TYPA Project List Highlights

Summer Camp 24

Tools and Software

- Microbit (All Grade Levels)
  - The microbit is a micro computer that the kids can program using block code. The level of coding and electronic attachments can range in level from Gr 1 - 6. It is a versatile tool for teaching software and hardware configuration for all elementary school ages.

- Microbit Electronics and Extensions (Gr. 5 – 6)
  - External sensors and motors for the Microbits such as UV, humidity, sonar, Infrared, crash, temperature etc. These kits focus on circuitry and the electronic component of the microbit.

- WonderKit (Gr. 1– 4)
  - The Wonderkit includes building blocks and basic sensors and motors for the microbit. The projects range in difficulty from Gr. 1 – Gr. 4

- Makers Tools (Gr. 1 – 6)
  - These are your basic making tools such as tapes, cardboard, scissors, crafting materials, cutting tools, safety gloves and gear

Gr. 1 – 2 Projects

- Mars Rover
- Constellation's Lantern
- Make a City
- Drawing Machine
- Forklift
- Top Spinner

Mars Rover

Description:

Campers will be making a balloon powered 'Mars Rover' inspired by NASA's 5 rovers; Sojourner, Spirit, Opportunity, Curiosity and Perseverance.

Learning Outcome:

Students use fine motor constructing skills to assemble a balloon powered car. The students will learn about the different states of matter and air pressure.

Constellation's Lantern

Description:

Students will learn about different constellations and create a lantern using a simple circuit and a switch to see their constellation glow.

Learning Outcome:

Students learn about constellations and also how to construct a simple circuit using a battery, copper tape, a brass fastener and an LED light.

Make a City

Description:

Design and make a city. Students will construct a city and road network using cardboard and cardstock. The city will serve as a background and prop for later projects such as the remote control forklift.

Learning Outcome:

Students will learn how to design 3D objects and cut cardstock. They will also learn different attachment techniques.

Drawing Machine

Description:

The students make a machine using building blocks and electronics that uses a motor to draw different shapes.

Learning Outcome:

Students become familiar with programming a microbit; a micro controller that uses block code programming. They will learn basic electronics and how to connect a motor to the microbit.

Forklift

Description:

Student will build a remote control forklift and hydraulic lift using the microbit and wonder kit building blocks.

Learning Outcome:

