Mykidstem Course Schedule and Updates

Welcome to our STEM Class at Mykidstem! This STEM class is designed to provide students with an exciting and challenging learning opportunity, allowing them to explore the mysteries of the fields of Science, Technology, Engineering, and Mathematics (STEM) while cultivating innovative thinking, logical reasoning, observation skills, hands-on abilities, and aesthetic sensibilities.

In this curriculum, students will gradually establish a solid foundation in mechanics, electronics, programming, and physics, preparing them adequately for the STEM fields of the future. Our goal is to ignite students' scientific interests and nurture their practical skills, enabling them to be competitive in their future careers and academic pursuits.

This class will encompass various subjects, including mechanical engineering, electronic engineering, mathematical modeling, artificial intelligence, and physics experiments, among others. Students will have the opportunity to design and create various intriguing experiments and projects, such as robots, circuit boards, chemistry experiments, and physics laboratory equipment. Additionally, they will collaborate with fellow students to complete various tasks, enhancing their teamwork and communication skills.

We firmly believe that by participating in this class, students will gain invaluable experience and skills. Whether they choose to pursue careers in science and engineering or simply have an interest in these fields, we hope that students will explore the unknown, challenge themselves, and develop the mindset of scientists and engineers during this enjoyable and educational journey. Let us embark on this exciting learning adventure together, explore the fascinating world of STEM, and collectively create possibilities for the future!

We wish everyone great achievements and enjoyment!

Stay tuned for the commencement of this STEM class!

Contents

Abstract

Software Learning

Solidworks is a commonly used 3D CAD software originally designed for mechanical engineers. This software enables users to perform operations such as 3D modeling, assembly, and drafting, making it highly suitable for fields like mechanical engineering, industrial design, and product design. In addition to these features, Solidworks also supports simulation and analysis functions, allowing users to conduct simulations and analyses in areas such as mechanics, fluid dynamics, and thermodynamics.

Ultimaker Cura is a free 3D printer software that assists users in converting 3D models into printable files. This software supports a wide range of 3D printers and offers numerous advanced printing settings to ensure users achieve optimal printing results. With Ultimaker Cura, users can easily adjust the size, position, and orientation of models to guarantee the best printing outcome. Additionally, the software includes an automatic support generation feature, which adds necessary support structures to the printed model, enhancing printing quality.
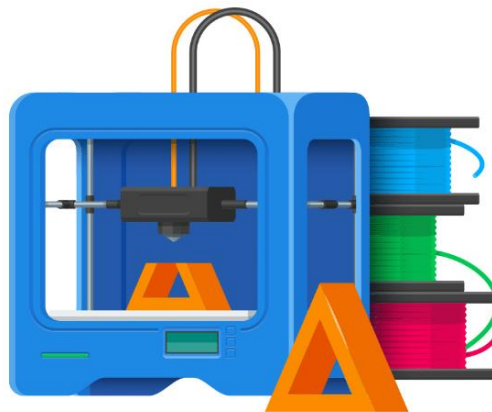
Matlab and Simulink are a highly popular pair of software tools for mathematical modeling and simulation. Matlab is primarily used for mathematical computations, data analysis, and visualization, among other fields. Simulink, on the other hand, is mainly employed for system modeling, simulation, and control system design. These two software packages can be integrated with each other, facilitating mathematical modeling and simulation analysis. They are

exceptionally well-suited for the design and development of integrated electromechanical systems, control systems, communication systems, and other related fields.
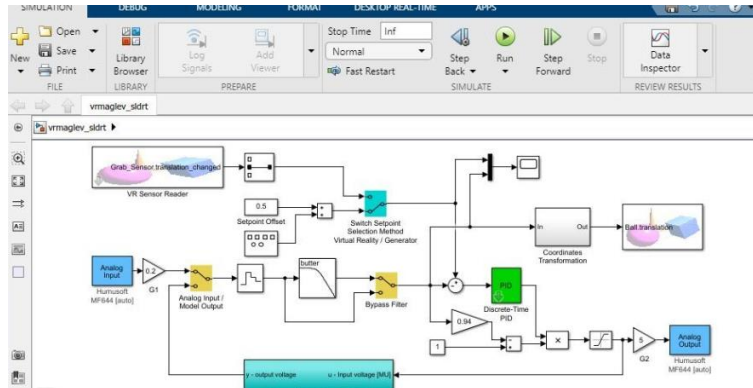
Tinkercad is a cloud-based circuit design software that assists users in circuit design and 3D modeling, among other operations. This software is highly suitable for beginners and children, helping them quickly grasp the fundamentals of circuit design and 3D modeling.
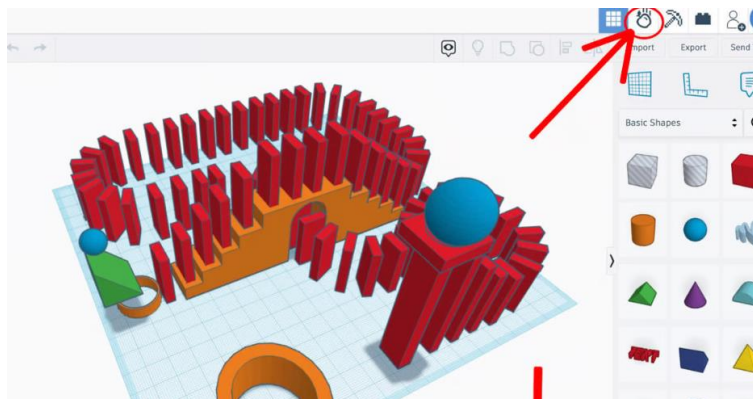
Arduino is a highly popular open-source hardware platform that assists users in designing and developing various electronic systems and interactive projects. This platform offers a rich library of functions and sample code, making it very suitable for beginners and educational purposes. Users can program and debug using the Arduino IDE software or choose to develop using other programming software.
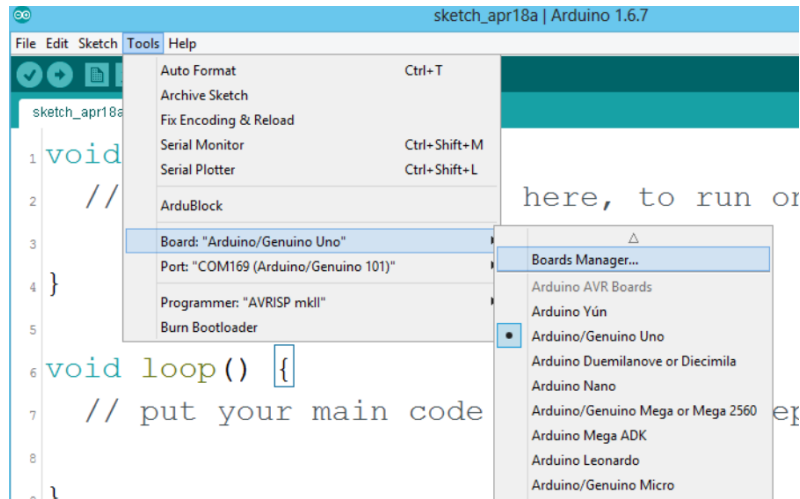
Comsol is a powerful and widely used engineering simulation software that can be employed to simulate and optimize a variety of engineering problems. With Comsol, you can simulate and optimize problems in multiple domains, including electromagnetics, structural mechanics, fluid dynamics, heat transfer, and more. Additionally, the software supports advanced features such as multi-physics coupling, parametric design, optimization, making Comsol an indispensable tool in the field of engineering.
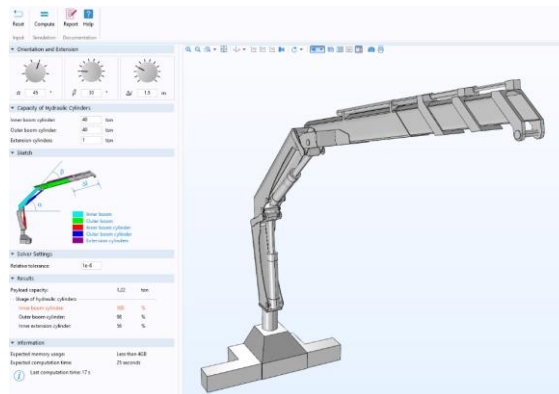
Hardware Learning

