Barobo RoboBlocky™

Sample Robot Machines for TK-12 RoboBlocky Math, CS, and STEAM Programs

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1. Introduction

The **Linkbot** **is a Barobo patented reconfigurable modular robot;** each unit functions as a building block with its own brain, actuators, and sensors. Although the Linklbot was invented to be simple and versatile for hands-on learning of mathematics with coding and robotics, as illustrated in Manipulatives for TK-12 RoboBlocky Math, it can also be used for learning computer science (CS), STEAM, and many other subjects. It enables teachers with little or no prior experience in coding or robotics, along with their students, to move beyond the textbook and apply mathematical and other concepts to the physical world.

This document showcases **over 100 sample robot machines** available in the Babobo C-STEM program. Each robot machine has a corresponding lesson and a video demonstrating how the robot can be used. It also includes a detailed step-by-step instruction on how to build the robot machine with a sample program to produce the motions shown in the video.

Key features of the Linkbot and its accessories include:

- **SnapConnect technology:** With **Barobo patented SnapConnect technology**, multiple Linkbots and accessories can be easily and quickly snapped together, without the need for special tools, to create a wide range of 2D and 3D shapes, and robotic systems for diverse tasks and projects.
- **K-12 versatility:** The same physical and programming tools can be used across all grade levels and subjects, from K to 12, allowing students to progressively deepen their learning while using the same versatile resources.
- **Diverse robotics tools:** The curriculum incorporates Linkbots, OmniBot robots, Arduino boards, and sensor-based robotics, offering unprecedented hands-on opportunities for learning and engineering design with multiple robots.
- **Ease of programming:** The multi-robot machines that students create can be easily programmed, allowing them to quickly engage with both math and coding concepts while seeing immediate results through interactive activities.
- **LEGO integration:** Widely available LEGO parts can easily be incorporated into student-designed Linkbot robot machines, further expanding design possibilities.
- **3D Printing:** Students can design parts and use 3D printers to make new parts to create their own robotics systems with Linkbots to solve real-world problems.

These sample robot machines can readily be used in the following Barobo curricula.

- RoboBlocky Math Core Curriculum (TK-12)

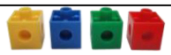
- RoboBlocky Math Accelerated and Highly Accelerated Curriculum (6-8)
- RoboBlocky Math Intervention and Enrichment Curriculum (5-12)
- CS and STEAM with Robotics (TK-12)
- Robotics and Robotics-Math Programs for Expanded Learning (TK-12)
- RoboPlay Challenge Competitions (1-12)

2. 4-Linkbot Bundle for Grades TK-12

The 4-Linkbot Bundle serves as a foundational set for classroom teaching and learning and may also be used by student teams participating in RoboPlay Challenge competitions. Additional bundles, including 8-Linkbot and 16-Linkbot configurations, as well as individual accessories, are available and may be shared across classrooms and among teachers.

The first image below illustrates a 4-Linkbot Bundle. The second image identifies the components and their corresponding names included in the 4-Linkbot Bundle.

4 Linkbot Classroom Bundle
Product Parts

Name	Picture	Name	Picture	Name	Picture
Linkbot-I (Joints 1 and 3 can move, Joint 2 is fixed)	 4	L Connector	 4	Screwdriver	 1
Linkbot Dongle	 4	3” Rectangle Connector	 4	Hacky Sack	 1
36” USB Cable	 4	4” Rectangle Connector	 4	A pack of screws and nuts	 1
7” USB Cable	 4	5” Rectangle Connector	 4	Cube Connector	 8
Snap Connector	 42	T Connector	 4	Triangle Connector	 4
3.5” Wheel	 8	U Connector	 2	Link Block Connector	 4
4” Wheel	 8	Small Ball Caster	 2	Link Blocks	 10 of each color
Ball Caster	 4	Snap Connector Cap	 8	#6-32 X 5/16" Screw	 25
Push Scoop	 4	RGBY Foam Cubes	 4 of each color	8"x10" Resealable Bag	 4
Gripper Pair	 2	Circle Connector	 2	Activity Mat: MathGrid	 1
Bridge Connector	 4	Cylinder Connector	 1	8-Port USB Charger	 1

3. The OmniBot Pack for Grades TK-12

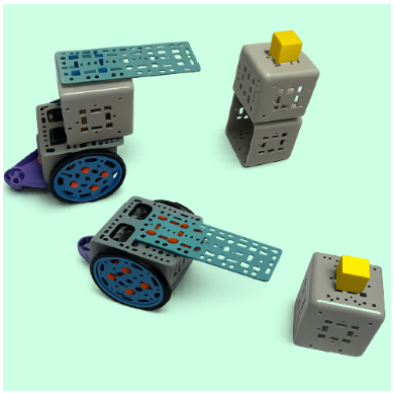
The OmniBot Pack is an accessory for the Linkbot that combines two Linkbot-I robots to create a four-wheeled OmniBot capable of moving in all directions. In addition to moving forward and backward, the OmniBot can turn, travel in circular paths, and move sideways and diagonally, making it a versatile base platform for a wide range of applications. The Pen Connector and Pen Adapter extend the OmniBot's functionality by enabling drawing and design, allowing students in TK–5 to explore geometric shapes, patterns, and spatial relationships using a wide variety of standard markers and pencils. The OmniBot's multi-directional movement makes it especially effective for TK–K students as they learn and practice orientation concepts such as left, right, up, and down through hands-on movement.