The students learn about degree turns and how to connect a servo motor to a microbit micro controller. They then use block code and radio function to pair the remote control to the microbit.
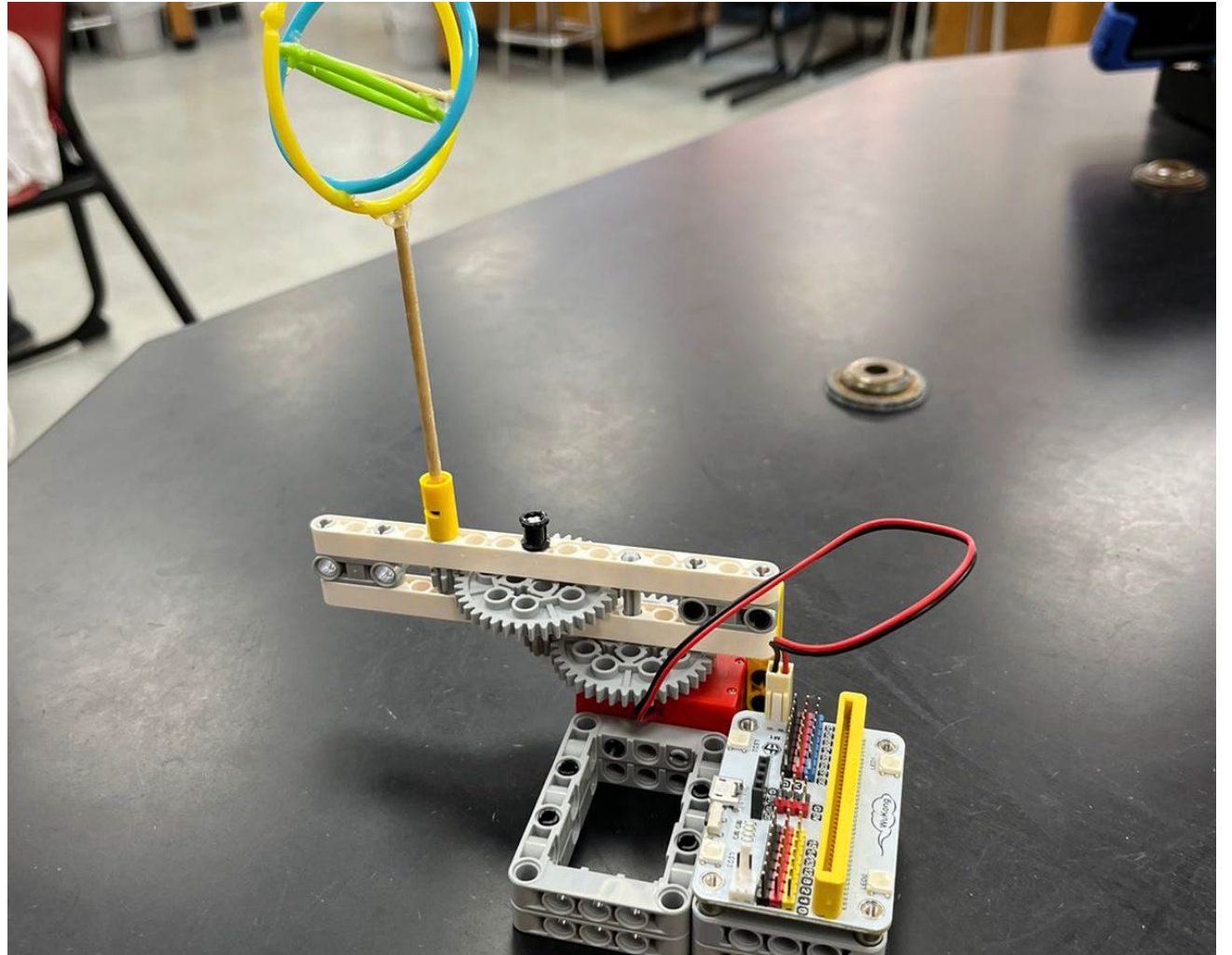
Top Spinner

Description:

Students use the Wonder Kit and Microbit to make a top spinner. The gears are powered by the motor and spin the gyro at the top.

Learning Outcome:

Students will learn about gears and motors. They discuss how the size of the gear determines the output speed. They will need to use code to turn the motor on and off.

Gr. 3 – 4 Projects

- Rocket 3D Design and Build
- Robotic Arm
- Smart Clothes Hanger
- Sumo Bots

3D Rocket Design and Build

Description:

Students will design a rocket using a CAD platform called Tinkercad. They will then use their designs as a blue print to build their own rocket model.

Learning Outcome:

Students will learn how to use a 3D design software tool. They will practice measuring and attachment techniques on the software and then applying those mechanical techniques to build their rocket.

Robotic Arm

Description:

Students use the Microbit and the Wonderkit to make a remote control robotic arm that can pick up objects.

Learning Outcome:

Students learn to connect a motor and servo to a microbit and then use code to program both the robotic arm and the remote. The code uses conditional statements and challenges the student logical thinking.

Smart Clothes Hanger

Description:

Students will use the microbit and the Wonderkit to build a model clothes hanger that will retract when the moisture sensor detects rain.