The Arduino Starter Kit is a perfect hardware kit for beginners, containing all the essential components you need for electronic programming. This kit includes an Arduino UNO board, along with various sensors and electronic components such as LED lights, potentiometers, temperature sensors, and more. With this kit, you can learn how to use Arduino programming and how to utilize various sensors and components to build your own electronic devices.
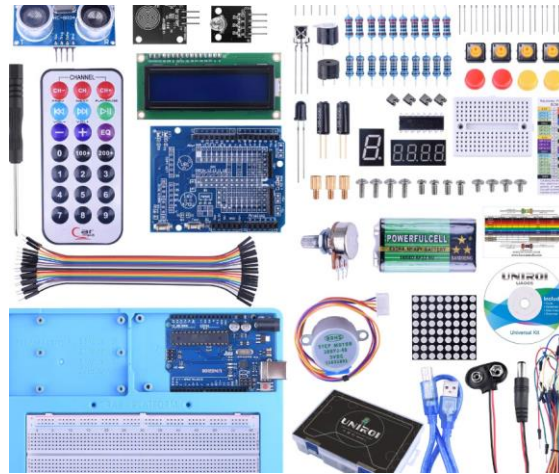
Sensors are devices capable of perceiving environmental information and converting it into electrical signals for output. In modern technology, sensors play a crucial role and find widespread applications in fields such as smart homes, industrial automation, medical devices, and more. There is a wide variety of sensor types, including temperature sensors, humidity sensors, pressure sensors, light sensors, and many others.

Science experiment kits are educational toys that allow children to learn science through hands-on experimentation. These kits typically include experiment materials, chemicals, guidebooks, and more, which children can use to conduct experiments following the instructions in the guidebook. There are many different types of science experiment kits, each suitable for children of different age groups.

For example, some kits designed for kindergarten and elementary school children are primarily aimed at helping them understand basic scientific concepts like colors, shapes, weight, temperature, and more. On the other hand, kits designed for middle school students are more complex and may involve higher-level scientific knowledge in fields such as chemistry and physics.

Science experiment kits enable children to learn through practical experience, fostering their hands-on skills and experimental abilities. They enhance children's interest in science while also improving their creativity and problem-solving skills.

Underwater robots are machines capable of performing various tasks underwater. They can be used for geological exploration, underwater resource development, marine environmental monitoring, and more. Underwater robots are typically divided into two categories: autonomous floating underwater robots and diving underwater robots. They can be configured according to different task requirements, such as installing various sensors, mechanical arms, and more.

Robots are machines capable of autonomously performing tasks. They can be programmed and guided to execute a wide range of tasks, from simple industrial manufacturing to complex medical surgeries. Robots can perceive their environment through sensors and computer vision, and they use motion control techniques to move and manipulate objects. They can be designed in various shapes and sizes to adapt to different tasks and environments. Currently, robots are increasingly being applied in various fields.

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In manufacturing, robots have become a crucial component, capable of handling repetitive and hazardous tasks on production lines. In the medical field, robots can assist doctors in surgeries, making procedures more precise and safe. Additionally, robots are used in the military, aerospace, exploration, and many other domains. While robotics technology has made significant advancements, there are still many challenges. For instance, robots need to become more intelligent and adaptable to different environments and tasks. Additionally, issues related to safety and privacy must be addressed to ensure that robots can work alongside humans safely.

A remote-controlled car is a small vehicle that can be controlled wirelessly using a remote controller. It typically consists of motors, wheels, a remote control unit, and a battery. Remote-controlled cars can be used for various fun projects, such as remote-controlled racing cars, remote-controlled helicopters, and more. Additionally, they can also be used for practical tasks like inspecting pipelines and search and rescue missions.

Theoretical Learning

In this program, we will cover topics such as mathematical modeling, thermodynamics, mechanics, electricity, magnetism, and dynamics. Mathematical modeling is the process of translating real-world problems into mathematical problems. By applying mathematical methods and techniques, we can mathematically model problems, derive mathematical analytical solutions or numerical

solutions, and ultimately find answers to practical problems. Thermodynamics, mechanics, electricity, and magnetism are vital branches of natural science, each studying phenomena related to heat, object motion, electric charges and fields, magnetic fields, and magnetic materials, respectively. Dynamics, a subfield of mechanics, focuses on the laws governing the motion of objects and various mechanical phenomena. These fields are closely interconnected, and their theoretical research and applications span various domains of natural science and engineering technology. In the development of modern science and technology, their research and applications have become increasingly widespread and play a crucial role in advancing various fields.

Eligibility Requirements

To enroll in this program, students must be part of the Gift Class and possess a strong enthusiasm for learning and a willingness to take on challenges. We hope that participants will have a high level of self-motivation, be available to participate weekly, and commit to a one-year program. Throughout this process, we expect participants to continuously challenge themselves, learn and grow, and share their learning experiences and knowledge with fellow students. We believe that this will be a meaningful experience, and we look forward to your participation. If you have any questions or need further information, please feel free to contact us.

Activity Schedule

This program will begin in September and will be held every Sunday from 2:00 PM to 4:00 PM. If you have any questions or need assistance, you can inquire within the group chat after 6:00 PM on weekdays. If you are interested in this program, I recommend asking for more details in the group chat. You can inquire about the topics, location, and whether advance registration is required. If you have decided to participate in this program, I suggest you plan your time in advance and prepare the necessary items, such as notebooks and pens. There will be assignments for each session, and reports need to be submitted. If a report does not meet the requirements, participants may be asked to discontinue.

Stage 1: Fundamentals of Mechanics and Manufacturing

Objective: Learn the basics of CAD software (SolidWorks), fostering students' spatial thinking and hands-on practical skills.

Content: Use SolidWorks to design and 3D print a solar-powered fan, covering fundamental CAD software operations, including 3D modeling and assembly. Simultaneously, develop students' spatial imagination and hands-on skills.

Participate in mathematical modeling competitions, cultivating students' model-based thinking. Work in teams to join mathematical modeling competitions, where you'll establish mathematical models and solve real-world problems. This phase aims to develop abstract thinking and modeling capabilities.

Explore principles of soft robotics, fostering innovative thinking. Build a soft crawling robot using piezoelectric and shape-memory materials as drivers, nurturing students' innovative thinking and unique robot design abilities.

Understand the control principles of soft robots, developing students' programming skills. Utilize an Arduino Kit and sensors to control the motion of the soft robot while enhancing students' logical programming thinking.

Theoretical Learning:

• Mathematical Modeling: Acquire skills in creating mathematical models to solve practical problems.

• Thermodynamics: Understand the fundamental principles of energy transfer and conversion.

• Mechanics: Master essential concepts of object motion and forces.

• Electronics: Comprehend basic theories of circuits and electric current.

• Magnetism: Study the properties and applications of magnetic fields.

• Dynamics: Investigate object motion and force scenarios.

Latest Research: Introduce breakthroughs in recent research areas such as sustainable energy, smart robotics, and materials science to spark students' interest in science and engineering.

Stage 2: Mechanical Principles and Magnetic Applications

Objective: Learn basic mechanical principles, cultivating students' logical thinking.

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Content: Build a magnetic car model, studying magnetic field principles, enhancing logical thinking skills, including designing the car body shell using CAD software and 3D printing.

Theoretical Learning: Delve deeper into the principles and applications of magnetic fields.

Latest Research: Explore recent advancements in magnetic applications, such as magnetic levitation trains and magnetotherapy.

WHAT IS FORCE?

