MakerState & StudentUnion **NYC's Premier STEAM After School** & Summer Programming Providers **STEAM Course Catalog**













MakerState and its non-profit partner, StudentUnion, inspire kids ages 4-18 with new science, technology, engineering, arts, and math (STEAM) passions and skills through hands-on, in-school, after-school, and summer camp courses in coding and video game design, robot engineering,

CHILL STATE

wearable electronic fashions, 3D design and printing, rocket science, moviemaking, and more. Students earn daily Challenge project badges in STEAM skills as well as Literacy, Math, Social Emotional and Executive Functioning skills, as they build and learn. We build ongoing program capacity by training teachers through programs such as the National Science Foundation Maker Partnership (Award #1742320) and NYC DOE's "CS4all" (NYC DOE Vendor #0463406362), helping train over 5,000 New York City teachers how to help them infuse coding in their elementary and middle school project-based learning.

After School Programming

- ★ Building a new hands-on STEAM project every day
- ★ Led by background-checked Maker Fellow instructors
- \star Over 40 courses

Events & Donations

- ★ School Fairs & Fundraisers
- ★ Family Engagement Night & Parent Workshops



Math through Coding/STEM

➤ factoring variables in Scratch coding ➤ finding the volume of a rectangle in 3D design converting decimals while editing movies

STEM Summer Camps & Summer Rising

★ Licensing full service STEM camp programming and instruction to partner schools and camps

School Programs & Training

- ★ Teacher Training
- ★ ELA & Math skill-building
- Curriculum integration coaching



ELA Skills through Coding/STEM

➤ revising sentences in digital comic-making ➤ constructing narrative in coded games speaking for project presentations

International School of Brooklyn

• Manhattan Country School

Collegiate School

• AND MANY OTHERS

• QUAD Manhattan (Twice Exceptional)

Bronx Charter School for Better Learning

Proudly serving more than 100 schools & youth organizations over 10 years

StudentUnion and MakerState (an approved DOE approved vendor) provide teacher training, in-school, after-school, and summer camps for some of NYC's most prestigious schools including:

- NEST+m
- Hunter College Elementary
- PS 3
- PS 10 • PS 11
- PS 87

Program Partners



National Science Foundation WHERE DISCOVERIES BEGIN





- PS 144
- PS 191M School for Makers & Artists
- PS 254 Dag Hammarsjkold
- PS 333
- PS 376 G&T School of Technology



communities

one life

The Research Alliance for **New York City Schools**

Better Evidence for Better Schools







Programs, Pricing & Tech Requirements

StudentUnion and MakerState are committed to serving all students and schools and will make pricing exceptions for disadvantaged children and schools.

<u>After School</u>

- 1. Focus: engaging, project-based coding, robotics, 3D design, and sustainable technology projects
- 2. Schedule: flexible delivery during your summer program
- 3. Impact: Improves ELA and math performance, fosters soft skills, critical thinking, and inspires future careers in STEM
- 4. Minimum/Maximum Students: Minimum class size = 5 students; Max class size with 1 instructor = 15
- 5. Laptop/Tablet Lab Cart: use of laptop lab or tablet set = additional \$50 per student per semester
- 6. Pricing:
 - a. Per Student (per student/per session): \$35-\$40 per student per 60-minute session with 1 instructor (student enrollment minimum is 8 (exceptions can be made on minimum); flexible on length of session
 - b. Flat Rate (per session): \$290-\$450 plus materials

Summer Camps (including Summer Rising)

- 1. Focus: immersive hands-on STEM project creativity with Social Emotional and Executive Functioning achievements
- 2. Schedule: 5 days/week, 6 hours/day (preferred) or Single Days (see below)
- 3. Impact: addresses summer & Covid learning loss and builds enthusiasm for STEM

4. Pricing: Week Camp:

- a. 5 day, Mon-Fri, 9am-3pm (approx schedule-we tailor to fit your program schedule)
- b. 3 hands-on STEM projects per day plus outdoor/gym play games
- c. Recommended for Summer Rising: 2 Orientations (1 orientation for students/families, 1 for staff) and one Finale Celebration Pop Up Makerspace.
- d. Per Child Pricing: Per child fee per week: \$350/child/week (minimum 8 kids per week)
- e. Flat Fee Pricing:
 - i. Flat fee up to 10 kids: \$2,800
 - ii. Flat fee up 11-20 kids: \$4,700
 - iii. Flat fee 21-30 kids per week: \$6,600

2. Pricing: Single Day of Camp

- a. Must schedule for a full day, cycling multiple groups of kids (often by age group) through consecutive sessions; 1 instructor leading the same hands-on STEM creative project in each session
- b. Pricing: \$260 per 60 minute session; minimum 3 consecutive sessions; max up to 5 consecutive sessions; 1 hands-on project per session; up to 15 kids per session. Price reductions on session rate: 1 session/week: \$300/session, 2-3 sessions/week: \$260, 4-5 sessions/week: \$200

Professional Development

- 1. **Focus**: teacher training to boost current academic learning objectives through the integration of engaging project-based learning in LEGO Robotics, block-based coding, 3D design into
- 2. Schedule: workshops on your schedule with ongoing support
- 3. Impact: equips your teachers and staff to deliver engaging, student-centered STEM project-based lessons
- 4. Models & Pricing:
 - 1. Single Day Training (6.5 hours) = \$1,200
 - 2. Half Day Training (3.5 hours) = \$650
 - 3. Multisession Workshops (in-school series)
 - a. Teacher Workshop: 1 Maker Fellow with multiple drop in teachers (15 participant max) = \$350
 - b. Faculty Workshop: 1 Maker Fellow during faculty professional development = \$350
 - c. **STEM Challenge Demo**: Maker Fellow 1-on-1 with teacher single class (Micro Fair, Demo Classroom Session) = \$225 \$375
 - d. **In-School Program or After School Program**: Maker Fellow & teacher co-teach (per session with coaching pricing model not per student) = \$300 \$450 per session with 1 hour teacher coaching per session (up to 25 kids for in-school and 15 for afterschool)
 - 4. Access to LevelUp Online Learning lessons = \$400 (per unit)
 - 5. Virtual Office Hours: Partner schedules 1 hour segment of time for 1 or more of their teacher(s) to attend a virtual support = \$100 per hour
 - 6. Curriculum Integration Support = \$225 \$350
 - 7. **On-site Coaching** (can support any/all of above and is highly recommended) We can provide on site coaching, please connect with us for unique pricing based on your location, etc. = \$200-\$500