Learning Outcome:

Students further their knowledge of connecting different sensors to the microbit. This time, they will learn about how to attach a moisture sensor to the microbit and how to code the microbit so that when the moisture sensor detect water, the motors will turn on and retract the clothes hanger.
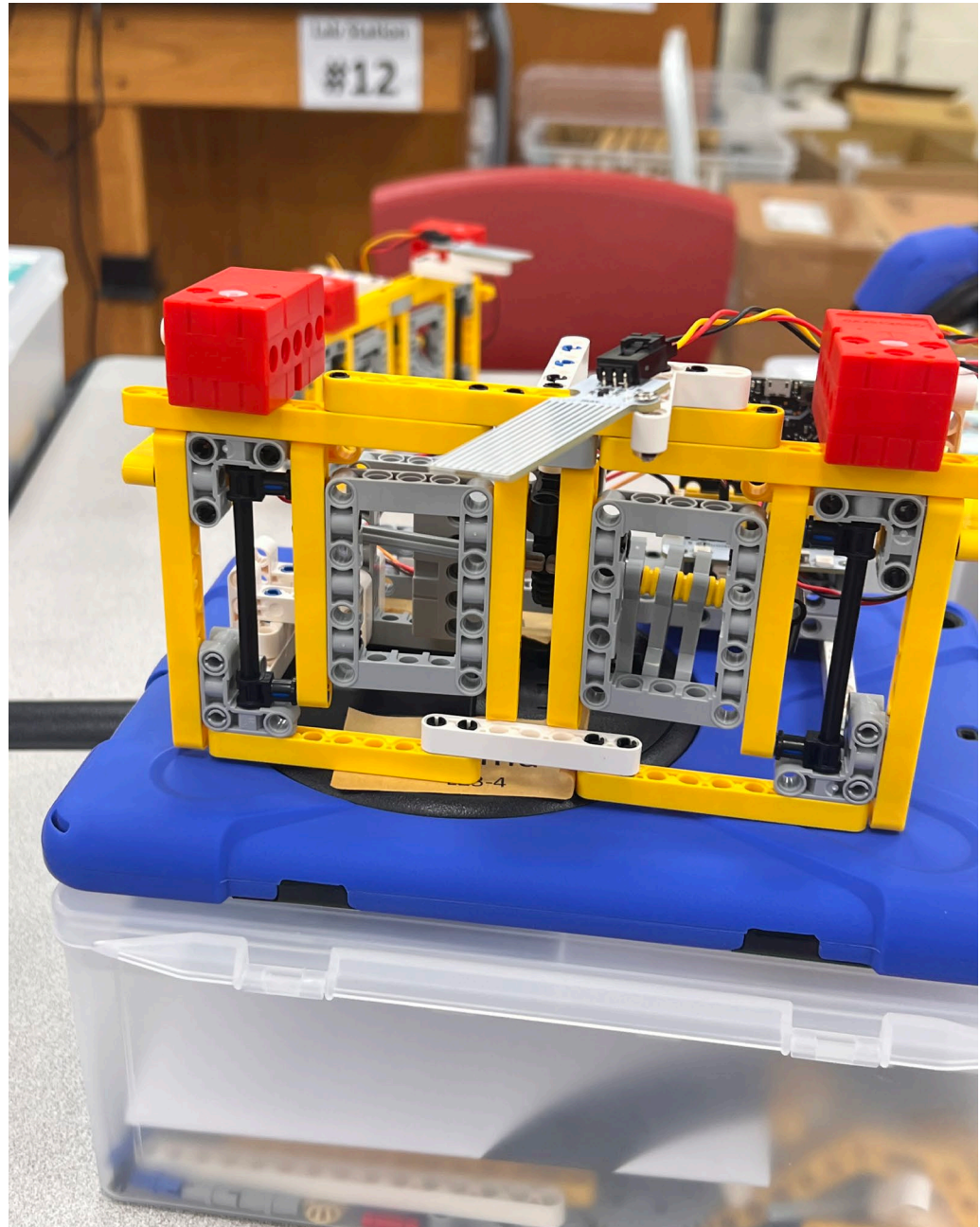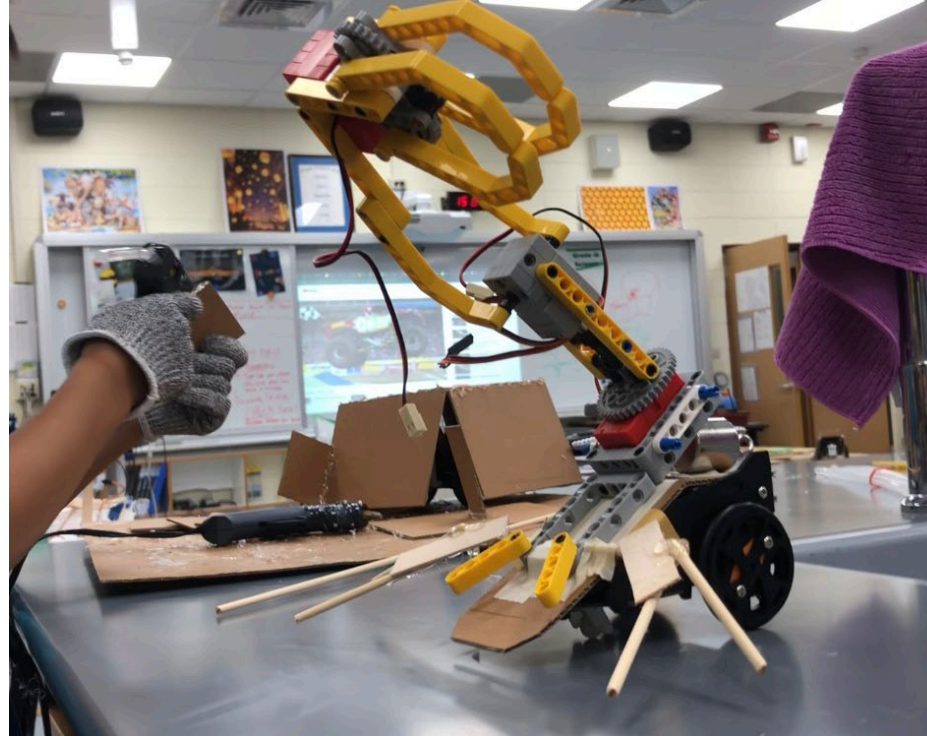
Sumo Bots

