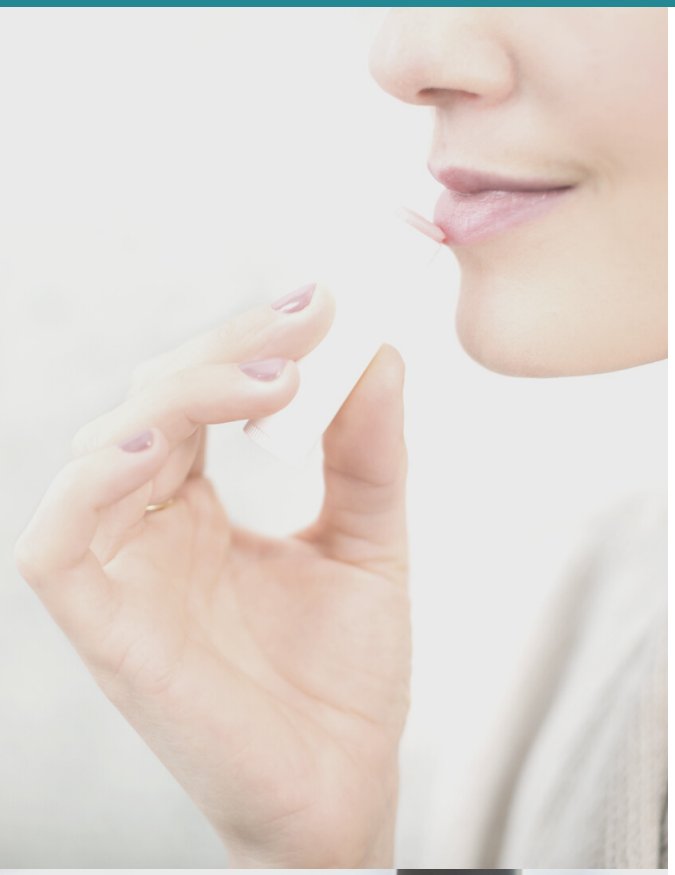
In this workshop, students will sample water and air for microbes present to explore the properties of bacterial growth, and determine a bacteria's ability to resist the antibiotic ampicillin and household cleaners.

ENVIRONMENTAL TOXICITY RESPONSE IN DAPHNIA

In this workshop, students will observe, compare and record the effects of alcohol and heavy metals found in the environment on Daphnia.

Cosmetic Sciences Programmes

STUDENTS WILL USE COSMETIC SCIENCE TO DEVELOP AND TEST CONSUMER PRODUCTS



TESTING LIP BALM RECIPES

Students will learn to create their own homemade lip balms, test their products quantitatively, and evaluate costumer preferences.

BATH BOMB SCIENCE

In this workshop, students will get to make their own homemade bath bombs and explore how changing the amounts of the different ingredients affects the fizziness of the bath bombs when they toss them in the bath.

STUDY SOAP SYNTHESIS

In this workshop students will carry out the chemical steps needed to transform coconut oil into a usable bar of soap, and purify it with salt to measure how its pH changes with its purity.

WHICH WORKS BEST TO KEEP SKIN MOIST?

In this workshop, students will create a model of human skin using jelly and test how well skin moisturizing products with different ingredients keep the model skin moist.

Sports Sciences Programmes

STUDENTS WILL EXPLORE HOW SCIENCE AND ENGINEERING CAN IMPROVE PERFORMANCE

SOFTBALL

Students will learn about the biomechanics of pitching to investigate how body position and physics interact to affect softball speed. Students will also find out which type of bat is better, wood or aluminum by comparing the hitting power.

MARTIAL ARTS

Students will learn about the physics of efficient kicking and compare the power impact of different martial arts kicks.

BASKETBALL

Students will determine if the ball's starting position for throwing a basketball into the net by shooting basketballs from chest height, chin height, and over the head. Students will also investigate if air pressure will affect the dynamics of ball bouncing.

FOOTBALL

Students will kick field goals and see how their success rate varies with distance. They will also kick a football at different launch angles and measure which one results in the longest horizontal distance

Renewable Energy Programmes

STUDENTS WILL USE REAL-WORLD DATA TO EVALUATE VARIOUS RENEWABLE ENERGY SOURCES

SOLAR ENERGY

Students explore the concepts of insulation, reflection, absorption, conduction and convection as they build and compare the performance of four solar cooker designs. Students will also design and build a model city powered by the sun by integrating photovoltaic panels into the design of buildings.

WIND ENERGY

Students transform wind energy into electrical energy by building their own miniature wind turbines and measuring the electrical current produced. They will explore how its design and position affect the electrical energy production.