In School & CBO Programming

- During School Makerspace: M-F During school hours (like NYC PD Day/Conference Days/Parent-Teacher Conference Days, assemblies, STEM fairs) = \$195 per hour (your staff in room for support and we guide them in STEM instructional delivery); 15 min pad time must be included.
 - a. LEGO EV3 \$25 per student, per station, per hour
 - b. LEGO WeDo, Ozobots \$22.50 per student, per station, per hour
 - c. Inventors Club, Junior Engineers \$20 per student, per station, per hour
 - d. Scratch Blocks \$17.50 per student, per station, per hour
 - e. Scratch, TinkerCad \$15.00 per student, per station, per hour
 - f. If MakerState provides laptops the cost is \$250 flat fee for 10 laptops for up to 7 hours of onsite use
- 2. Holiday Break Day Makerspace: \$750 per day per group of 10 and \$75 per student over 10
- 3. Weekend Day Makerspace: \$295 per 90 minute table
- 4. Pop Up Makerspace: Outside school hours (PTA/curriculum night, fundraisers, fairs) = \$295 per 90 min table
 - a. \$15-\$25 per student, per station per hour based on station curriculum/project (examples below, but not limited to):

Family Engagement

- 1. Focus: Hands-on creative workshop and STEM showcase nights and events to involve parents and guardians
- 2. Impact: Strengthens family-school connections and student support networks
- 3. Flexible: open houses, workshops, showcases can be planned on a flexible basis

Tech Requirements

for the courses in this catalog are represented by

for Macbook, for Windows PC, for Chromebook, for Android tablet, for iPad <u>Click here for pictures, GIFs, and videos to help market your MakerState program!</u>

(all course description in this table below are on the following pages; for scheduling, select any 2 grade bands within grade range)

Category	Programs	Grades (select 2 grades within this range)	Per Hour Session Per Student	1 Time Materials Fee Per Student	Computer Required	Can run on Chromebook
Coding	Coding Club with Minecraft	1-6	\$35	\$20	\checkmark	
	SCRATCH Coding & Game Design	1-6	\$35	-	\checkmark	V
	My First Code with Scratch Jr.	K-1	\$35	\$10	\checkmark	V
	Game Design with Coding, 3D Printing & Animation	2-6	\$35	\$20	\checkmark	V
	Minecraft Mod Makers	2-6	\$35	-	\checkmark	
	Chess Club	2-6	\$35	-		
Engineering & Building	The Makerspace (100% Hands-on)	K-6	\$35	\$25		
	Fab Lab (100% Hands-on)	1-6	\$35	\$25		
	Minecraft Engineering	1-6	\$35	\$15	\checkmark	
	NASA AstroInnovators with 3D Design, Coding & Minecraft Engineering (50% hands-on)	2-6	\$35	\$15	V	
	Rocket Scientists (30% - 40% Hands-on)	1-4	\$35	-		
	3D Design with TinkerCAD	1-6	\$35	-	\checkmark	\checkmark
	Roblox Game Studio & Coding	1-6	\$35	-	\checkmark	
	Roblox Coding & Worldbuilding	1-6	\$35	-	\checkmark	
	Lego 3D Designers	PK-5	\$35	-		
	Social Impact Design Challenge	1-5	\$35	-	\checkmark	
	Game Design for Computer Scientist	2-5	\$35	-		
	Tiny Techies (75% Hands-on)	PK-1	\$35	-		
	3D Design & Printing Lab with Lego, Tinkercad & Minecraft (50% Hands-on)	1-6	\$35	\$15	\checkmark	
Robotics	Beginner Bots Robotics	PK-1	\$35	-		
	RoboChallenge Robotics Team	1-6	\$35	-	\checkmark	
	VEX Virtual Robotics & Game Coding	1-6	\$35	-	\checkmark	
	Micro:bit Robotics with Scratch & Python Coding	1-6	\$35	\$90	\checkmark	
	Micro:bit Robotics with Scratch & javascript Coding	1-6	\$35	\$90	\checkmark	
	Robotic Arts	2-6	\$35	\$25		
	Thinking & Learning Machines: Lego Robotics, Art Automata & 3D Design	2-6	\$35	\$30	\checkmark	
	Drone Pilot, Racing & Coding School	3-6	\$35	\$35		
	First Lego League Robotics Team	1-6	\$35	\$75	\checkmark	
Creative Art	7 Wonders Workshop with 3D Design, Printing & MInecraft (50% Hands-on)	2-6	\$35	\$15	\checkmark	
	Science Lab Arts (100% Hands-on)	1-6	\$35	\$30		
	Inventors Club with 3D Design & Printing, Scratch Coding, Minecraft Engineering (50% Hands-on)	2-6	\$35	\$15	~	
	Writing for Games	2-6	\$35	\$15	\checkmark	V
	3D Design & Minecraft Storytelling	1-6	\$35	-	\checkmark	
	Random Arts of Kindness (75% Hands-on)	K-5	\$35	\$30		
	Game Animation & Coding	1-6	\$35	-	\checkmark	\checkmark
	Board & Card Game Design Workshop	1-6	\$35	-		
	Game Design with Coding, 3D Printing & Animation (25% Hands-on)	1-6	\$35	-	\checkmark	\checkmark
	Quantum Magicians (100% Hands-on)	2-5	\$35	-		
	Junior Engineers (75% Hands-on)	1-4	\$35	-		
	3D Printing Lab with 3Doodler, Tinkercad & Minecraft	2-6	\$35	\$15	\checkmark	
	Vanguard Alliance Tabletop Gaming Club	5-8	\$35	\$75		