Description:

Student design their own sumo bot car. The objective of the game is to flip or push an opposing car out of the arena.

Learning Outcome: Students will use their creativity to design their own effective car. They will need to use simple machines and concepts such as leverage to build their car. They will then code the car so that it is paired with the remote.

Gr. 5 - 6 Projects

- Microbit Space Station

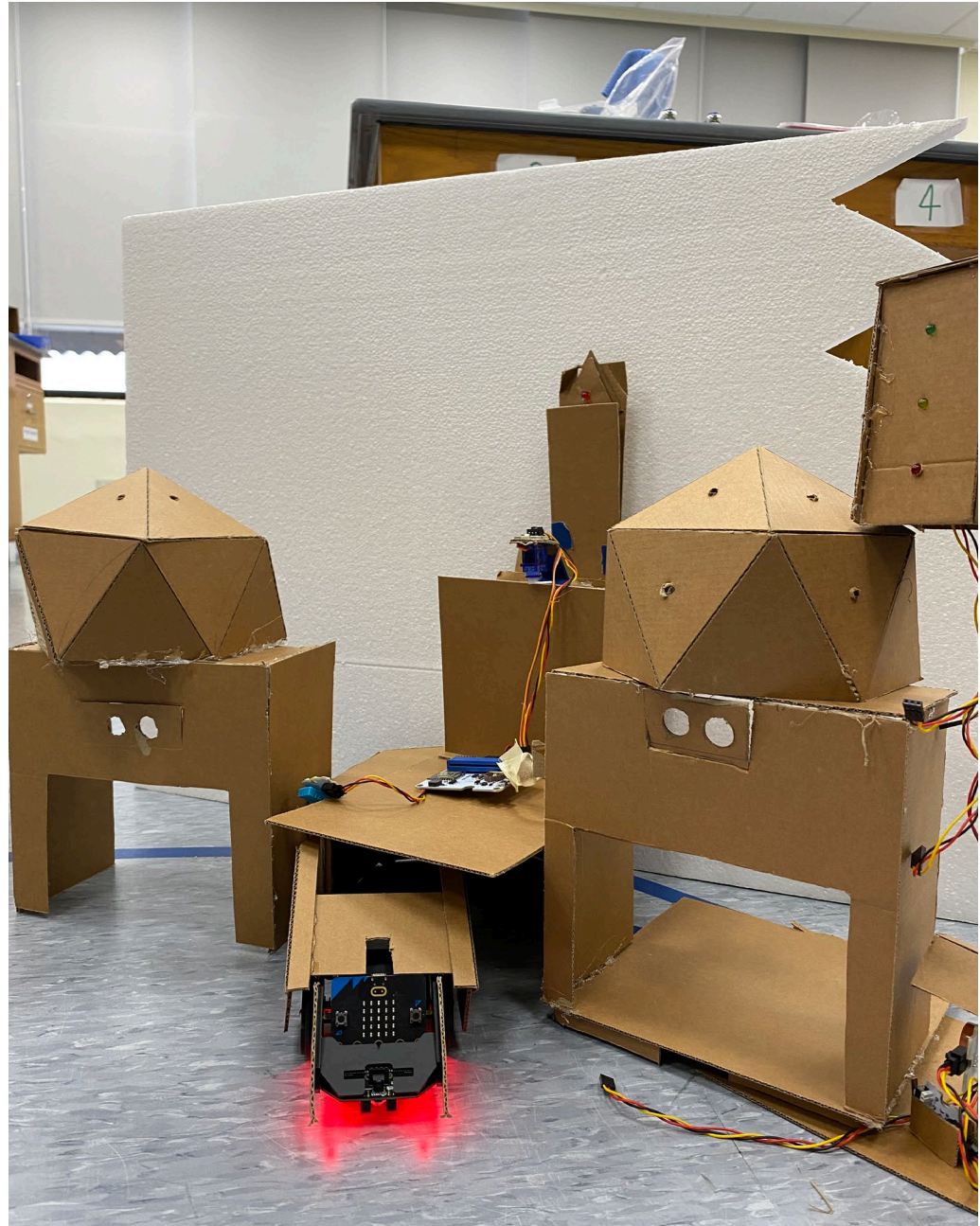- Remote Control Boat

- Eco Friendly House

- Sumo Bots

Space Station

Description:

Students will spend most of the week creating a modular space station. Each module will incorporate different sensors attached to the microbit. Some of the modules feature automatic doors, object detection towers and a space shuttle landing pad.

Lesson Objective:

Students learn advanced cardboard building techniques and combine with electronics and circuit building. They will learn the basics of python coding language and use it to program their microbits and sensors.

Remote Control Boat

Description:

Students will use the microbit, remote control, and servo to build a remote control boat. They will also design attachments to the boat and play a game so that the students need to scoop up pieces of trash out of the water.

Learning Outcome:

The main focus of this project is to get the kids started with python coding and attaching a servo to a microbit. They will also apply angles and degree turns design the turning radius of the boat's rudder.

Eco Friendly House

Description:

Students make a modular eco friendly house using the microbit and sensors. The modules include a roof that opens and closes based off of UV detection and also a automatic watering system based on soil moisture reading.