A force can cause things to slow down, speed up, change direction, or change shape. It cannot be seen, but its effects are evident every day.

PULL — A push or a pull acting on an object ← FORCE → A product of interaction between two objects — PUSH

TYPES OF FORCES

magnetic force | gravitational force | frictional force | applied force | tension force | normal force

FORCE AS A VECTOR

arrow length (magnitude) — arrowhead (direction)

Force has both magnitude and direction.

force = 10 newtons, east

The SI unit for force is Newton (N), named after Isaac Newton.

Stage 3: Circuit Design and Creative Production

Objective: Learn electrical circuit principles, nurturing students' innovative thinking.

Content: Design a creative desk lamp with dimmable LED lights. This stage emphasizes fostering students' innovative thinking, allowing them to create unique lamp designs, including using CAD software for shell design and 3D printing.

Theoretical Learning: Gain a deep understanding of circuit design and current control. Latest Research: Introduce the latest electronic materials and circuit design technologies, such as flexible electronics and wearable devices.
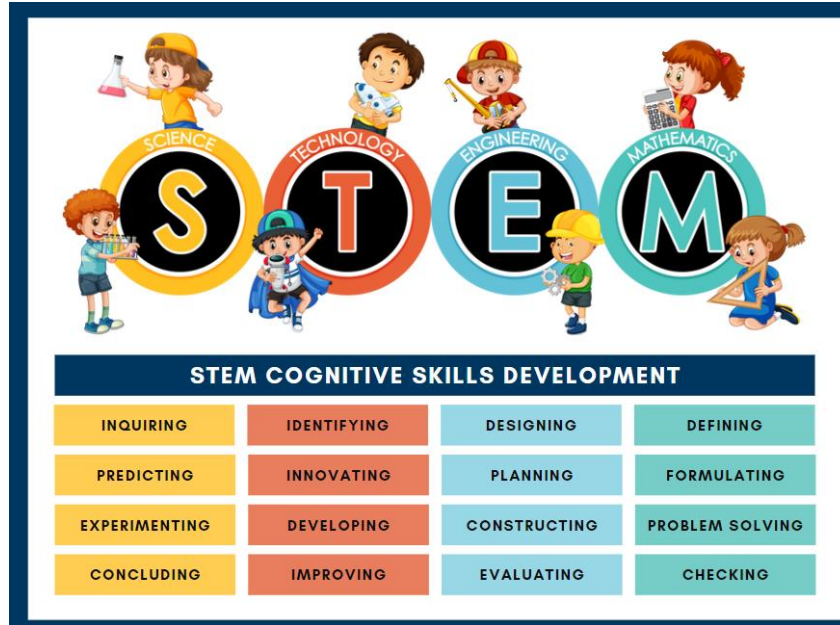
Stage 4: Optics and Aesthetics

Objective: Master CAD software use, developing students' aesthetic sense.

Content: Design a colorful fiber optic lamp, creating stylish lampshades using CAD software and installing LED light sources inside. Special focus on enhancing students' aesthetic sense.

Theoretical Learning: Study the principles of light propagation and reflection.

Latest Research: Explore the latest optical applications, such as laser communication and optical sensing technology.

Stage 5: Electronics and Programming Fundamentals

Objective: Learn programming knowledge, fostering students' logical thinking.

Content: Create a DIY clock using an Arduino Kit, study programming concepts, and display time using a screen.

Theoretical Learning: (Electronics) Further study of electronic components and digital circuits.

Latest Research: Introduce the latest embedded systems and IoT technologies, such as smart homes and wearable devices.
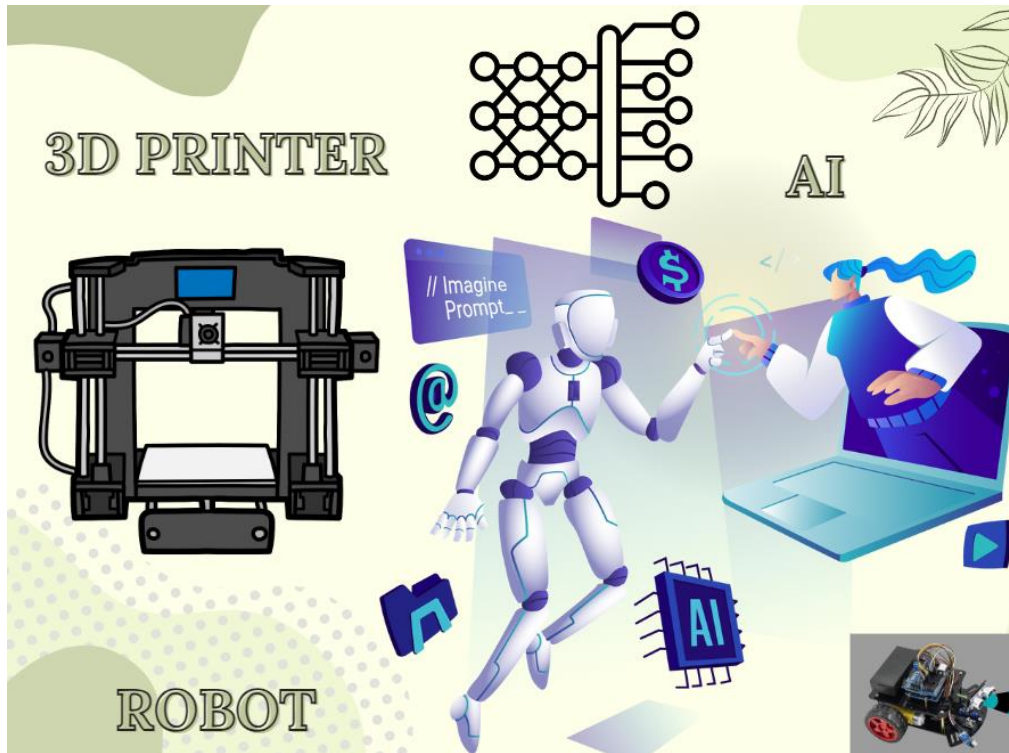
Stage 6: Mechanical Motion and Physics Fundamentals

Objective: Learn basic mechanical principles and physics, nurturing students' hands-on and logical abilities.

Content: Build a classic snow scene with infrared sensors controlling stepper motor motion. This stage emphasizes hands-on craftsmanship and observation skills.

Theoretical Learning: (Mechanics) Dive deep into the mechanics of objects' behavior and motion.

Latest Research: Introduce recent developments in mechanical motion technology and materials science, such as 3D printing and nanomaterials.
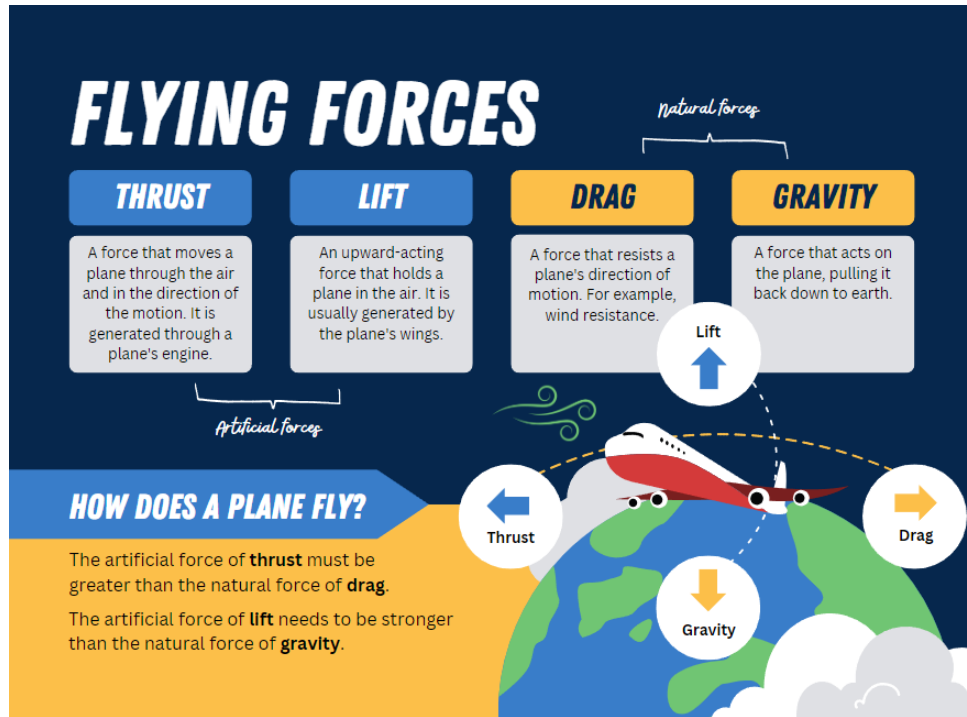
Stage 7: Robot Design and Programming

Objective: Learn basic robot principles and programming, fostering students' hands-on and logical thinking skills.