WINTER/SPRING 2025 AFTERSCHOOL COURSES

HANDS-ON STEAM LEARNING FOR GRADES K-6

CREATING WITH FRIENDS

ENGINEERING INSTRUCTORS

FUN PROBLEM-SOLVING **SOCIAL EMOTIONAL LEARNING**



CODING THEMES

CODING CLUB WITH MINECRAFT (Grades 1-6)

Budding programmers will create new blocks, interactive maps, puzzles, and characters, forging them all from imagination in Minecraft in this fun-first introduction to computer programming through Minecraft game design. Projects include generating buildings from blueprint designs, creating pixel art through algorithms, and applying an understanding of geometry to create 3D structures such as pyramids, cones, and spirals. We'll build collaboration, communication, problem-solving, and digital citizenship skills as they share their knowledge with others in their class and online. With MakerState's help, students can develop a lifelong interest in computer programming and design, all within the super-creative world of Minecraft.



Skills Learned: Coding, Minecraft Engineering, Hands-On Engineering, Animation, Creative Arts, Story Crafting, Game Design

SCRATCH CODING & GAME DESIGN (Grades 1-6) 💿 🛋

Create stories, video games, and animated art as you learn to code with MIT's block-based coding language for kids, Scratch. Scratch coding combines art, animation, and programming with our heroes and stories at the center. If you love to play games and want to learn to code your own games, this introduction to computer programming and game design is just for you.

Skills Learned: Coding, Game Design, Animation, Story Crafting, Creative Arts



🜟 Coding is like learning a superpower! Little coders will explore computer science and computational thinking through fun, hands-on projects. We'll create magical worlds with mountains, rivers, forests, animals, and robots, and program our own interactive stories and games using ScratchJr, Kodu, and CodeClubWorld. Along the way, we'll learn animation tricks, creative problem-solving, teamwork, and how to express ourselves through stories

and games. Screen time isn't just fun-it's creative learning time! Let's code and make something awesome! 🚀 🔆 Skills Learned: Animation 🎬, Coding 🌉, Computational Thinking 🧩, Game Design 🎮,

Story Crafting III. Social-Emotional Growth 🤗 MATERIALS FEE: \$10 per student

GAME DESIGN WITH CODING, 3D PRINTING & ANIMATION (Grades 2-6)

We're creating the toys and games of our dreams in this fun-first introduction to coding, 3D design, and 3D printing. We'll start with our favorite book, game and movies heroes and stories and then design, code, animate, and play our games in Scratch, MIT's block-based programming language for kids and we'll advance into intros to Python coding. We'll 3D design and build our own toys, games, cars, rockets, robots, castles, and circuits in Tinkercad, the 3D design tool where you can create anything you can imagine. We'll brainstorm our inspirations with clay, foam, and paper prototypes, then we'll use 3D printing pens to create 3D objects. If you can imagine it, you can create it!

Skills Learned: Coding, Game Design, Animation, 3D Design & Printing, Story Crafting, Creative Arts







MINECRAFT MOD MAKERS (Grades 2-6)

Let's take our Minecraft worldbuilding and coding to the next level with Mcreator, a great tool to learn Minecraft modding and software programming. We'll start by building a basic block, then create custom biomes with mobs that do whatever you wish by customizing their AI. We'll create ore extension and forging mods and advanced technology mods that include a custom sustainable energy system. We'll start with no programming knowledge with design wizards and WYSIWYG editors. All to make the Minecraft game just the way you want it! Let's go!

Skills Learned: Minecraft Modding, Coding, Game Design, Engineering Design, Animation, 3D Design & Printing, Story Crafting, Creative Arts

CHESS CLUB (Grades 2-6)

Chess Club kids have fun solving short "chess puzzles" and mini-games in round robins for engagement, creativity, and learning. We'll start with "No Stress Chess" to learn opening moves and advance to clever tactics like pin, fork, and discovery. As we play, we'll look at the game through the lens of computer science, highlighting algorithm design, logic, sequence, pattern finding, and decomposition, as well as the development of artificial intelligence and programmed chess engines, user interfaces, and databases. From strategy to tactics, to opening moves and endgames, you will master the playing field. We play with our partners, instead of against opponents, practicing respect, generosity, and self-improvement, even as we compete against our personal best. Boost your brain powers of critical thinking,

focus, logic, creativity, and problem solving, along with courage, sportsmanship, and resilience. We'll create our own ChessKids accounts to track our progress as we level-up and earn achievements. ChessKids is great for playing and practicing at home and sharing your accomplishments with family too. Common Core ELA aligned. We will compete in friendly tournaments with certificates awarded to all students at semester's end.

Skills Developed: Problem Solving, Goal Setting, Critical Thinking, Coding, Computer Science, Computational Thinking, Social-Emotional Skills

BUILDING & ENGINEERING THEMES

THE MAKERSPACE (Grades K-6)

Feeling creative? Jump into our latest super-fun engineering arts and crafts! We're building anything we can imagine in the Makerspace this semester, including slime, the tallest paper tower, sensory bottle biome, exploding seed pod, confetti launcher, plantable seed paper, Rube Goldberg marble runs, and a lot more! Dream it, plan it, and build it! This is about creativity, self-expression, and social-emotional development by creating artistic projects that create a fun and sustainable world. Skills Learned: Hands-On Engineering, 3D Design, Arts, Creative Arts, LEGO Engineering

MATERIALS FEE: \$25 per student

FAB LAB (Grades 1-6)

