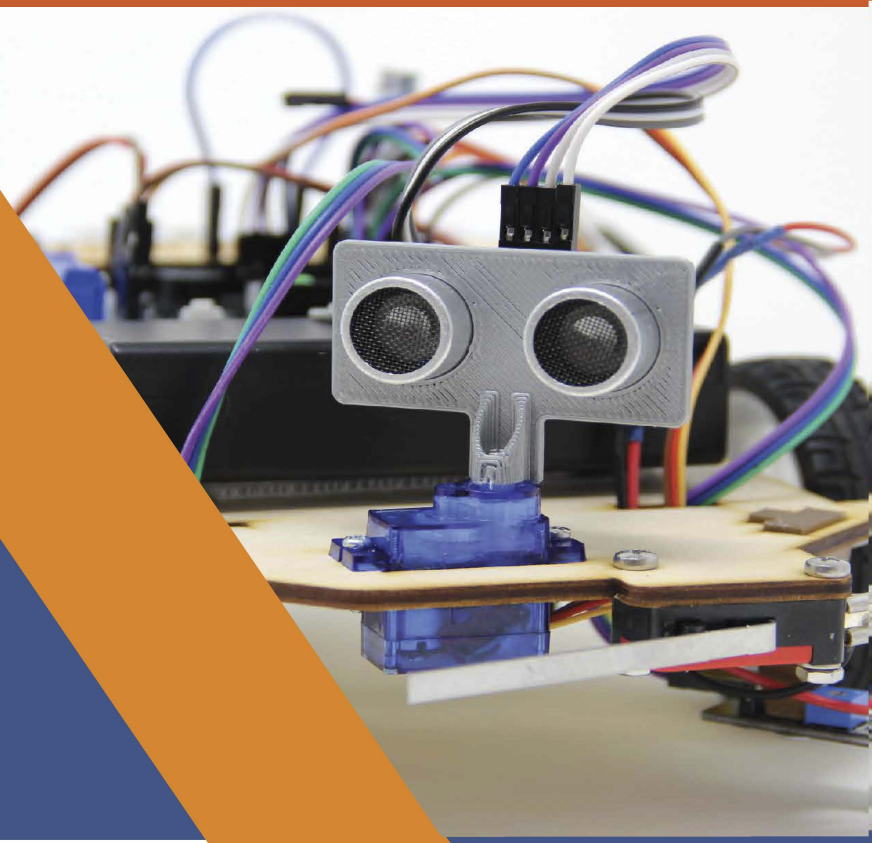
TinkRworks®

transforming learners to innovators



TinkRworks STEAM

SUPPLEMENTAL HANDS-ON STEAM CURRICULUM

+918792740014 talktous@uniformjunction.com www.TinkRworks.com

TinkRworks®
transforming learners to innovators

TinkRworks provides innovative K-8 STEAM curriculum to schools and organizations to:

- Foster a love of creating
- Encourage self-expression
- Reinforce and expand on concepts and ideas taught in school
- Enhance problem-solving skills
- Provide delight & inspire curiosity

Components of TinkRworks STEAM Curriculum

Standards-aligned curriculum

Page 1

- Supports CCSS, CSTA, NGSS & other standards
- Curriculum maps with learning objectives, essential questions to answer, pacing guides, alignment to standards, and checks for understanding.
- Detailed lesson plans, video modules, assessments, teacher activity guides and student worksheets

Professional development & support

Page 2

- End-to-end training on curriculum & project builds for both remote & in-person delivery
- Dedicated support team

Web-based learning platform

Page 2

- Chromebook, Mac, PC & iPad compatible
- Embedded coding environment that wirelessly connects to project kits
- Downloadable curriculum for facilitators
- Self-paced video modules for facilitators' & students' learning and reference

Multidisciplinary projects

Page 3

- Individual student project kits
- Full innovation cycle exposure:
  - Art design
  - Assembly
  - Electronics integration
  - Coding
  - Testing

Standards-Aligned Curriculum

TinkRworks STEAM curriculum reinforces core learning through projects that promote cross-curricular connections to art, engineering, design, science, math, and data analysis.