HYDROELECTRIC ENERGY

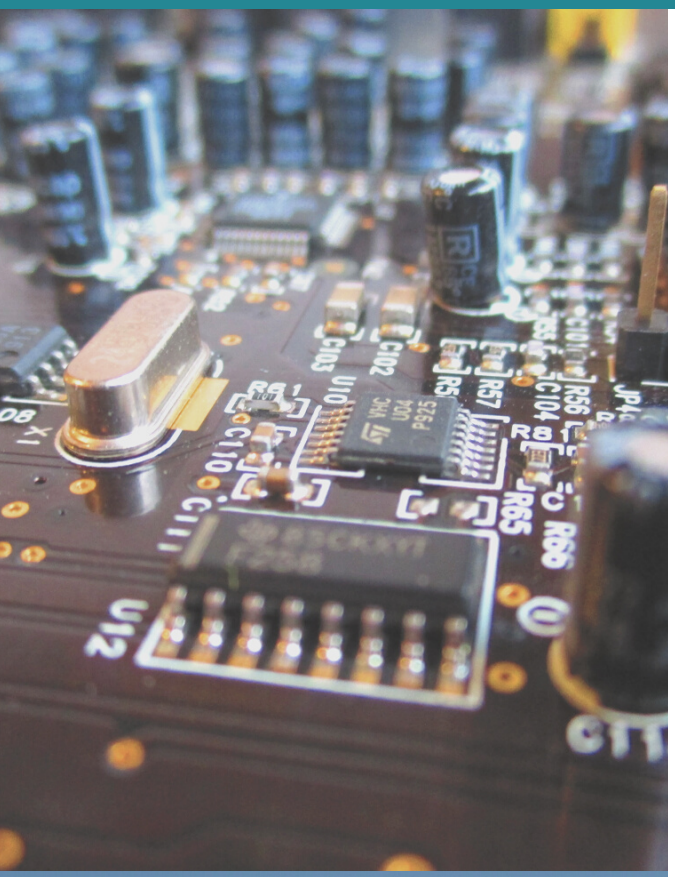
Students explore kinetic energy by creating their own experimental waterwheel from a plastic bottle to investigate the transformations of energy involved in turning the blades of a hydro-turbine into work, and experiment with how weight affects the rotational rate of the waterwheel.

BIOFUELS

Students will calculate the heat of combustion released from biodiesel they create from cooking oil, and explore the production of ethanol biofuel by investigating the effect of enzymes and temperature on the breakdown of starch.

Applied Technology Programmes

INDUSTRIAL-BASED EXPOSURE PROGRAMMES



3D PRINTING

Students will learn the fundamentals of 3D printing and basic modeling using computer software to make solid models and fabricate part models using 3D printing.

ELECTRONICS

Students will learn basic electronic design to construct prototypes such as electronic display boards, smart tracking robot cars, Bluetooth speakers, water detectors and night light activation circuit.

DRONE TECHNOLOGY

Students will assemble, test and fly drones, and will be given a chance to code for the drone to fly while gaining knowledge of basic concepts of aerodynamics and flight control systems.

AVIATION / AERONAUTICS

Students will be given a task to build, test and launch a glider by making use of the aerodynamic principles they learn, and learn air traffic control in simulated game-based environment to practice radio-telephony procedures as used by Air Traffic Controllers.

micro:bit Programmes

STUDENTS WILL APPLY THEIR DIGITAL SKILLS TO REAL WORLD SOLUTIONS

HEALTH TECHNOLOGY

Students will design, code and test a prototype of a wearable device and a heart rate monitor to measure the heart rate to to remind people to exercise and track their activity level.

MARINE SENSORS

Students will make prototypes of wireless sensors to monitor the environment at sea and create an autonomous vehicle that can mop up oil spills.

WEARABLE DEVICES

Students will design, program, test and create working prototypes of a flashing wheel light and a light up bag to help improve road safety for a wheelchair user.

PLANT GROWTH SENSOR

Students will create a prototype sensor to send alerts when trees are being illegally cut down and make moisture sensors to create a prototype of an automated farming system.

Food Sciences Programmes

KITCHEN-BASED EXPERIMENTS ON THE SCIENCE BEHIND THE PROCESS OF MAKING CERTAIN FOODS

- Choice Cheesecakes: Which Baking Method is the Best?
- How Much Baking Powder Do Quick Breads Need?
- Can Baking Soda Substitute for Baking Powder in a Recipe?
- Great Globs of Gluten! Which Wheat Flour Has The Most?
- Flavor That Food! Exploring the Science of Marinades
- From Sauce to Solid: The Science of Cranberry Condiments
- How Can Tofu Pack Such a Flavorful Punch?
- Is the Soup Ready? Measure How Much Water is Absorbed by Dried Beans
- Perfecting Pastries: The Role of Fats in Making a Delicious Pastry
- The Pasta Puzzle: How Much Water is Required to Cook Pasta?

CONTINUED ON NEXT PAGE

Food Sciences Programmes

KITCHEN-BASED EXPERIMENTS ON THE SCIENCE BEHIND THE PROCESS OF MAKING CERTAIN FOODS

- Smashing for Mash: The Science of Making Memorable Mashed Potatoes
- Stop Slumping: What Makes Foams Stand Up Straight
- Which Fruits Can Ruin Your Gelatin Dessert?
- You Want Fries With That? The Science of Crispy Potatoes
- When Science is Sweet: Growing Rock Candy Crystals
- Shimmy, Shimmy Soda Pop: Develop Your Own Soda Pop Recipe
- Lactose, Sucrose, and Glucose: How Many Sugars are in Your Smoothie?
- Juice Balls: The Science of Spherification
- Fruits Gone Bad? Discover Enzymatic Browning
- Make Your Own Marshmallows and Ice-Cream

THIS IS NON-EXHAUSTIVE LIST OF ACTIVITIES.