Fab Lab is non-stop, hands-on FUNdamentals in physics, chemistry, and computer programming to build a lifelong love of science! We're creating glow in the dark slime, turning milk into plastic, creating electricity with fruit, writing secret messages with invisible ink, creating tiny volcanos, miniature explosions, water that glows in the dark, super bouncing balls, fireworks in a cup, Archimedes screwballs, rainbow rain, Galileo-inspired periscopes and kaleidoscopes, gumdrop molecules, gravity-defying beads, and elephant toothpaste! We'll learn how to prototype and code our contraptions with the Lego Boost robot, making anything from an off-road buggy to

ball shooting battle bots or a music sequencer to record your raps, beats, and loops. Every day brings a new challenge from an unsung legend of science like Mary Jackson, NASA's first female African American engineer, Jane Goodal, champion of animal protection, Ada Lovelace, mother of the computer, and Sabrina Gonzales, the youngest person in the world to build and pilot their own aircraft. Step into the Fab Lab!

Skills Learned: Hands-On Engineering, Scientific Method, Engineer Design & Design Thinking, Coding, Physical Computing, **Computational Thinking**

MATERIALS FEE: \$25 per student









MINECRAFT ENGINEERING (Grades 1-6)

In this Minecraft-based introduction to engineering, modding, and coding, you'll be challenged to build a new Redstone contraption each week that expands your creativity, divergent thinking, and innovation, as well as your coding and modding skills! Let's build giant pixel art, adventure quests, and Redstone circuit-based contraptions, all within a secure MakerState server. Minecraft is an open-world, creative game that promotes collaboration and problem-solving in an immersive environment where the only limit is the imagination. Skills Learned: Hands-On Engineering, 3D Design, Circuitry, Modding, Animation, Coding, Creative Arts, Story Crafting

NASA ASTROINNOVATORS WITH 3D DESIGN, CODING &

MINECRAFT ENGINEERING (Grades 2-6)

Our mission to out of this world STEM arts and crafts fun is ready to launch! Join our astronaut engineer mission to 3D design and print starships from our favorite movies, build solar-powered space stations, and design fashionable and functional spacesuits for the on-trend astronaut. We'll build, launch and test our rockets for safety, speed, and orbital trajectory, and we'll craft a Mars colony farm and biome ecosystem from Minecraft Redstone circuit blocks. We'll discover and experiment with microorganisms from our own classroom environment and create advanced alien species that might evolve from them with clay. Along the way, we'll solve real-world engineering problems by building rocket-safe parachutes, multiplanet-ready geodesic dome homes, and a terraforming Mars Rover from a cute light-up LED microcontroller that identifies water and plants

seeds. To commemorate our journey we'll design and 3D print personalized NASA mission patch medallions for our backpacks. Calling all carbon-based life forms-we are imagining and building our sustainable future in space! 3, 2, 1...blast off! Skills Learned: 3D Design & Printing, Physical Computing, Microcontrollers, Engineering Design, Scratch Coding

NASA ROCKET SCIENTISTS (Grades 1-4)

Budding pilots and astronauts will build and test their own gliders, catapults, rockets, moon rovers, parachutes, and more in this hands-on exploration of NASA Engineering Design to further our journey into space. Set off for space and learn about the forces of flight, aerodynamics, rocket design, and the wonders of space like gravity and inertia this semester. Skills Learned: Rocket Science, Aeronautics, Hands-On Engineering, Creative Arts MATERIALS FEE: \$20 per student

3D DESIGN WITH TINKERCAD (Grades 1-6)

Let's 3D design and build toys, games, cars, rockets, robots, castles, and circuits in Tinkercad, the 3D design tool where you can create anything you can imagine like architects and engineers. Then we'll make our 3D shapes, learning spatial awareness, geometry, and math computation along the way. Skills Learned: 3D Design & Printing

ROBLOX GAME STUDIO & CODING (Grades 1-6)

Do you love to play and build in Roblox? Get ready to create obstacle courses, racing and role-playing games, space exploration missions, pirate voyages, and city skylines of a sustainable future all through 3D design and games. We'll design, code, and playtest our games in Roblox Game Studio, learning to build and code assets just as professional game designers do. Let's go!

Skills Learned: Coding, Game Design, Engineering, Art, Animation, Creative Arts, Story Crafting

ROBLOX CODING & WORLDBUILDING (Grades 1-6)

Do you love to play and build in Roblox? Get ready to create obstacle courses, racing, role-playing games, space exploration missions, pirate voyages, and city skylines of a sustainable future, all through 3D design and games. Let's go!

Skills Learned: Roblox Engineering, 3D Design, Story Crafting, Creative Arts



















LEGO IMAGINEERS (Grades K-2)

Build LEGO brick creations based on your favorite book, game, and movie characters, and then 3D design them in Tinkercad with LEGO bricks in this play and creative-based introduction to 3D design, creative problem-solving, and engineering. This play-based course will foster creativity, collaboration, and communication as Imagineers build and design, utilizing their problem-solving skills to create new and innovative designs.

Skills Learned: LEGO Engineering, Hands-On Engineering, 3D Design, Creative Arts, Game Design

SOCIAL IMPACT DESIGN CHALLENGE (Grades 1-5) Ć

Engineers will team up and take on a series of Discover-Create-Improve design cycles as we explore and research real-life challenges and problems in our community and worlds like pollution, hate crimes, or voting access and learn more about what we each value most in the process. We'll focus on three STEAM skill sets to prototype solutions to our chosen challenges, Scratch Coding, Tinkercad 3D design and printing, and Canva graphic arts, in the iterative design process used at companies like Apple, Tesla, and NASA.

