FOUNDATIONS TO ROBOTICS

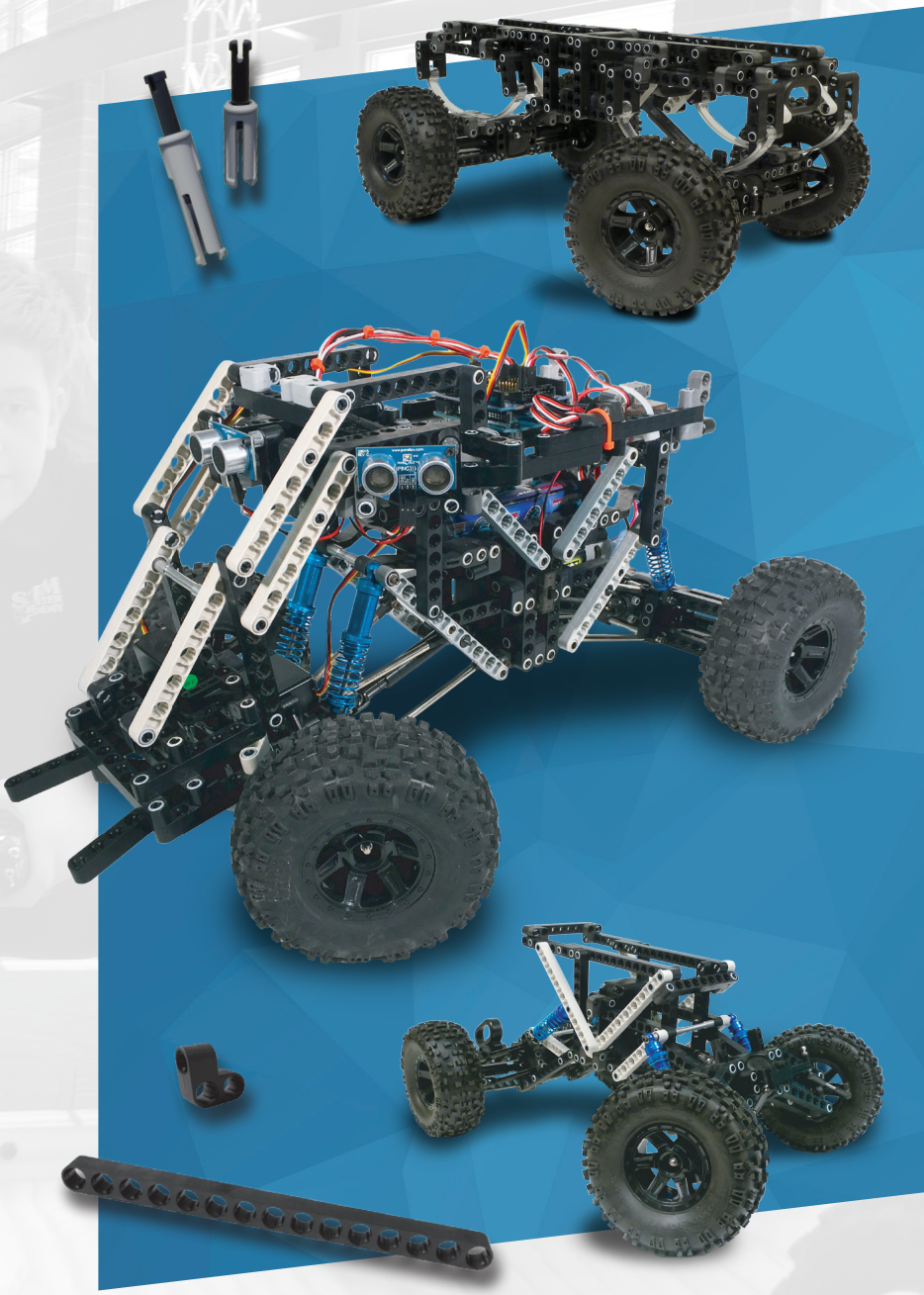
Introduction to STEM Robotics

MCK-FDLB-4X4

MINDS-i STEM INTEGRATED ROBOTICS: FOUNDATIONS LAB - 4X4

Introduce students to the foundations of robotics with easy to assemble and modify rovers that emphasize real-world applications. Working collaboratively using the Engineering Design Process, students build and program advanced robots to tackle impressive challenges. As they explore mechanical engineering, electrical engineering and programming, students also analyze the robot's physics, mathematical and scientific elements.

- 2 lab options: 4 or 6-wheel drive
- Each lab is one semester (90 hours of curriculum) with seven units, designed for 3-5 students



SPARK AND SUSTAIN STUDENTS' INTEREST IN STEM

MINDS-i Robotics engages students in an energizing STEM learning environment with easy to build, program, and modify robots. Technologically advanced rovers and drones perform impressive real-world tasks that build excitement for STEM careers. The curriculum encourages collaborative problem-solving and the open-source Arduino® C++ programming language fosters endless creativity. With outstanding technical support, teachers are empowered and students are inspired to build whatever they envision in their "mind's eye."

COURSE DESIGN

Each lab is one semester and designed for 3-5 students. Foundations is the recommended prerequisite to the Drones Lab + Curriculum.

GEAR REDUCER | TACHOMETER | MULTIMETER | TORQUE METER | RC CONTROL | CONTROLLER | CATAPULT

FIND YOUR MINDS-i SALES REPRESENTATIVE AT:

mindsieducation.com »

info@mymindsi.com »

CURRICULUM OUTLINE - 90 HOURS

Unit 1: Introduction to MINDS-i
- 1.1 Introduction to MINDS-i
- 1.2 Student Performance Development Process
- 1.3 What is a Robot?