Content: Create a crawling robot using servo motors for propulsion, with Arduino controlling motor movement. Develop students' construction and programming logic capabilities.

Theoretical Learning: (Mechanics and Dynamics) Further study robot motion and mechanical principles.

Latest Research: Introduce the latest robot technologies, such as artificial intelligence and autonomous navigation robots.

Stage 8: Mechanical Art and Drawing

Objective: Learn how drawing robots work, nurturing students' creativity.

Content: Craft a doodling robot using two stepper motors to control a mechanical arm for drawing on paper. Cultivate creativity through programming for different drawing styles.

Theoretical Learning: Aesthetics and Art: Explore the principles of combining art and mechanics.

Latest Research: Introduce recent developments in mechanical art and art robots, such as 3D printing art and robot art performances.

The Hydrosphere

WATER IN THE ATMOSPHERE
This includes water vapor, fog, or water droplets in the form of clouds.

GROUNDWATER
This is freshwater stored in cracks under the Earth's surface. It is extracted and often used for drinking and irrigation.

RIVERS AND TRIBUTARIES
These are streams of moving water, mostly freshwater.

GLACIERS
These are massive bodies of ice on the Earth's polar regions. They store 3/4 of the Earth's freshwater.

LAKES
These are bodies of freshwater in an inland basin that are still or slow-moving.

OCEANS & SEAS
These are large expanses of saltwater that occupy more than 70% of the Earth.

The hydrosphere is the totality of the water on Earth and covers 75% of our planet.
Saltwater makes up 97% of the Earth's water, while freshwater is a scarce resource at three percent.

Stage 9: Hydraulics and Experiments

Objective: Learn hydraulic knowledge, developing students' hands-on and observational abilities.

Content: Construct a manual water pump using piston pump principles. This phase aims to foster students' hands-on construction skills.

Theoretical Learning: (Thermodynamics and Fluid Mechanics) Delve into the principles and applications of fluid behavior in hydraulic systems.

Latest Research: Introduce recent hydraulic technology and green energy applications, such as hydraulic power assistance systems and hydroelectric power generation.

Forest Food Web

01 Fruits
Fruits serve as a primary food source for many animals in the forest.

02 Seeds
Seeds also serve as a source of food and are dispersed by various animals.

03 Chipmunk
Chipmunks play a role in seed dispersal and are preyed upon by larger predators.

04 Beetle
Beetles are a group of insects that help primarily with decaying matter.

05 Grouse
Grouse are medium-sized birds that feed on various plant parts, including leaves, buds, and seeds.

06 Deer
Deer are herbivores that graze on vegetation, including grasses and fruits.

07 Green Snake
Snakes are carnivores that feed on a variety of prey, including small mammals.

08 Marmot
Marmots are large ground-dwelling rodents that primarily feed on plant material.

09 Bear
Bears are considered omnivorous apex predators in the forest food web.

10 Hawk
Hawks are birds of prey known for their keen eyesight and aerial hunting abilities.

Stage 10: Mechanical Motion and Wind Power

Objective: Learn principles of rotational mechanics, cultivating students' innovative thinking.

Content: Create an adjustable fan using a linkage mechanism to adjust blade angles for wind control. This stage is designed to foster innovative thinking and unique fan designs.

Theoretical Learning: (Mechanics and Dynamics) Further study mechanical motion and power conversion.

Latest Research: Explore recent developments in wind power generation and renewable energy technologies, such as vertical axis wind turbines and wind energy storage.
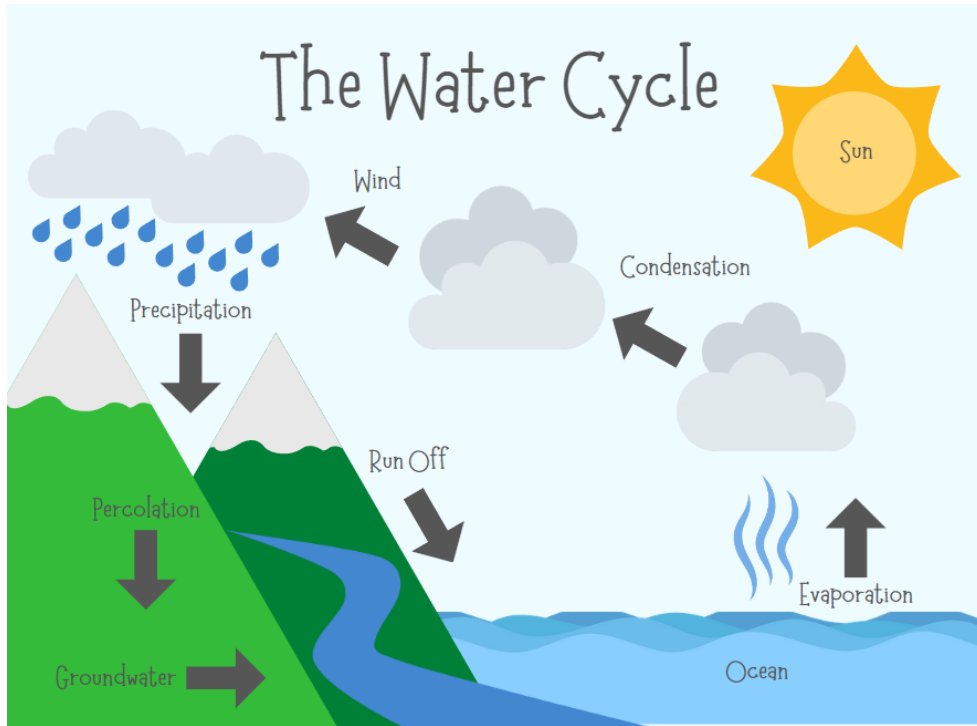
Stage 11: Sensors and Automation

Objective: Learn the use of optoelectronic sensors, fostering students' hands-on and logical thinking skills.

Content: Build a laser-controlled fan using photodetectors to detect laser interruptions and control fan speed. This stage aims to develop students' hands-on and logical thinking abilities.

Theoretical Learning: (Sensor Technology and Automation Control) Study sensor applications and principles of automation systems.