Skills Learned: Coding, 3D Design & Printing, Graphic Arts, Problem-Solving, Community Action

GAME DESIGN FOR COMPUTER SCIENTISTS (Grades 2-5)

Jump (literally!) into the world of thinking machines and the internet of things as we create art and code and build computer games and apps that respond to our speech and movement. We'll imagine and design devices and games with the Micro:bit microcontroller and improve our innovations through Google Teachable Machine and webcam-enabled block-based coding, building a portfolio of software and hardware for use in the classroom, college, and career. Includes an introduction to Python. Skills Learned: Computer Programming, Computational Thinking, Physical

Computing, Artificial Intelligence, Machine Learning, Problem-Solving, Intro to Python

TINY TECHIES (Grades K-1) 💿 🛋

Tiny Techies leads Pre-K kids through fun, playing, and building-based games and projects in STEM (science, technology, engineering, and math). Exploration and experimentation-based projects include programming robots to solve mazes, applying computational thinking to games like obstacle courses, engineering marble roller coasters, and exploring the capabilities of the Ozobot robotics platform to foster early interests in STEM and introductory skills lead to a lifelong love of STEM. Skills Learned: Introduction to Computational Thinking, Computer Programming, Scientific Method, Hands-On Engineering, 3D Design

3D DESIGN & PRINTING LAB WITH LEGO, TINKERCAD & MINECRAFT (Grades 1-6)

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Let's get hands-on to create a green future with 3D printing pens. Lego bricks, Tinkercad computer aided design, and the immersive world of Minecraft. We'll imagine and build water filtering mountains, building-top amusement parks, wind turbine farms, and underground, pollution free public transportation and fill those landscapes and structures with heroes and scenes from your favorite stories, movies, and games in this creative, hands-on introduction to 3D design, engineering, and problem-solving. We'll prototype our ideas in playdough, design foam, modeling clay, and 3D printing pens. And we'll import our favorite 3D designs block by block into our own coded Minecraft worlds. From subways to rooftops, villages to castles, spaceships to future worlds, we'll imagine it and build it together. If you dream of exploring, crafting stories, building landscapes, and

creating heroic characters, join us to bring your wildest world-changing ideas to life. Skills Learned: Creative Arts, Hands-On Engineering, 3D Design & Printing, Minecraft Engineering & Coding, LEGO, Animation, Story Crafting



















BEGINNER BOTS ROBOTICS + KODU & SCRATCH JR. (Grades PreK-1)

Let's explore the world of robotics through art and games! This hands-on introduction to robotics is all about colorful art, creativity, fun-first engineering, and team-based problem-solving. We'll create hand-drawn, art-based computer programs using colors and shapes to guide our robots to solve exciting daily challenges. We'll navigate mazes, race in the arena, and face off with friendly bot battles. We'll build robots, cars, unicorns, flying cars with gears, wheels, pullies, and robotics and engineering sets from Lego, Hexbug, Brio, Bee Bot, Ozobot, Squishy Circuits, and Educational Insights to practice motor, critical thinking, problem-solving, and engineering design skills.

Skills Learned: Robotics, Coding, Hands-On Engineering, Story Crafting, Creative Arts, Game Design

ADMINISTRATOR NOTE: A one time \$25 robotics materials fee per student applies to this course. The program will utilize MakerState robotics. The program does not require

computers but it's best if we can start with robotics art and then eventually get onto computers to program our bots in the Ozoblockly programming language.

ROBOCHALLENGE ROBOTICS TEAM (Grades 2-5)

We're looking for enthusiastic young engineers! We'll build robots and learn to code them to solve fun competition-like team challenges Starting with Lego snap-together robotics kits, engineers will build and resolve a new hands-on STEM challenge as we build mechanisms and attachments for our robots and using motors and sensors to ignite the most creative and efficient robotics solutions that we can also apply to real-world problem-solving situations, such as sumo wrestling, line followers, lifting payloads and basketball robots that are capable of shoot some great hoops!

Skills Learned: Robotics, Hands-On Engineering, Coding, Creative Arts MATERIALS FEE: \$25 per student MATERIALS FEE WITH TAKE HOME ROBOT: \$50

VEX VIRTUAL ROBOTICS & GAME CODING (Grades 1-6) Ć

Let's design and build our own VEX virtual robots with sensors and bot brains to solve mazes, navigate obstacle courses, draw creative patterns, and electromagnet coin-collecting games in this fun introduction to robotics, computer programming, artificial intelligence, and creative problem solving. Build bots. Learn lots!

Skills Learned: Robotics, Hands-On Engineering, Coding, Creative Arts

MICRO:BIT ROBOTICS WITH SCRATCH & PYTHON CODING (Grades 1-6)

Young engineers will build their robots and learn to code them to solve fun team challenges. We'll build our bot with a Micro:bit microcontroller brain, sensors, and motors that make it move, follow commands, and paths, avoid obstacles and even sing a song. Learning themes include robotics, computer programming, physical computing, mechanical engineering, circuitry, and physics. Engineers will program their bot creations, first in Scratch, a drag-and-drop, color-coded programming editor created by MIT to teach skills and concepts in programming, and then advance to an introduction to Python, the industry-standard programming language for machine learning and AI, web development, data science and analytics, app and game development, and the internet of things. BONUS: Drone Pilot School and drone racing competitions will be available for interested students.

Skills Learned: Robotics, Hands-On Engineering, Coding (MIT Scratch & Python), Physical Computing, Computational Thinking MATERIALS FEE (not required): \$90, only if we want students to own and take home robots at the end of the program.

ROBOTICS THEMES







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MICRO:BIT ROBOTICS WITH SCRATCH & JAVASCRIPT CODING (Grades 1-6) 💿 🛋 🖷 🗯

Young engineers will build their robots and learn to code them to solve fun team challenges. We'll build our bot with a Micro:bit microcontroller brain, sensors, and motors that make it move, follow commands, and paths, avoid obstacles and even sing a song. Learning themes include robotics, computer programming, physical computing, mechanical engineering, circuitry, and physics. Engineers will program their bot creations,

first in Scratch, a drag-and-drop, color-coded programming editor created by MIT to teach skills and concepts in programming, and then advance to an introduction to Javascript, the industry-standard scripting language used by over 95% of dynamic websites as well as animation, apps, and multimedia. BONUS: Drone Pilot School and drone racing competitions will be available for interested students.

