



CURRICULUM

GRADE 9-12 YEAR 1

S.no	Kit/Platform Used	Concept Covered with Activity / Project Name	Activity/Project Details or Coverage	Inter-Disciplinary Learning Outcome around STEM/Maths/Science
1	Introduction to Robots			
2	Tinker Orbits	Turn on Light Using Switch	With Tinker Orbits, ignite STEM curiosity! Build a circuit, program it using block-based coding in the Tinker Orbits app/AI Connect platform, and turn on a light with the power of your code and a switch.	<p>STEM Proficiency: Master circuitry, coding, and light control with Tinker Orbits.</p> <p>Scientific Exploration: Understand electrical principles through hands-on experimentation.</p> <p>Mathematical Logic: Apply logical thinking while programming for tangible results.</p>
3		Alarm System	Craft an Alarm System with IR and buzzer using the Tinker Orbits kit. Combine modules, employ block-based programming on the Tinker Orbits app/AI Connect platform.	<p>Electronics Mastery: Integrate IR, buzzer for an alarm, emphasizing STEM.</p> <p>Mathematical Logic: Apply logical reasoning through block-based programming.</p> <p>ICT Proficiency: Utilize Tinker Orbits app for hands-on tech learning.</p>
4		Automatic fan	Create an automatic fan using the Tinker Orbits kit, integrating an IR sensor. Utilize block-based programming through the Tinker Orbits app/AI Connect platform for an interactive, hands-on electronics project.	<p>Electrical Understanding: Comprehend circuits and sensors, enhancing STEM and science.</p> <p>Mathematical Logic: Apply math concepts in programming, promoting mathematical thinking.</p> <p>ICT Proficiency: Develop digital skills through block-based programming, linking ICT to electronics.</p>
5		Display text on OLED	Utilize Tinker Orbits kit to display text on OLED screens. Engage in block-based programming through the Tinker Orbits app/AI Connect platform, fostering STEM understanding and IoT skills interactively.	<p>Electronics Proficiency: Master text display via OLED screens, connecting STEM principles.</p> <p>Mathematical Logic: Apply logical thinking in block-based programming, enhancing math.</p> <p>Digital Skills: Develop ICT competencies through interactive Tinker Orbits tasks.</p>
6		Smart Lamp	Create a Smart Lamp with the Tinker Orbits PBL kit. Assemble MDF pieces, adding ultrasonic sensor for hand wave activation and a potentiometer to control RGB strip colors.	<p>Electrical Mastery: Craft Smart Lamp, blending STEM, Math, and electronics.</p> <p>Scientific Principles: Understand sensors, linking Science to technology.</p> <p>Mathematical Control: Apply potentiometer for color adjustment, reinforcing math concepts.</p>
7	Tinker Orbits PBL	Automatic Pet Feeder	Build an Automatic Pet Feeder with the Tinker Orbits PBL Kit. Assemble MDF pieces to create the structure. The robot uses an ultrasonic sensor to detect the pet's presence and servo motors to dispense food into the bowl, making feeding a breeze.	<p>Engineering & Robotics: Create an Automatic Pet Feeder with precision.</p> <p>Scientific Observation: Explore ultrasonic sensor functionality for pet interaction.</p> <p>Mathematical Logic: Program precise food dispensing, linking math and automation.</p>
8	Quiz: Tinker Orbits			
9	Project - 1: Theme- Sustainable Cities and Communities (UN Goal -11)			
10	STEMBOT	Obstacle Avoider Robot	An obstacle avoider robot using STEMBOT is a small robot designed to navigate its environment while avoiding obstacles in its path. It is equipped with sensors, such as ultrasonic sensors or infrared sensors, that detect the presence of obstacles and allow the robot to change its direction to avoid collisions.	<p>STEM Proficiency: Construct obstacle avoider robot, merging science, technology, engineering.</p> <p>Mathematical Logic: Apply math to sensor data for navigation decisions.</p> <p>Technological Adaptation: Integrate ICT with sensor-driven obstacle avoidance strategies.</p>
11		Light Follower Robot	A light follower robot using STEMBOT is a small robot designed to track and follow a light source. It utilizes light sensors, typically phototransistors or light-dependent resistors (LDRs), to detect the intensity of light in its surroundings. The Microbit, a microcontroller board, is responsible for processing the sensor readings and controlling the robot's movements.	<p>Science Integration: Explore light behavior through phototransistors and LDRs.</p> <p>Mathematical Logic: Apply math in programming for precise light tracking.</p> <p>ICT Proficiency: Utilize Microbit for sensor data processing and robot control.</p>