Highlights of TinkRworks curriculum:

- Standards aligned (CCSS, CSTA, NGSS, and others) and mapped
- Students design, build and program their own projects
- Curriculum maps, essential question & key vocabulary
- Formal and informal assessments
- Student digital portfolios - a place for students to document their project journey and reflect upon their work

STEAM Product Portfolio

STEAM Projects	Beginner Programming Environment			Advanced Programming Environment					
	K	1st	2nd	3rd	4th	5th	6th	7th	8th
STEAM Academy	●								
Smart Lamp		T	●						
Pampered Plant		●	T	●	●	●			
Weather Station				T	●				
TinkRbot				●	T	●			
Planetary Pathways					●	T	●		
TinkRdrone								T	
SensorBot								T	
Morse Coding								T	

T **Target Grade Level:** STEAM curriculum developed to support the specific grade level NGSS standards

● **Grade Band Support:** STEAM curriculum developed to support delivery across multiple grade levels

Note: *Grade Band implementation cannot span both programming environments*

Professional Development & Support

TinkRworks PD is designed to provide facilitators with the training needed to effectively deliver projects to their students. Facilitators receive end-to-end hands-on training spanning both curriculum and project builds.

Highlights of TinkRworks Professional Development

- In-person and remote training options
- Complete lesson walk-throughs, concept exploration, as well as training on activities that reinforce concepts
- Troubleshooting strategies and opportunities to discuss implementation questions
- Certified facilitators have access to the TinkRworks Support Team by email or phone to ensure successful delivery of curriculum to their students

Web-Based Learning Platform

TinkRworks' proprietary, drag-and-drop programming environment helps students focus on developing algorithms to solve problems as they create code that is uploaded wirelessly to their project using a Bluetooth link.

Highlights of TinkRworks learning platform:

- Laptop, Chromebook, & iPad compatible
- Block-based, easy-to-use coding environment
- Connects easily and wirelessly to projects
- No prior coding experience is required (applies to both facilitators and students)

Multidisciplinary Projects

K through 8th

TinkRworks student project kits are personalized manipulatives that encompass the full innovation cycle of art design, assembly, electronics integration, coding, and testing

Students Take Home

Their very own interactive art project

KINDERGARTEN

STEAM Academy

Students will integrate art and technology in this unique project where artwork comes to life as people view it. They will start by using sandpaper, paint and other art supplies to customize a wooden template of either a rocket or a flower. Students will then incorporate technology into their artwork using programmable LEDs, a speaker, and an Arduino minicomputer which controls these elements. Students will learn about the primary colors of light and experiment with combining these to create any color they can envision. As a final step, the children will insert a proximity sensor that measures distances to objects and will code their artwork to come to life with sounds and lights of their choosing when someone approaches.

Key Concepts

Introduction to Arduino and circuitry; programming lights and sounds.

1ST GRADE

Smart Lamp

It's one thing to personalize a bedroom with posters and pictures, but it's another to do so with a smart lamp that not only lights up but also plays music that students compose. Students will create their lamp from acrylic panels, screws, and 3D-printed posts. They will then program a minicomputer to activate LEDs and music. They'll even customize it by creating their own designs on the panels. Students will use their hands and brains to make their very own unique bedside companion.

Key Concepts

Introduction to design; programming lights, sounds, and sensors; social emotional learning (moods and feelings).

Students Take Home

Fully functional night light

2ND GRADE

Pampered Plant

Students combine electronics, sensors, and an Arduino minicomputer to build and code a plant monitoring station. Students will program their station to indicate the "happiness level" of their plant by measuring the moisture level in the soil and displaying a happy or sad face on an LED grid. They will learn about plant science; how plants use energy from sunlight; how factors such as humidity, temperature, and the level of UV light affect plant growth. Students will experiment with sensors and learn to add them to monitor conditions.