Latest Research: Introduce the latest sensor technologies and automation control systems, such as smart sensor networks and autonomous driving technology.
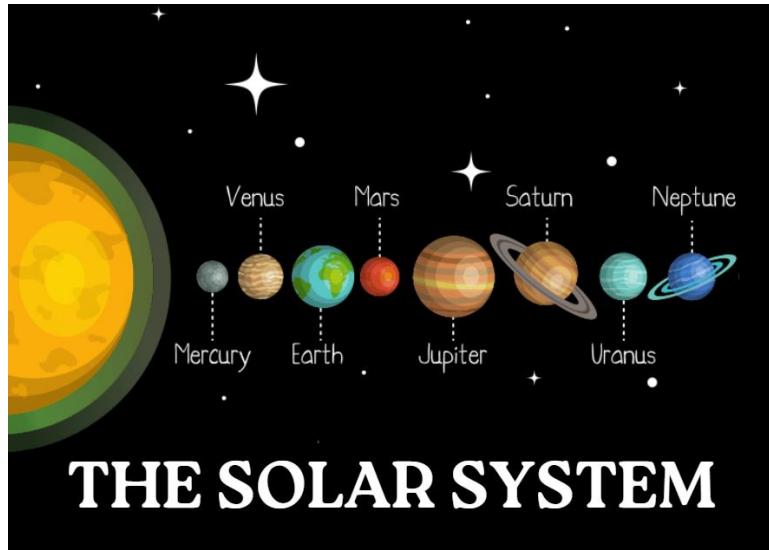
Stage 12: Hydraulics and Experiments

Objective: Learn hydraulic knowledge, developing students' hands-on abilities.

Content: Create a hydraulic lift using piston pump principles for lifting. This phase aims to nurture students' hands-on construction skills.

Theoretical Learning: (Fluid Mechanics and Hydraulic Technology) Gain an in-depth understanding of hydraulic system principles and applications.

Latest Research: Introduce recent developments in hydraulic systems and hydraulic machinery, such as efficient hydraulic systems and hydraulic cylinder design.
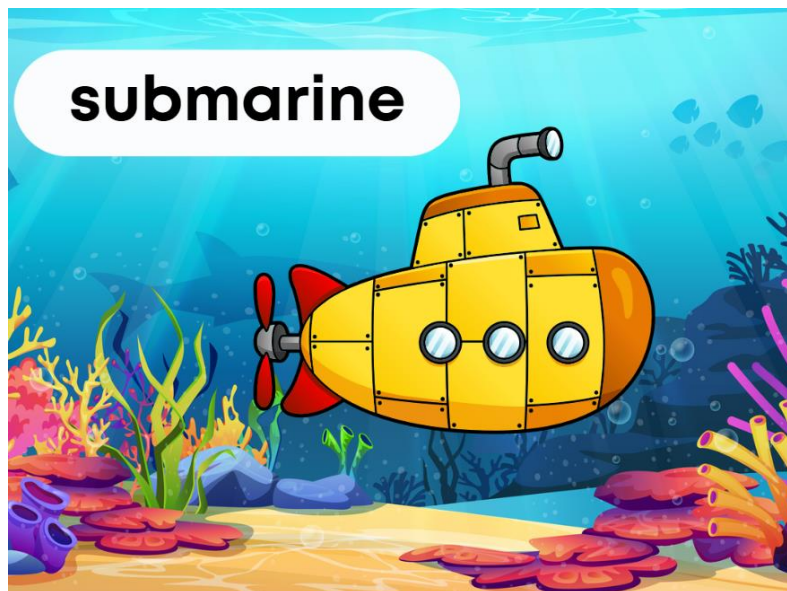
Stage 13: Air Pressure and Observation

Objective: Learn air pressure knowledge, cultivating students' observation skills.

Content: Build an air-floating ball, utilizing atmospheric pressure principles to make the ball float. This stage is designed to develop students' observation skills.

Theoretical Learning: (Gas Mechanics) Study gas behavior and atmospheric pressure principles.

Latest Research: Introduce recent applications of gas and air pressure technology, such as aerodynamics and air cushion technology.

Stage 14: Chemistry Experiments and Lab Skills

Objective: Learn chemical experimental methods, developing students' lab skills.

Content: Perform chemistry experiments, such as making acid-based indicators and separating mixtures. Through hands-on practice, students will refine their lab equipment operation and experimental abilities.

Theoretical Learning: (Principles of Chemical Experiments and Safety Regulations) Study chemical experimental methods and safety procedures.

Latest Research: Introduce recent advances in chemical experimental techniques and research, such as green chemistry experiments and nanomaterial applications.

4 TYPES OF CHEMICAL REACTIONS

SYNTHESIS — $2Na + Cl_2 \longrightarrow 2NaCl$

DECOMPOSITION — $CuSO_3 \longrightarrow CuO + CO_2$

SINGLE REPLACEMENT — $Fe + CuSO_4 \longrightarrow Cu + FeSO_4$

DOUBLE REPLACEMENT — $2NaOH + CuSO_4 \longrightarrow Cu(OH)_2 + NaSO_2$
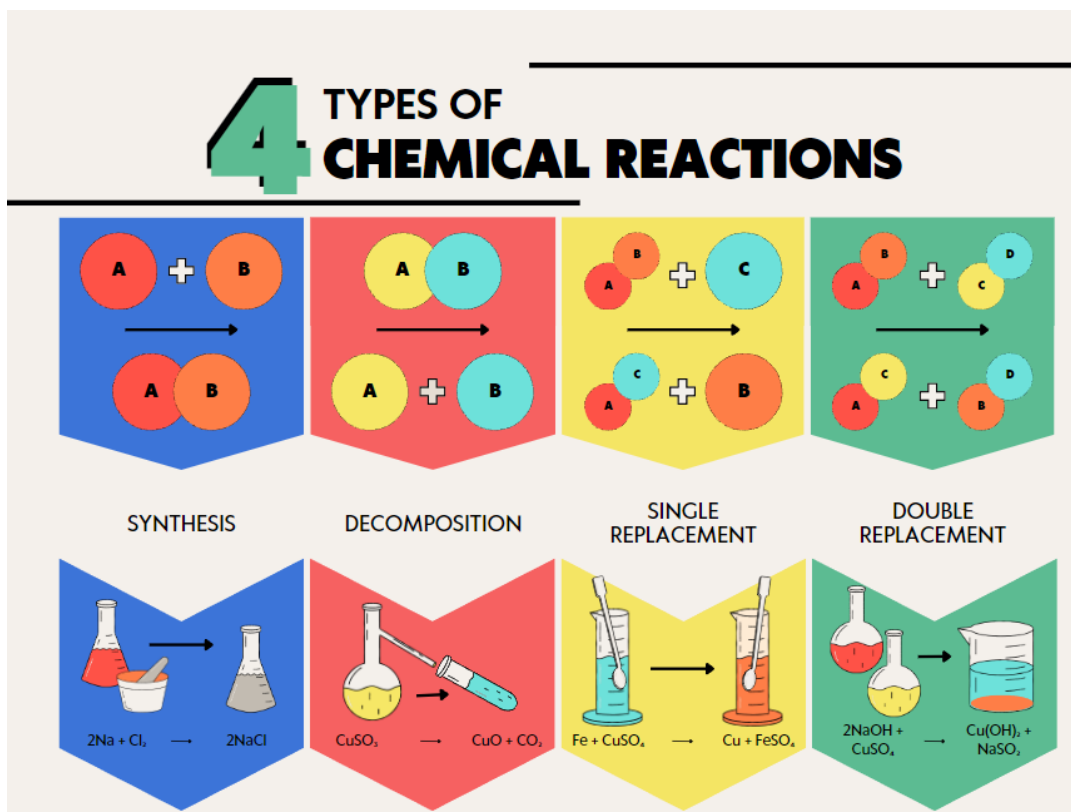
Stage 15: Organic Chemistry and Comprehensive Applications

Objective: Learn organic chemistry knowledge, developing students' comprehensive application skills.

Content: Conduct experiments in the synthesis of organic compounds, such as aspirin. Through practical synthesis processes, students will train in applying chemical knowledge.

Theoretical Learning: Fundamentals of Organic Chemistry and Synthesis Methods: Study organic molecule structures and principles of organic synthesis.

