

STEAMPI - 18 Week Program Syllabus

Program Description

This program offers an exciting journey into the worlds of robotics and digital creation, designed to cultivate logical thinking through the integration of VEX GO, Scratch programming, art, and technology. Students will begin by exploring the fundamentals of engineering and mechanics with VEX GO, building a strong understanding of simple machines and robotics design. The curriculum then transitions to the vibrant, visual environment of Scratch, where students will learn to code their own interactive stories, animations, and games. This dual approach empowers students to become versatile creators, comfortable with both physical construction and digital design, fostering problem-solving skills, creativity, and a solid foundation in technological principles.

Student Learning Objectives

By the end of the program, students will be able to:

Robotics & Engineering (VEX GO):

- Identify and use VEX GO components to build functional robots.
- Apply simple machine principles (e.g., levers, gears) to solve mechanical problems.
- Follow the engineering design process to plan, build, test, and improve designs.
- Understand gear ratios and their effects on speed and torque.
- Collaborate on group-based building projects.

Coding & Logical Thinking (Scratch):

- Navigate Scratch and use block-based code to create animations and games.
- Apply key programming concepts like loops, conditionals, and variables.
- Control sprites and backdrops to build interactive stories and dynamic scenes.
- Integrate user input to develop engaging, playable games.

General Skills:

- Strengthen logical thinking and problem-solving abilities.
- Blend creativity, design, and technical skills in hands-on projects.
- Manage multi-step projects and explain design choices clearly.

Week-by-Week Breakdown

Unit 1: Robotics Foundations (Weeks 1–5)

Focus: Building basics, understanding VEX GO parts, understanding simple machines principles, teamwork

Week 1: Intro to VEX GO & Engineering Design

Week 2: Simple Machines - Inclined Plane

Week 3: Simple Machines - Lever

Week 4: Simple Machines - Wheels and Axle

Week 5: Simple Machines - Gear Application (Clock)

Unit 2: Intro to Digital Art (Week 6-11)

Focus: Students will learn the basics of block-based coding using Scratch, including how to create animations, control characters (sprites), and design interactive scenes. They'll explore key concepts such as stages, sprites (actors), motion, events, and sequencing

Week 6: Introduction to Scratch

Week 7: Make It Fly: Arrow-Key Flight Game

Week 8: Minecraft Walk Cycle

Week 9: Food Truck Animation

Week 10: Scratch Got Moves: Dance Party

Unit 3: Dynamic Worlds in Scratch: Movement & Environments (Week 11-15)

Focus: Students will deepen their understanding of coding logic by creating dynamic and interactive digital environments in Scratch. They will master sprite movement, use loops like the "forever" block, and develop two-player mechanics.

Week 11: Introduction to Basic Movement in Scratch with Backdrop

Week 12: Movement Masterclass: Two-Player Cat Movement

Week 13: Endless Adventures: Scrolling Backdrops & Sprites

Week 14: World in Motion: Techniques for Moving Backdrops

Week 15: Dynamic Character & Moving World Project

Optional:

Unit 4: Intermediate Engineering Principles (Week 16 - 18)

Focus: Students will advance their engineering and coding skills by exploring more complex mechanical builds and integrating programming logic using VEX GO.

Week 16: Simple Machines - Drawbridge

Week 17: Simple Machines - Adaptation Claw

Week 18: VEX GO Racers: Designing the Super Car