Key Concepts

Plant science; introduction to Arduino and circuitry; binary code and conditionals; integration of sensors and displays.

Students Take Home

Their very own potted plant, complete with their plant monitoring system

Students Take Home

Their very own interactive weather station

3RD GRADE

Weather Station

Weather Station focuses on scientific concepts related to earth science. Students will build a weather-monitoring system using an Arduino minicomputer and a variety of sensors. Students will program the sensors and display readings on an LCD screen. They will learn about factors that affect weather, such as temperature and pressure. Students will learn about how weather data is analyzed and apply this to build weather forecasts.

Key Concepts

Introduction to Arduino and circuitry; programming of sensors and LCD display; conditionals; weather factors and climate.

Students Take Home

Complete robot & remote control

4TH GRADE

TinkRbot

Students will create and customize their own robots, incorporating a variety of electronic components that enable movement and sensing. They will learn about motors, sensors, LEDs, and Arduino minicomputers. Students will experiment and integrate these components together to develop a fully-functional robot. They will then program it to move, explore, and interact with the environment, all the while linking their experiments back to concepts around energy, forces, and interactions. Students will also learn about the role of robotics in society today. They will develop skills by solving challenges centered around developing functionalities that include and combine motion, sound, and light.

Key Concepts

Intro to robots and robot design; programming lights, sound, sensors, and motors; programming remote-control and subroutines; robotic coding challenges.

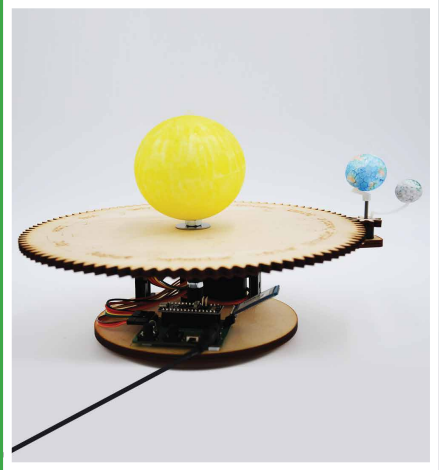
5TH GRADE

Planetary Pathways

Students create a rotating model of the Sun, Earth, and Moon as they bring to life their learnings about planetary orbits. The model they create, called an Orrery, teaches students about how the relationship between our planet and other celestial bodies affect life on Earth and how those relationships change through the year. Students will add and program electronics, including a motor to drive the model. They will learn how the movement of the Sun, Earth, and Moon affects what we see in the sky.

Key Concepts

Seasons and movement of the Earth and Sun; phases of the moon and how they relate to the Earth and Sun; integrating circuitry, programming lights and motors.



Students Take Home

Completed working Orrery model

6TH GRADE

TinkRdrone

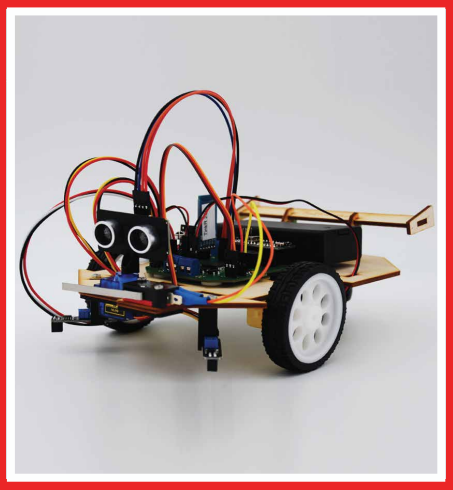
Students design, build, and fly their own functioning quadcopter drones. They learn about the physics of flight and perform experiments to understand how flight is achieved. Students will customize drone frames and integrate electronics. They will learn and experiment with different components needed to get the drone airborne, including the flight-controller board, motors, gearing system, and propellers. Students will learn about flight dynamics such as yaw, roll, and pitch, by participating in drone games to develop their piloting skills.