Latest Research: Introduce recent advancements in organic chemistry synthesis techniques and recent developments in organic synthesis reactions.
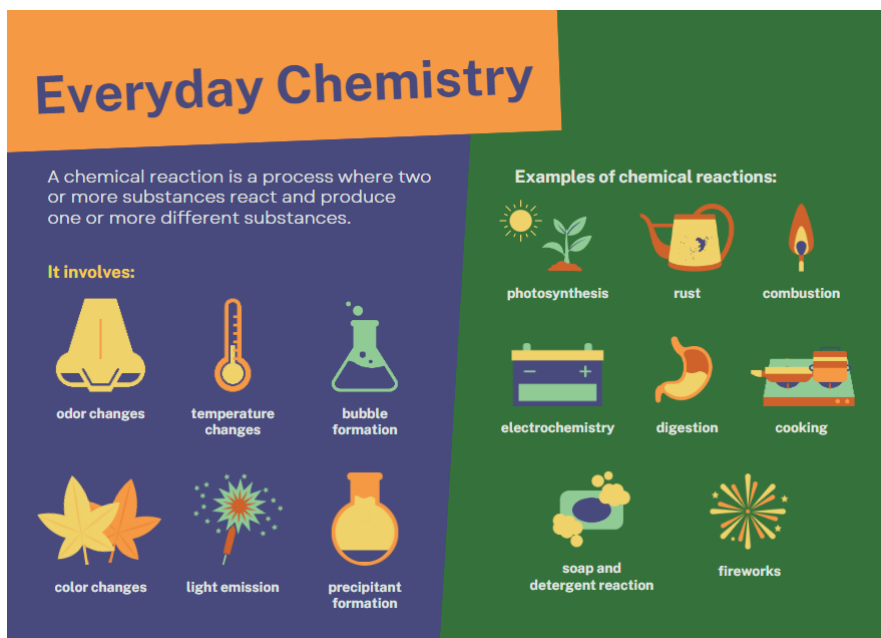
Stage 16: Biology and Medical Knowledge

Objective: Learn human anatomy, developing students' biological knowledge.

Content: Use scientific models to study the structure of the human skeleton, muscles, and other systems, gaining an in-depth understanding of human anatomy. Cultivate students' biological knowledge.

Theoretical Learning: Human Anatomy and Biological Structures: Study the structure and function of various parts of the human body.

Latest Research: Introduce recent biomedical research, such as 3D-printed human organs and developments in biomedical imaging.

THE BRAIN

frontal lobe

parietal lobe

thalamus

occipital lobe

hypothalamus

temporal lobe

brainstem

cerebellum
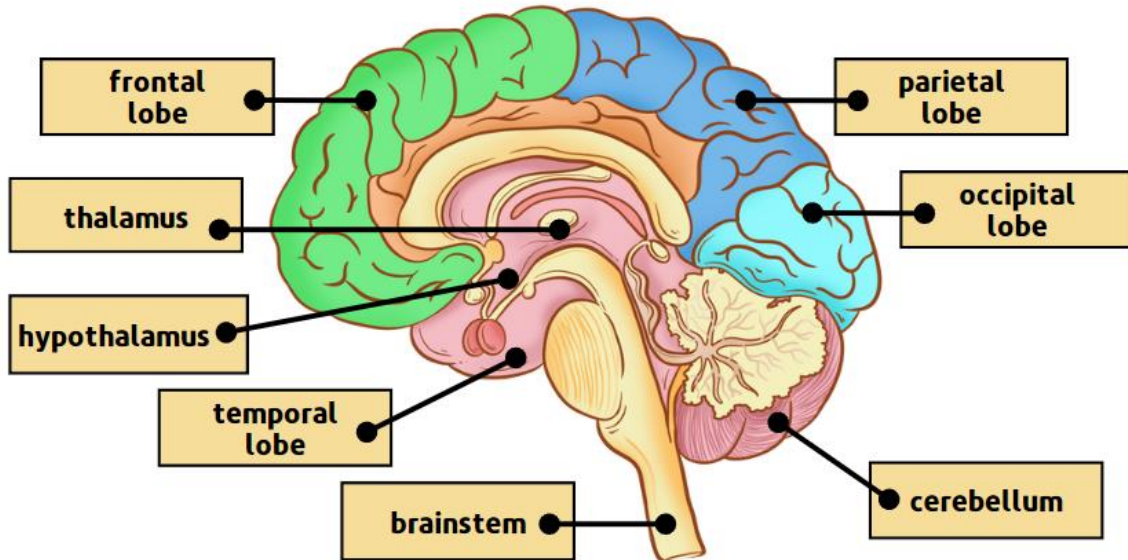
Stage 17: Human Body Systems

Objective: Understand the physiological functions of the various human systems, developing students' knowledge of physiology.

Content: Learn about the physiological functions of the human circulatory system, respiratory system, and more through video demonstrations. Gain an in-depth understanding of physiology.

Theoretical Learning: (Basics of Physiology and Organ Functions) Study the physiological functions of various human systems.

Latest Research: Introduce recent physiological research and medical technologies, such as gene editing and stem cell therapy advancements.

THE HEART

aorta

superior
vena cava

pulmonary
artery

pulmonary
vein

right
artrium

left
atrium

pumonary
valve

left
ventricle

interior
vena cava

right
ventricle
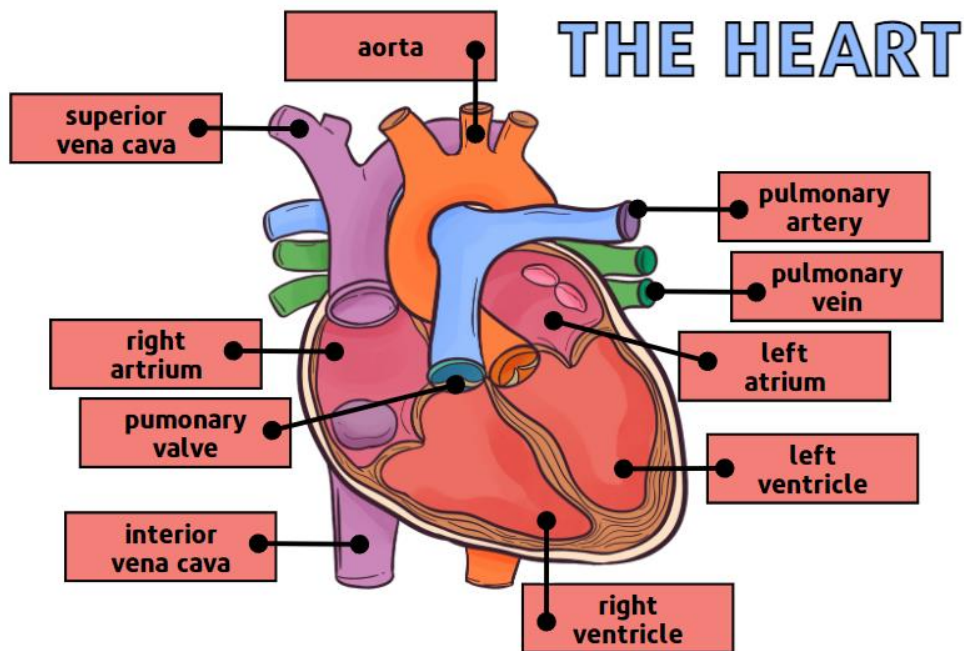
Stage 18: Pathological Systems

Objective: Learn about human pathology, developing students' medical awareness.

Content: Study various diseases' causes and physiological changes through case studies, fostering students' interest in medicine. Gain an in-depth understanding of pathology.

Theoretical Learning: Pathology and Medical Diagnosis: Study disease mechanisms and medical diagnostic methods.

Latest Research: Introduce recent medical research and advances in medical technology, such as gene therapy and cutting-edge precision medicine.

Cellular Respiration

Cell respiration is the process where cells break down glucose to release energy for the cell to use. It happens in the mitochondria and produces carbon dioxide, water, and ATP, which is the cell's energy source.