Skills Learned: Robotics, Hands-On Engineering, Coding (MIT Scratch & Javascript), Physical Computing, Computational Thinking MATERIALS FEE (not required): \$90, only if we want students to own and take home robots at the end of the program.

THINKING & LEARNING MACHINES: LEGO ROBOTICS, ART AUTOMATA & 3D DESIGN (Grades 2-6)

Arts and crafts plus robots plus 3D design. We'll build snap together LEGO robots with obstacles courses we design ourselves from geometric jello blocks and playdough straw. We'll use 3D printing pens to create character jewels and cardboard automata to discover mechanics and physics. We'll 3D design obstacles for our bots to navigate in Tinkercad and print that 3D art with the 3Doodler pen. We'll also explore the fundamentals of AI and machine learning that are integral to how these robots work as we design and build a greener world. This is advanced hands-on creativity for advanced fun and learning...all for beginners! Let's go! Skills Learned: Robotics, Hands-On Engineering, Coding (MIT Scratch), 3D Design & Printing ADMINISTRATOR NOTE: A one-time \$30 robotics materials fee per student.

DRONE PILOT, RACING & CODING SCHOOL (Grades 3-6) 💿 🛋 🛋 🛊 🔄

We'll start in Drone Pilot School to earn our wings in safe, indoor flight, then advance to building, coding and racing our own drones in this thrilling introduction to drones, physical computing, and coding. We'll build our drones with a microcontroller brain, sensors, and servo-driven rotors, and code them with a combination of Scratch, Python, Javascript, and Swift to launch from our hands into aerial stunts, races, obstacle courses, rescue missions, and special challenges that we create based on needs we research and improvements we imagine for the real-world. **Skills Learned**: Hands-On Engineering, Coding, Physical Computing, Computational Thinking, Artificial Intelligence, Mechanical Engineering, Circuitry, Aeronautical Engineering MATERIALS FEE: \$35 per student

LEGO / VEX ROBOTICS TEAM (Grades 1-6)

Let's build and code our own robots to race, battle, and navigate "obby" (obstacle) courses that your team creates! You'll learn how to program your robot with AI to conquer a new challenge every day like creating art, sumo wrestling, lifting payloads, shooting baskets, and scoring goals! We'll learn to code our bots in the Blockly block-based coding language with introductions to JavaScript. You'll be challenged to make a one-of-a-kind bot to solve a real-world problem like transportation for the elderly or cleaning up pollution. Learning to

invent and problem-solve with your own robot is soooo much fun. Think you might like robotics? Join the team! BONUS: Drone Pilot School and drone racing competitions will be available for interested students. Skills Learned: Robotics, Hands-On Engineering, Coding, LEGO Engineering, Creative Arts, Game Design, Story Crafting

Skills Learned: Robotics, Hands-On Engineering, Coding, LEGO Engineering, Creative Arts, Game Design, Story Crai MATERIALS FEE: \$50 per student, includes take home robot.

See next page for more details on specific levels of LEGO robotics teams.













LEGO ROBOTICS

Our Lego Robotics team programs align with national standards that include 21st Century Skills, Common Core State Standards (ELA & Math), Computer Science Teachers Association (CSTA), and Next Generation Science Standards (NGSS). MATERIALS FEES: Fees for robotics and materials will apply if your program must purchase robotics for your team. For programs on a budget, we have starter sets of robotics.

FIRST LEGO LEAGUE "DISCOVER" ROBOTICS TEAM (Ages 4-6, Grades PreK-1)

FIRST LEGO League Discover is a playful introduction to STEM for children ages 4-6 that ignites their natural curiosity, while building early interests and confidence in STEM. Each day brings a new hands-on STEM challenge to solve together as we build models using LEGO bricks. **Skills Learned:** Robotics, Hands-On Engineering, Coding, LEGO Engineering, Creative Arts, Game Design, Story Crafting



FIRST LEGO LEAGUE "EXPLORE" ROBOTICS TEAM (Ages 6-10, Grades 2-4)

FIRST Lego League Explore is an entry-level program for children aged 6 to 10 (grades 2-4) that ignites interest in STEM through team-based, hands-on activities. Each year, kids explore a new science and technology topic, build and program motorized LEGO models, and create a Show Me Poster to illustrate their journey. The program emphasizes FIRST's core values of respectful interaction, shared experience, and critical thinking. It culminates in regional exhibitions where teams



present their projects and share ideas. This playful yet educational experience fosters problem-solving skills, creativity, confidence, and a foundation in STEM learning.

Skills Learned: Robotics, Hands-On Engineering, Coding, LEGO Engineering, Creative Arts, Game Design, Story Crafting

FIRST LEGO LEAGUE "CHALLENGE" ROBOTICS TEAM (Ages 9-13, Grades 4-8)

FIRST LEGO League's Challenge team fosters hands-on creative engagement in STEM through competitive, team-based activities. Each year, teams explore a real-world problem, then design, build, and program autonomous robots using LEGO Mindstorms or SPIKE Prime kits to complete specific missions. The program emphasizes FIRST's core values of innovation, inclusion, teamwork, and fun. Teams also create innovative solutions and present their projects to judges at regional tournaments. This experience enhances critical thinking, engineering skills, and collaboration, while igniting a passion for science and technology. Building bots is so much fun! Join the team!