Key Concepts

Newton's Third Law and fundamentals of force; introduction to physics of flight, drone design, motors, propellers, and manipulation of speed for flight control.

Students Take Home

A custom drone, controller, battery, and battery charger.



Students Take Home

Interactive, sensing robot with remote control

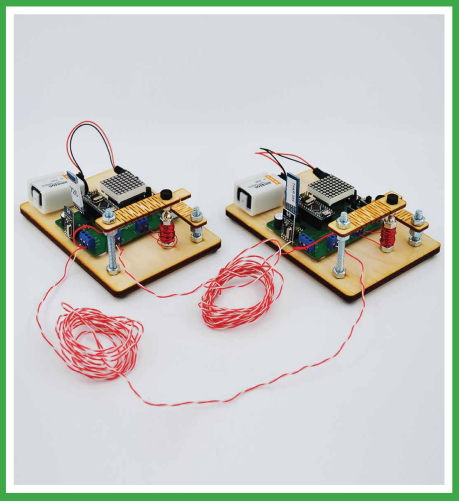
7TH GRADE

SensorBot

Students learn about robotic sensing as they assemble and code robots capable of sensing and reacting to their surroundings. They will experiment with different sensors—touch, reflectance, ultrasonic, and infrared. After integrating sensors, students will develop coding skills by progamming the robot to solve challenges focused on object detection and avoidance, as well as line following. They will incorporate motions and light into the robot's reactions.

Key Concepts

Introduction to robots and robot design; introduction to foundational sensors (ultrasonic, reflectance, touch, infrared); integration of sensor data and motor programming to solve specific problems; intermediate algorithm development; robotics coding challenges.



Students Take Home

Completed wired-telegraphing system and wireless-communications device

8TH GRADE

Morse Coding

Students will explore the history of human communications from prehistoric to modern-day wireless communications devices. They will create a device with two functions: a traditional wired telegraph and a modern-day "wireless telegraph." Students will learn—and make—their own electromagnets which will serve as the central part of their design. They'll then create a key, register, and power up their system with a battery. They'll also learn about Morse Code and use it to communicate with other students within the classroom.

Students will then learn about wireless communications and complete the portion of their device that acts as a wireless telegraph. Using radio waves they will explore first-hand how they can transmit and receive information. As they develop their devices, students will learn about circuits and electronics, and use their devices to communicate with each other.

Key Concepts

Electromagnetics, circuits, and electronics; radio-wave properties; information technology (digital vs. analog signals & reliability); encryption and decryption.

In the Words of Educators & Administrators

Ryan Evans
SE Gross Middle School, District 95

Principal

TinkRworks selection:

S.E. Gross Middle School chose TinkRworks as their preferred vendor for STEAM design and curriculum due to their hands-on approach to student learning that is strongly linked to NGSS standards and offers students experiences like no other program out there. Their supportive staff provides robust training, amazing support, and superior guidance through the entire process.

Impact:

S.E. Gross Middle School is working to prepare its students to be innovative and solution orientated problem solvers so that they are prepared for their lives and future careers. TinkRworks' STEAM programming stretches the limits of student thought by integrating many different modalities into their rich curriculum that is focused on problem solving and overcoming design challenges. Students at SEG who interact with this curriculum are better prepared for future success.

Ali Beirmeister
LaGrange Highlands School, District 106

Director of Teaching and Learning

TinkRworks selection:

There were two distinct factors that set TinkRworks apart from other STEAM organizations Highlands was considering: the hands-on approach of the STEAM projects and the level of customer support.

Impact:

Students demonstrated their drones in front of the board, who were instantly captured by the depth of their knowledge and ability to apply it to their STEAM project. The students' ability to talk about the design of their drones, as well as, the construction challenges they faced during the building process impressed the board most, as it went along with the theme of the school year, "safe to fail."

MAF Technologies Private Limited
4th Floor, Mafatlal House,
Backbay Reclamation, Churchgate
Mumbai, Maharashtra India

+918792740014

talktous@uniformjunction.com

www.TinkRworks.com