EbD TEEMS NxtGen – Grade 6
At-A-Glance

Intended Audience: 6th Grade **Course Length: 6-8 weeks**

Our World and Me serves as a capstone experience for sixth-grade learners using hands-on inquiry and design as they explore robotics through the engineering field of mechatronics. Mechatronics is an interdisciplinary engineering field that focuses on the integration of mechanical, electrical, and software systems. This curriculum extends ITEEA's **EbD-TEEMS Integrative-STEM Curricula for K-6** as the students create an interactive automaton that (1) educates others about environmental impacts caused by humans/technology, OR (2) presents a new idea on how to reduce human/technological impacts on the environment. Following guided inquiry activities, a design challenge provides an opportunity for students to apply knowledge and skills in a meaningful way as their automaton moves from a mere mechanical device to a robot. In this course, students learn about robotics, coding, computational thinking and programming fundamentals.

Objectives

- Students will use the brainstorming guidelines to generate ideas.
- Students collaborate as a team to select and share ideas regarding a selected topic. Students will view multiple videos (and other multimedia sources as appropriate) to gather information on the historical and cultural origins of automata and mechanical toys and record their observations in their engineering design notebooks.
- Students will use the practice of reverse-engineering to examine how an object/device works and record their observations in their engineering design notebooks.
- Students will use construction methods such as folding, cutting, gluing, and/or taping to construct a crank mechanism.
- Using the storyboard technique, students will observe how their crank mechanism works and create a five-panel storyboard and demonstration for class members who constructed a different crank mechanism.
- Students will identify and describe the types of motion found in their crank mechanism by using the terms oscillation, rotary, reciprocating, irregular, linear, and intermittent.
- Students will learn how three-dimensional figures are represented using nets made up of rectangles and apply these techniques in the context of solving real-world and mathematical problems.
- Students will use the skill of prototyping to construct a new display stand by either scaling up or scaling down from the original design.
- Students will practice using the Engineering Design Process to understand the Mini-Challenge Design Brief: Electrify!
- Students will read, interpret, and use electronic schematic symbols found in Technical Data Sheets, Standard Operating Procedure documents, and schematic diagrams; as well as schematic symbols used on electrical components (e.g., battery, battery holder) and instruments (e.g., digital multimeter).
- Students will use the digital multimeter (DMM) to perform electrical measurements including battery voltage checks and continuity checks of a designed circuit.
- Students will use Technical Data Sheets (TDS) to gain an understanding of various electrical components and will add information to the TDS based on their use of the components.
- Students will use Standard Operating Procedure documents (SOP) in the use of electrical components, tools, or processes.
- Students will construct schematic diagrams demonstrating the relative speed and the direction of the motor.
- Students will use a multimeter to determine the potentiometer's maximum resistance, left-center range, and right-center range.
- Students will use tools to connect devices to a controller. Students will create expressions and sequences using programming software.
- Students learn coding, computational thinking and programming fundamentals.

For More Information

Contact Us At

ebdbuzzsupport@iteea.org