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12	STEMBOT	Voice control robot	A voice-controlled robot using STEMBOT, AI (Artificial Intelligence), and ML (Machine Learning) is an advanced robot that responds to voice commands and performs tasks based machine learning. The AI and ML components enable the robot to understand and interpret the voice commands. Through training and data analysis, the robot learns to recognize patterns in speech and accurately understand user instructions.	<p>STEM Proficiency: Build a voice-controlled robot, integrating STEM, ICT technologies.</p> <p>Scientific Application: Understand AI and ML principles for voice recognition.</p> <p>Mathematical Logic: Implement data analysis, reinforcing math in pattern recognition.</p>
13	Quiz: MicroBit			
14	Project - 2: Theme Good Health and Well-being (UN Goal -3)			
15	 <p>Basic Electronics Kit</p>	Automatic Street Light	Create an Automatic Street Light with a breadboard kit and Light Dependent Resistor (LDR). Understand LDR's light-sensitive behavior without coding, illuminating the streetlight when it gets dark.	<p>Physics Understanding: Explore LDR's light sensitivity, demonstrating streetlight functionality.</p> <p>Mathematical Analysis: Calculate light threshold, integrating math and engineering concepts.</p> <p>STEM Application: Engage in hands-on electronics, fostering practical STEM knowledge.</p>
16		Make your own battery	Engage in hands-on learning with the Breadboard Kit. Build a homemade battery using capacitors, exploring electrical concepts without coding, fostering a deeper understanding of energy storage.	<p>Electrical Mastery: Create capacitive homemade battery, reinforcing STEM principles.</p> <p>Mathematical Application: Calculate energy storage, linking math to real-world circuits.</p> <p>Scientific Exploration: Understand energy dynamics, promoting science through hands-on experiments.</p>
17		Security alarm system	Create a DIY Security Alarm System using LDR, buzzer, and lasers with a breadboard kit. Students connect components to design a simple yet effective alarm without coding, enhancing understanding of electronics and security concepts.	<p>Electronics Expertise: Understand component connections, boosting STEM knowledge.</p> <p>Scientific Understanding: Explore light properties, connecting science to practical applications.</p> <p>Mathematical Logic: Apply logical thinking in circuit design, reinforcing math skills.</p>
18	Quiz: Breadboard			
19	 <p>Arduino Robotics Kit</p>	Car Parking System	Create a Car Parking Sensor with an Ultrasonic Sensor and buzzer using the Arduino Robotics Kit. Learn about distance measurement, alert systems, and sensor technology in this engaging project.	<p>Distance Measurement: Apply math and science to calculate distances accurately.</p> <p>Alert Systems: Understand technology for creating real-world warning systems.</p> <p>Sensor Technology: Grasp sensor functionality and applications in robotics.</p>
20		Servo Motor Control	Learn servo motor control with the Arduino Robotics Kit. Assemble and program a robotic arm to perform precise movements, exploring robotics, electronics, and programming concepts in a hands-on project.	<p>Robotics Proficiency: Craft and code robotic arm, bridging STEM and technology.</p> <p>Electronic Control: Understand servo motors, linking math to precise movements.</p> <p>Programming Skills: Code logic, nurturing computational thinking through Arduino Robotics Kit.</p>
21		Color Sorter (Black & White)	Sort White and Black articles by sensing through IR sensor and using a servo to segregate them	<p>Color Recognition: Understand optics, linking science and technology concepts.</p> <p>Algorithmic Logic: Develop coding skills for sorting, integrating mathematics and programming.</p> <p>Sensor Integration: Explore sensor applications, bridging STEM disciplines seamlessly.</p>
22		Message display on LCD	With the Arduino Robotics Kit, students create a message display on an LCD screen, learning coding, electronics, and robotics. Engage in hands-on STEM exploration.	<p>Coding Proficiency: Learn programming logic for message display, enhancing STEM skills.</p> <p>Electronics Mastery: Understand circuitry, linking science and technology concepts.</p> <p>Robotics Foundation: Explore robotic interactions, integrating math in problem-solving.</p>
23	Quiz: Arduino			
24	Project - 3: Theme-Responsible Consumption and Production (UN Goal -12)			
25	3D Printer	Make Hollow/ Shell Objects	Design a hollow box using TinkerCAD	<p>STEM Integration: Apply geometry principles to design 3D hollow structures.</p> <p>Mathematical Skills: Calculate dimensions, volumes, and proportions for precise designs.</p> <p>Scientific Insight: Understand structural stability and material science concepts.</p>

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26	3D Printer 	Turn 2D Object into 3D Object	Design a Batman logo and various other keychain designs	<p>Mathematical Transformation: Apply 2D to 3D conversion through geometry.</p> <p>Engineering Design Skills: Craft intricate 3D models, enhancing creativity.</p> <p>Science of Materials: Understand materials in crafting personalized keychains.</p>
27	Quiz: 3D Printer			
28		Introduction to Python and AI Connect Geometrical Shape and Pattern	Explore AI Connect for fun coding adventures	<p>Cross-Disciplinary Skills: Fosters problem-solving skills connecting STEM, Math, and AI.</p> <p>Algorithmic Thinking: Introduces coding concepts bridging Science and Mathematics.</p> <p>Real-world AI Insights: Encourages AI exploration with mathematical foundations.</p>
29	Python Programming (AI-Connect)	Multi-line Print Statement	Code with block based python to print a statement and learn about different data types in python	<p>Math Skills Integration: Apply math concepts in data types, enhancing numeracy.</p> <p>Scientific Awareness: Explore AI's data handling, connecting to scientific data.</p> <p>STEM Literacy: Build foundational STEM knowledge through AI-powered activities.</p>
30		Design calculator	Program to create a calculator using python programming	<p>Math Proficiency: Enhance mathematical skills through calculator design with AI.</p> <p>Scientific Understanding: Learn AI's role in computation and problem-solving.</p> <p>STEM Integration: Explore the intersection of math, science, and technology.</p>
31	Quiz: AI Connect			
32	Project -4: Industry, Innovation and Infrastructure (UN Goal -9)			