Skills Learned: Robotics, Hands-On Engineering, Coding, LEGO Engineering, Creative Arts, Game Design, Story Crafting



FIRST "TECH CHALLENGE" (FTC) ROBOTICS TEAM (Ages 12-18, Grades 7-12)

Let's team together to build and code an advanced robot in the super-fun and prestigious annual FIRST Tech Challenge Robotics Competition. We're building our robot from the ground up and learning skills in teamwork, problem-solving, and project management, as well as coding skillsets in Blocks, a drag-and-drop graphical language based on Google's Blockly, and Java, a line-by-line professional language. You'll be challenged to build and code one-of-a-kind bots to solve a real-world problem like helping the elderly in assisted living, cleaning our neighborhood, and life-saving technologies. You'll learn how to build, program, and modify your robot in Blockly block-based coding and Javascript with AI to identify objects, create art, lift payloads, shoot baskets, and navigate obby courses. Think you might like to help build a more sustainable, inclusive, and just world through robotics? Join the team!



Skills Learned: Robotics, Hands-On Engineering, Coding, Engineering Design, AI & Machine Learning, Project Management

CREATIVE ARTS THEMES

Ć 7 WONDERS WORKSHOP WITH 3D DESIGN, PRINTING & MINECRAFT (Grades 2-6)

If you like to think big, let's circle the world together and build the Seven Wonders of the Ancient and Modern World! We'll design with clay, playfoam, paper mache, 3D printing pens, and Tinkercad 3D design and printing to raise the pyramids from the blowing sands, grow the Hanging Towers of Babylon from seedlings and clay, and the Great Wall of China from hand made Lego bricks. We'll import our 3D models of these wonders into our own Minecraft worlds at 1-to-1 scale so we can share with friends. And we'll personalize and 3D print our most epic creations to share with family as artifacts to last through the ages. Wonder workers, let's build our legends!

Skills Learned: 3D Design & Printing, Engineering Design, Minecraft Coding & Modding

3D DESIGN & MINECRAFT STORYTELLING (Grades 2-3)

Budding designers will combine 3D art, Minecraft block and world-building, and creative writing to craft heroes, stories, and worlds in Minecraft and Tinkercad, a 3D design program in which you can create (and then print!) anything you can imagine. As we build, collaborate, and innovate, we'll grow skills in 3D design, art, game modding, writing, and presentation. Includes use of 3D printing pens and introductions to Minecraft modding and coding. Dreaming it? Build it!

Skills Learned: 3D Design, Minecraft Engineering, Story Crafting, Hands-On Engineering, Animation, Creative Arts, Game Design

WRITING FOR GAMES (Grades 2-6) 💿 🛋 🖷 É

We're making writing fun with characters and stories we've always imagined but didn't know how to bring to life... until now! We're combining the joy of playing board games, card games, and video games with the art of storytelling and game creation to make games we can play and share. We'll create tradable card games like Pokemon and Yu-Gi-Oh!, 3D design and print game pieces, code playable video games, and craft our own choose-your-own-adventure stories. We'll practice fundamental writing skills that include character and

motivation, point of view, conflict and resolution, and plot development, intent, purpose, impact, and audience, all through different genres and themes in fiction and non-fiction, including mythology, fantasy, science fiction, and great moments in history. Skills Learned: Storytelling, Reading Comprehension, Story Brainstorming, Sentence

and Paragraph Structure, Genres of Writing, Editing and Rewriting, Computational Thinking

SCIENCE LAB ARTS (Grades 1-6)

Let's create slime, rubber eggs, cloud in a jar, jelly bean building, elephant toothpaste, thermometers, strawberry moon sand, marbled paper, paper rainbows, and more in this hands-on science-themed arts and crafts experiments lab. Skills Learned: Science Experiments, Hands-On Engineering, Creative Arts

MATERIALS FEE: \$30 per student

RANDOM ARTS OF KINDNESS (Grades K-5)

Let's create playful, "maniFESTive" art that pays kindness and positivity to the community through painted rocks, kindness flyers, secret garden gems, and chalk art inspirations! We'll practice fundamental art skills such as color, line, shape, form, perspective, and texture through drawing, painting, collages, sculpture in clay and playfoam, and lots of creative collaboration that builds social-emotional skills and a chance to develop personally and with our peers. Our art is meant to share with family and friends and placed in our surrounding community to inspire our neighbors to stand for

and care for ourselves and others as we practice empathy and compassion through art. We're creating, growing, and serving at the same time! Let's imagine a world we want to live in, one piece of art at a time.

Skills Learned: Creativity, Visual Arts, Social-Emotional Skills, Story Crafting, Community Service MATERIALS FEE: \$30 per student













GAME ANIMATION & CODING (Grades 1-6) 💿 🗯 🔳 🗰

If you love to play games and would like to learn to code and animate your own games, this coding, animation arts, and game design workshop is just for you! Create stories, video games, and animated art, and mod your own characters, skins and scenes with block based code and pixel animated art, with your own heroes and stories at the center. We'll draw inspiration from vour favorite games and movies like Mario Bros., Minecraft, Roblox, Bed Wars, Marvel, American Ninja Warrior, The Floor Is Lava, Star Wars, LEGO Movie and more! Imagine and create game sprites, moving characters, and animated gifs, and even import them into your own coded games.

Skills Developed: Animation, Coding (Scratch & Python), Creative Arts, Game Design, 3D Design, Story Crafting

BOARD & CARD GAME DESIGN WORKSHOP (Grades 1-6)

Let's learn to make our board games and card games! We'll use a fun-first, creative workshop model, playing through a new game each day, starting with your favorites, then taking on a daily mini-challenge around game design concepts like luck, strategy, cooperation, fairness, and balance, and must-haves like game themes, mechanics,

and victory conditions. By the end of the semester, each designer will have at least one fully playable game and some incredible prototypes, all of which can be played and shared with friends.

Skills Learned: Creativity, Confidence, Collaboration, Problem-Solving, Storytelling

JUNIOR ENGINEERS (Grades 1-4)

Junior Engineers will build bridges, skyscrapers, catapults, Rube Goldberg machines and Lego demolition derby cars in this creative, hands-on introduction to design, physics, computational thinking and engineering. We'll explore concepts such as energy, gravity, elasticity, and pressure through cooperative problem-solving in these fun-first and creative science-based projects. What will today's building challenge be? Let's solve it, plan it, build it, make it...together!