Mitochondria

Cytosol

O_2

NADH

CO_2

Glucose

Pyruvic Acid

Glycolysis

Krebs Cycle

NADH

FADH2

Electron Transport

ATP

ATP

ATP
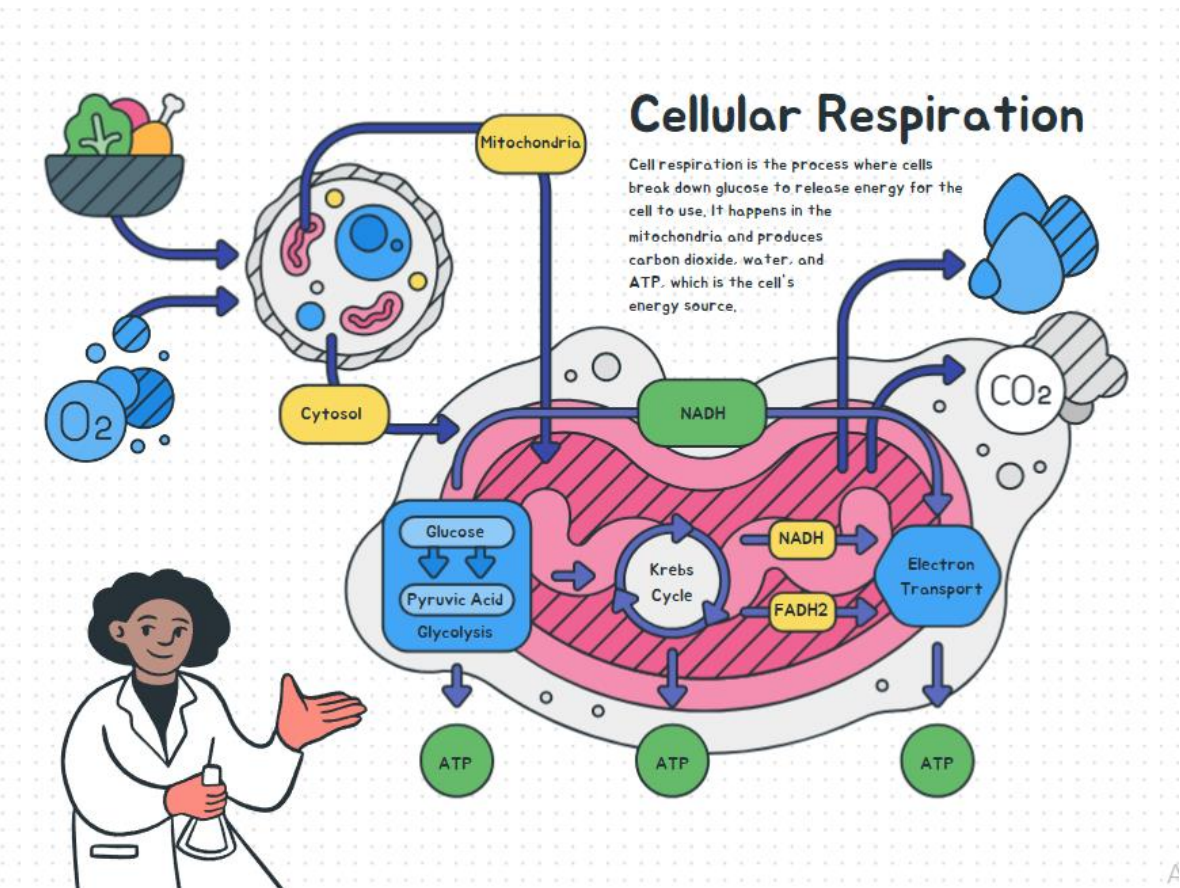
Course 1: STEM Course: Mastering STEM Kits - 3D Design, Electronics, and Machine Learning

Duration: 2 hours in person per week

Are you excited to explore the diverse world of STEM (Science, Technology, Engineering, and Mathematics) through a comprehensive and hands-on approach? Join us for an immersive online course that spans across 33 STEM kits, including 3D design, electronics, and machine learning. Over the course of engaging lessons, you will dive into topics such as 3D printing, SolidWorks, MATLAB, Arduino, Eagle software, and more.

Course Contents:

- Introduction to STEM and the 33 Kits
    - Unveiling the World of STEM and 33 Kits
    - Overview of the 33 STEM Kits and Their Applications
- Navigating 3D Printing
    - The Fundamentals of 3D Printing Technology
    - Mastering 3D Printing Techniques
- Dive into SolidWorks for 3D Design
    - SolidWorks Interface and 3D Modeling
    - Designing with SolidWorks - Practical Applications
- Exploring Electronics with Eagle
    - Introduction to PCB Design and Eagle Software
    - Schematic Design and Component Selection
- Understanding Arduino and Microcontrollers
    - Introduction to Microcontrollers
    - Arduino Fundamentals and Programming
- Electronics for STEM Kits
    - Motors, Sensors, and Power Systems
    - Communication and Control in Electronics
- MATLAB and Simulink for Control
    - MATLAB Basics and Programming for STEM
    - Simulink for Control System Design
- Diving into Machine Learning
    - Introduction to Machine Learning
    - Machine Learning Algorithms and Applications
- Advanced Machine Learning for STEM
    - Implementing Machine Learning in STEM
    - Real-world Applications of Machine Learning
- Designing with STEM Kits
    - Principles of 3D Design for STEM
    - Material Selection and Real-world Design Challenges
- Motors and Propulsion Systems

- o Motors and Mechanisms for STEM Kits
  - o Propulsion Systems and Their Design
- Control Systems for STEM Kits
  - o Control Systems and Automation
  - o Tuning and Practical Control System Applications
- Sensors and Data Acquisition
  - o Sensor Technology and Integration
  - o Data Acquisition and Analysis
- Safety and Regulations
  - o Safety Measures and Protocols
  - o Navigating STEM Regulations and Compliance
- Capstone Projects with STEM Kits
  - o Customized Capstone Projects
  - o Design, Build, and Test Your Capstone Project

Course Cost:

- Tuition: $50/hour
- Hardware Kit: $500 (Includes components for all 33 STEM kits, microcontrollers, sensors, and other electronic components)

Unlock the world of STEM through hands-on learning and practical applications. Enroll now and embark on an exciting journey of discovery and innovation!

Couse 2: STEM course: Mastering Remote Robot Car Design, Electronics, and AI

Duration: 2 hours in-person per week

Are you ready to dive into the exciting world of robotics and technology? Join us for an engaging online course where you'll learn the art of designing remote control robot cars, explore the realm of electronics, and delve into the wonders of machine learning. We'll cover everything from 3D printing to SolidWorks, MATLAB to Arduino, and Eagle software.

Course Contents:

- Introduction to Robotics and RC Cars
  - Unveiling the World of Robotics and RC Cars
  - Applications of Remote Control Robot Cars
- Navigating 3D Printing
  - The Fundamentals of 3D Printing Technology
  - Mastering 3D Printing Techniques
- Dive into SolidWorks for Design
  - SolidWorks Interface and 3D Modeling
  - Designing the Robot Car Chassis
- Exploring Electronics with Eagle
  - Introduction to PCB Design and Eagle Software
  - Schematic Design and Component Selection
- Understanding Arduino and Microcontrollers
  - Introduction to Microcontrollers
  - Arduino Fundamentals and Programming
- Electronics for Robot Cars
  - Motors, Sensors, and Power Systems
  - Communication and Control in Robot Cars
- MATLAB and Simulink for Control
  - MATLAB Basics and Programming for Robotics
  - Simulink for Control System Design
- Diving into Machine Learning
  - Introduction to Machine Learning
  - Machine Learning Algorithms and Applications
- Advanced Machine Learning for Robotics
  - Implementing Machine Learning in Robot Cars
  - Real-world Applications of Machine Learning
- Designing the Robot Car Body
  - Vehicle Design Principles and Materials
  - Customizing the Robot Car Body
- Motors and Propulsion Systems
  - Motors and Gear Systems for Robot Cars
  - Propulsion Mechanisms for Remote Control Cars
- Control Systems