Unit 2: Design Engineering
- 2.1 Model for Inquiry
- 2.2 The Importance of Data
- 2.3 Parts & Purposes
- 2.4 Simple Machines

Unit 3: Variable of Force & Motion
- 3.1 Force & Motion
- 3.2 Parts & Purposes
- 3.3 Gear Ratios; Speed & Torque
- 3.4 Friction
- 3.5 Inertia

Unit 4: Software Programming; Sensors & Servos
- 4.1 Why Programming?
- 4.2 Parts & Purposes
- 4.3 Testing the Micro-controller
- 4.4 Creating the Breadboard; Servo
- 4.5 Adding to the Breadboard; Esc
- 4.6 Adding to the Breadboard; Radio Transmitter
- 4.7 Adding to the Breadboard; Ultrasound Sensor
- 4.8 Adding to the Breadboard; QTI Sensor
- 4.9 Core Syntax

Unit 5: Autonomous Robotics
- 5.1 What Makes a Robot Autonomous
- 5.2 Basic Control Structures
- 5.3 Autonomous Obstacle Avoidance
- 5.4 Line Following

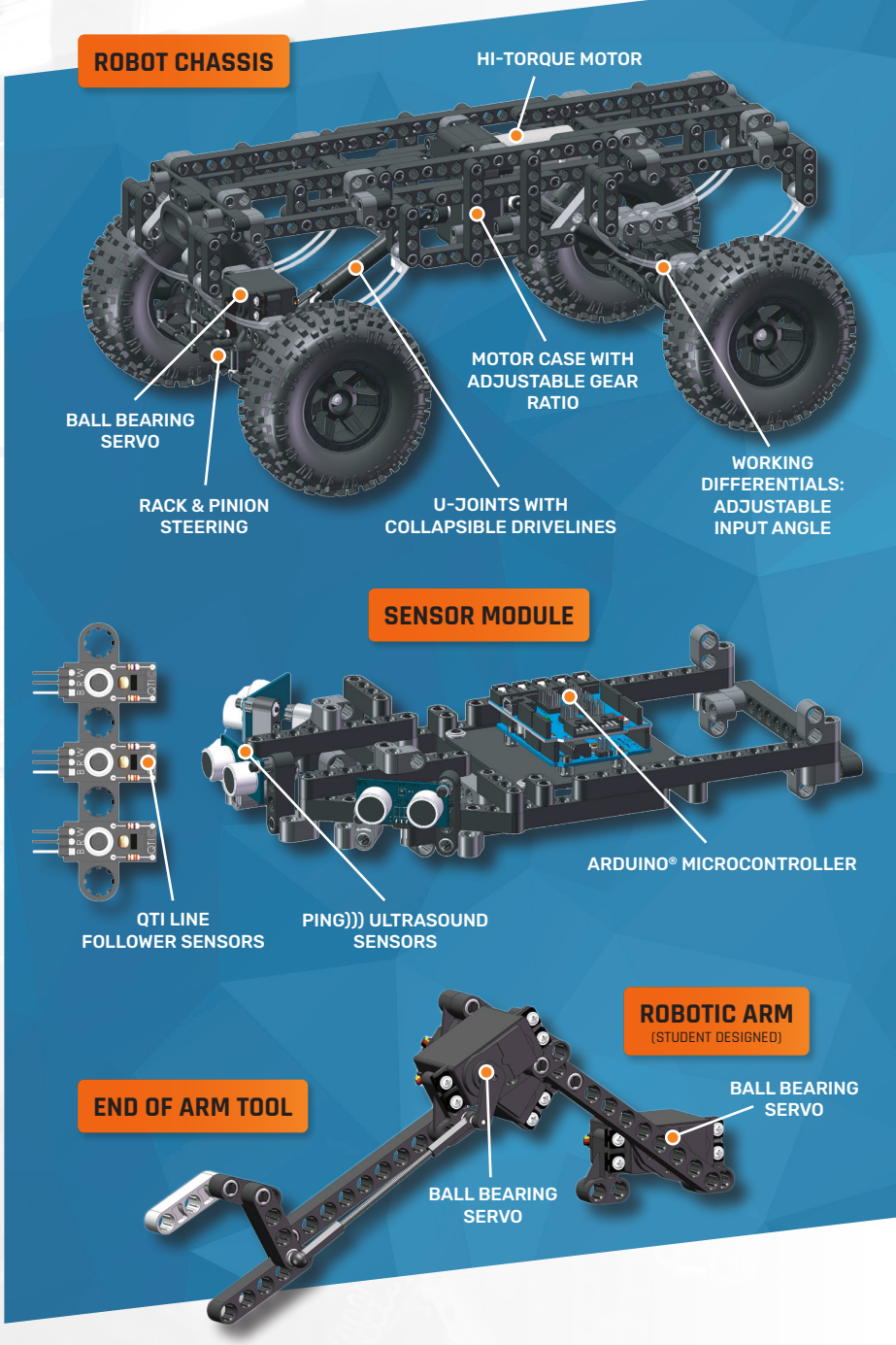
Unit 6: Mechanical & Structural Engineering
- 6.1 Levers, Cams & Span
- 6.2 Structural Design
- 6.3 Robot Arm & End of Arm Tool

Unit 7: Culminating Project
- 7.1 Preparing for the Challenge
- 7.2 Cleanup / Organizing

STEM INTEGRATED ROBOTICS FOUNDATIONS

This curriculum covers a multitude of engineering concepts including

- Programming
- Physics
- Mechanical Systems
- Electrical and Electronic Systems
- Hands on Activities and Capstone Projects in each Semester



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