Skills Learned: Hands-On Engineering, Design Thinking, Creative Arts, LEGO Engineering, **Problem Solving**

GAME DESIGN WITH CODING, 3D PRINTING & ANIMATION (Grades 1-6)

We're creating the toys and games of our dreams in this fun-first introduction to coding, 3D design, and printing. We'll start with our favorite book, game and movies heroes and stories and then design, code, animate, and play our games in Scratch, MIT's block-based programming language for kids. We'll 3D design and build our own toys, games, cars, rockets, robots, castles, and circuits in Tinkercad, the 3D design tool where you can create anything you can imagine. We'll brainstorm our inspirations with clay, foam, and paper prototypes, then we'll use 3D printing pens to create 3D objects. If you can imagine it, you can create it!

Skills Learned: Coding, Game Design, Animation, 3D Design & Printing, Story Crafting, Creative Arts

INVENTORS CLUB WITH 3D DESIGN & PRINTING, SCRATCH CODING, MINECRAFT ENGINEERING

(Grades 2-6)

Calling all creators, thinkers, artists, tinkerers, and inventors! We're building quantum speed space elevators, bloodstream-navigating nano-bots, and epically-scaled, working models of DaVinci pulleys, planes, and levers to catch ghost particles, move mountains, and split atoms. We'll reimagine revolutions in tech that put you and me at the center of sustainable change. We'll design in 3D and build circuits in Tinkercad and 3D print our objects or import them into Minecraft to build Redstone-powered contraptions. From steam-pressured and fossil-fuelled to wind-spun and star-powered. We'll animate 2D characters in Piskel and import

them into Scratch-coded games and apps. From smoke signals and Morse code to smarter phones and guantum computing. We're journeying into a sustainable world that we build project by project every day. Tap your lifetime supply of curiosity and creativity! Welcome to the Inventors Club.

Skills Learned: MIT's Scratch Coding, Minecraft Redstone Circuitry, Tinkercad 3D Computer-Aided Design & 3D printing, 2D Animation









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QUANTUM MAGICIANS (Grades 2-5)

We're exploring the future of science together in this fun-first, hands-on creativity arts and experiments workshop! We'll create black holes in bottles, sculpt subatomic Particle Pals from colorful clay, build spinning magnetic centrifuges, and chain reaction Rube Goldberg machines with rolling balls, ramps, pendulums. We'll charge up our own Faraday homopolar motors and mix some impenetrable non-Newtonian fluid and push our fingers through it. We'll construct mosaic models of plants that show atomic structure and create our own magic with square bubbles, color chain reactions, and handheld fourth dimensions to astonish our friends. We'll make our own thought experiments like the Lego Ship of Theseus and conduct the irresistible Stanford Marshmallow Experiment. And...we might, or might not, meet Schrödinger's Cat! Into the rabbit hole!



Skills Learned: Scientific Method, Design Thinking, Creativity, Collaboration, Social Emotional Learning

3D PRINTING LAB WITH 3DOODLER, TINKERCAD & MINECRAFT (Grades 2-6)

Let's get hands-on to create a green future with 3D printing pens, computer aided design, and the immersive world of Minecraft. We'll collaborate to solve real-world challenges like planet-friendly farming, sustainable transportation, and renewable energy. We'll experiment with playdoh, bubble wands, and 3D designed geometric shapes like triangles, pentagons, and hexagons to test structural integrity and create giant sustainable structures like water filtering mountains and windmills in Tinkercad. And we'll import our towering bridges and buildings into our own Minecraft worlds. This camp combines hands-on building and drawing with a 3D printing pen with the imaginative power of Tinkercad and Minecraft to bring your wildest sustainable architecture ideas to life. If you like to explore, craft stories, and build amazing creations.

Skills Learned: 3D Design & Printing, Engineering Design, Minecraft Coding & Modding

VANGUARD ALLIANCE TABLETOP GAMING CLUB (Grades 5-8)

Join the Vanguard Alliance and charge into the world's greatest tabletop strategic miniatures game that combines teamwork, creative arts, battle tactics, and 3D printing, all through hands-on, unplugged play. We'll build, assemble, and paint our miniatures, tabletop terrain, and adventure campaigns as a team and compete in mini-tournaments with awards for painting, playing, 3D design, written lore, and community leadership. We'll align the values we stand for in real life to our in-game heroes as we plan and deliver service learning projects that foster empathy, leadership, and social entrepreneurship. We'll start by creating our chapter's own unique values and principles–starting with Integrity, Teamwork, and Creativity–and then stand up for those values despite all odds. Every session brings a new challenge. Will we hold fast against the Necron Warriors, who prize profit above people and the planet? Will we face our fears and stand together against the Kruleboyz, who seek to divide and conguer as they burn through the planet's resources?



Your adventure starts with a choice: Will you stand up with your fellow warriors and fight for humanity and the future of planet Terra? Our future depends on you!

Skills Learned: imagination, engineering design, math, art, critical thinking, reading and creative writing, advanced model-making, computer-aided design (CAD), 3D printing, game design, as well as life skills in social-emotional and executive functioning, problem-solving, critical thinking, leadership, and community service

MATERIALS FEE: \$75 per student (includes your own take-home miniatures set)



LET'S EARN SOME BADGES & CHALLENGE COINS!

We earn badges every day for skills practice in social-emotional awareness, teamwork, problem-solving, persistence, collaborative creativity, courage, peer feedback, revising, and innovation.

Our Badge Book is at right with brief explanations for each badge.



We also pull a 3D printed Challenge Coin, like those pictured and listed above, from the "Eye Can" jar each day and if we complete that challenge, we keep the collectable coins? Challenge Coins are earned for improving something you made, focusing on a task, asking for help, learning from mistakes, helping someone, speaking in front of a group, and a lot more.