- o Introduction to Robot Car Control
- o Configuring and Tuning Control Systems
- Navigation and Sensing
  - o GPS and Sensor Integration
  - o Obstacle Detection and Avoidance
- Safety and Regulations
  - o Safety Measures and Best Practices
  - o Navigating Robotics Regulations and Compliance
- Advanced Robot Car Projects
  - o Building Customized Robot Cars
 - o Capstone Project - Design, Build, and Test Your Robot Car

Course Cost:

- Tuition: $50/hour
- Hardware Kit: $500 (Includes components for building a remote control robot car, microcontrollers, sensors, and other electronic components)

Ready to embark on a thrilling journey into the world of robotics, electronics, and machine learning? Enroll now, and let's explore the fascinating realm of technology together!
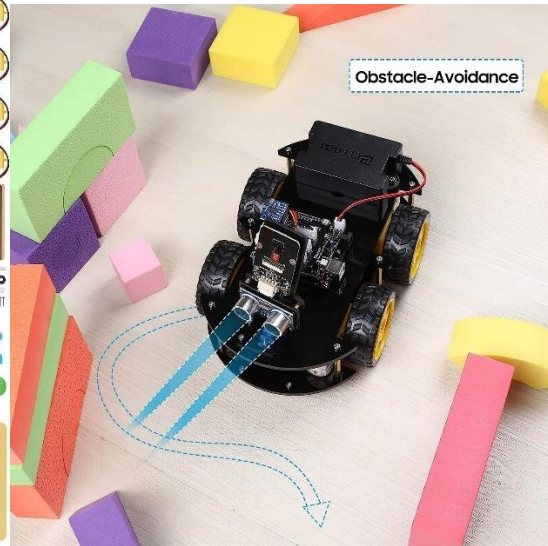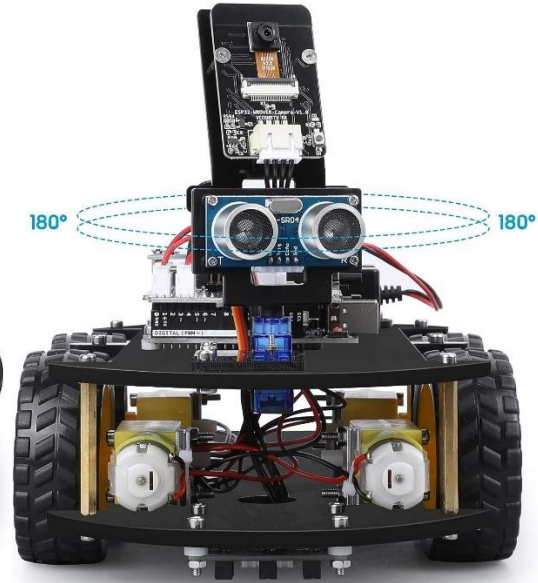
Course 3: STEM course: Mastering Drone Design, Electronics, and Machine Learning

Duration: 2 hours per week

Are you ready to embark on an exciting journey into the world of STEM? Join us for a comprehensive online course where you'll learn the intricacies of drone design, electronics, and machine learning. Over the course of engaging lessons, we'll explore topics ranging from 3D printing to SolidWorks, MATLAB to Arduino, and Eagle software.

Course Contents:

- Introduction to Drone Technology
  - Understanding the Basics of Drones
  - Navigating the World of Drone Applications
- Getting Started with 3D Printing
  - Introduction to 3D Printing Technology
  - 3D Printing Fundamentals and Terminology
- Mastering SolidWorks for Design
  - SolidWorks Interface and Navigation
  - Sketching and 3D Modeling in SolidWorks
- Dive into Electronic Design with Eagle
  - Introduction to PCB Design and Eagle Software
  - Schematic Design and Component Placement
- Understanding Arduino and Microcontrollers
  - Introduction to Microcontrollers
  - Arduino Fundamentals and Programming
- Electronics for Drones
  - Motors, ESCs, and Power Distribution
  - Sensors and Communication in Drone Electronics
- MATLAB and Simulink for Drone Control
  - MATLAB Basics and Coding for Drones
  - Simulink for Drone Control System Design
- Exploring Machine Learning
  - Introduction to Machine Learning
  - Machine Learning Algorithms and Applications
- Advanced Machine Learning in Drones
  - Implementing Machine Learning in Drone Systems
  - Real-world Drone Machine Learning Applications
- Designing the Drone Frame
  - Aerial Vehicle Design Principles
  - Aerodynamics and Material Selection
- Drone Propulsion and Motors
  - Propulsion Systems for Drones
  - Selecting Motors and Propellers

- Drone Flight Controllers
  - Flight Controller Basics
  - Configuring and Tuning Flight Controllers
- Autonomous Navigation
  - GPS and Autonomous Waypoint Navigation
  - Obstacle Avoidance and Computer Vision
- Drone Safety and Regulations
  - Safety Measures and Best Practices
  - Navigating Drone Regulations and Compliance
- Advanced Drone Projects
  - Building Customized Drones
  - Capstone Project - Design, Build, and Test Your Drone

Course Cost:

- Tuition: $50/hour
- Hardware Kit: $1000 (Includes components for building a drone, Arduino, sensors, and other electronic components)

Are you ready to dive into the exciting world of drones, electronics, and machine learning? Enroll now, and let's embark on this educational journey together!

Course 4: STEM Course: Mastering Underwater Robot Fish Design, Electronics, and AI

Duration: 2 hours in person per week

Are you fascinated by the mysteries of the deep sea and cutting-edge technology? Join us for a captivating online course where you'll learn the art of designing underwater robot fish, delve into electronics, and explore the world of machine learning. Over the engaging lessons, we'll cover everything from 3D printing to SolidWorks, MATLAB to Arduino, and Eagle software.

Course Contents:

- Introduction to Underwater Robotics
    - Unveiling the World of Underwater Robotics
    - Exploring the Applications of Underwater Robot Fish
- Navigating 3D Printing
    - The Fundamentals of 3D Printing Technology
    - Mastering 3D Printing Techniques
- Dive into SolidWorks for Design
    - SolidWorks Interface and 3D Modeling
    - Designing the Underwater Robot Fish Frame
- Exploring Electronics with Eagle
    - Introduction to PCB Design and Eagle Software
    - Schematic Design and Component Selection
- Understanding Arduino and Microcontrollers
    - Introduction to Microcontrollers
    - Arduino Fundamentals and Programming
- Electronics for Underwater Robots
    - Motors, Sensors, and Power Systems
    - Communication and Control in Underwater Robotics
- MATLAB and Simulink for Control
    - MATLAB Basics and Programming for Robotics
    - Simulink for Control System Design
- Diving into Machine Learning
    - Introduction to Machine Learning
    - Machine Learning Algorithms and Applications
- Advanced Machine Learning for Robotics
    - Implementing Machine Learning in Robotics
    - Real-world Applications of Machine Learning
- Designing the Robot Fish Frame
    - Aerial Vehicle Design Principles
    - Material Selection and Underwater Dynamics

- Propulsion Systems
  - Propulsion Mechanisms for Robot Fish
  - Motors and Propellers for Underwater Locomotion
- Control Systems
  - Introduction to Robot Fish Control
  - Configuring and Tuning Control Systems
- Navigation and Sensing
  - GPS and Sonar for Underwater Navigation
  - Implementing Obstacle Avoidance
- Safety and Regulations
  - Safety Measures and Protocols
  - Navigating Underwater Robotics Regulations
- Advanced Robot Fish Projects
  - Building Customized Robot Fish
  - Capstone Project - Design, Build, and Test Your Robot Fish

Course Cost:

- Tuition: $50/hour
- Hardware Kit: $1000 (Includes components for building an underwater robot fish, microcontrollers, sensors, and other electronic components)

Embark on a remarkable journey into the depths of underwater robotics, electronics, and machine learning. Enroll now, and let's explore the fascinating world of aquatic technology together!