Learning Outcome:

Students continue to learn about python coding and electronics. They will use sensors for UV, humidity, and temperature and practice technical engineering skills.
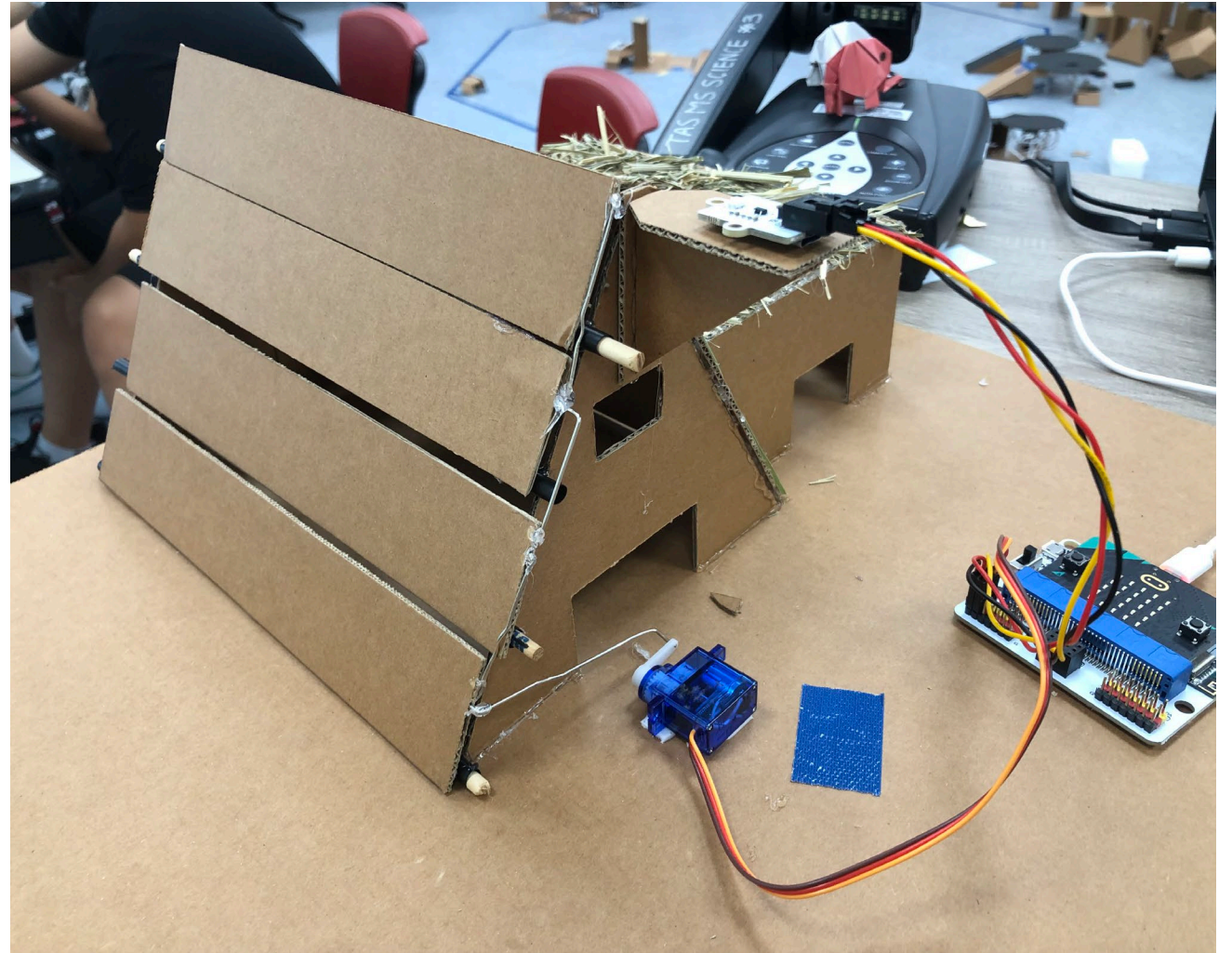
Sumo Bots Gr. 5 -6

Description:

Similar to the Sumo Bots game in Gr. 3 -4. The main objective of the game is to design a car that will flip or push another car out of the arena.

Learning Outcome:

Students use their creativity and knowledge of simple machines to design and create an effective car in the arena. They must use leverage or ramp like shaped attachments to give their car an advantage.