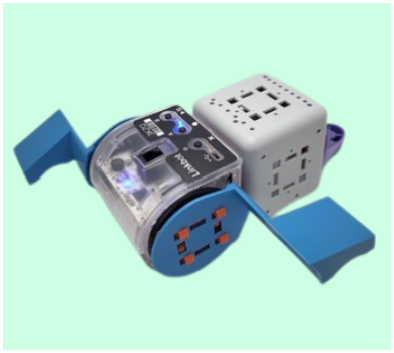
4. Robot Machines for Grades TK-2

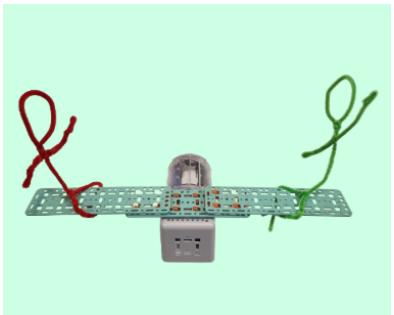
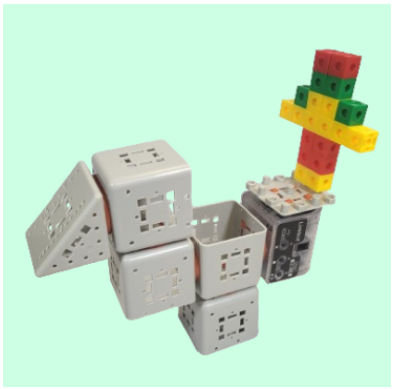
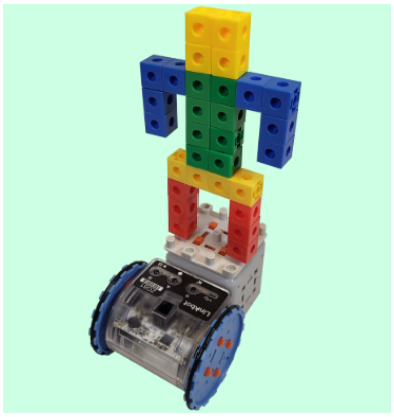
Although these robot machines are appropriate for students in grades Tk-2, they can also be used by students in grades 3-12.

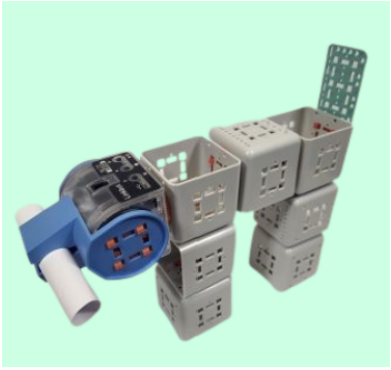
4.1 Robot Machines with Single LinkBot for Grades TK-2

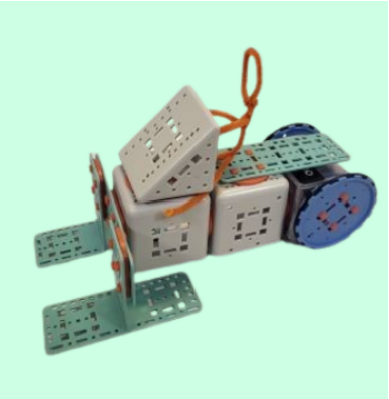
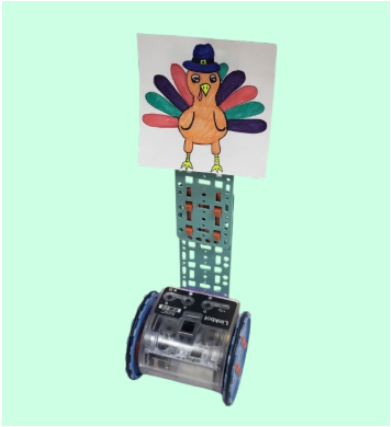
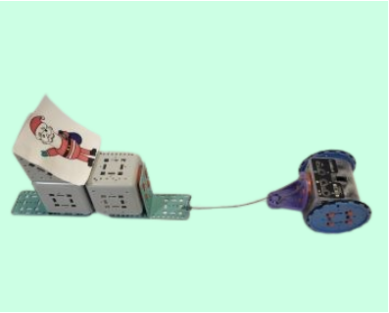
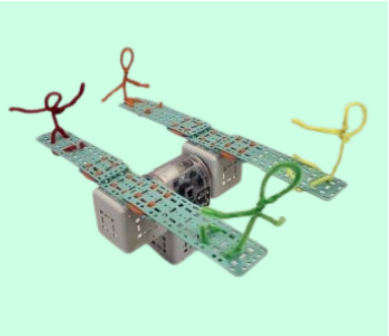
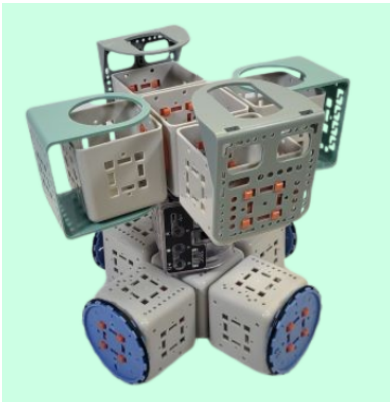




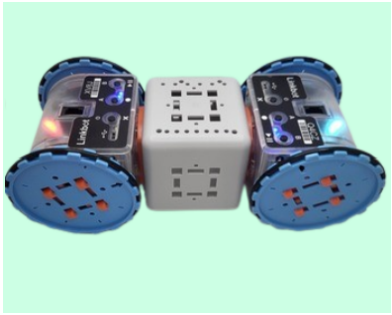


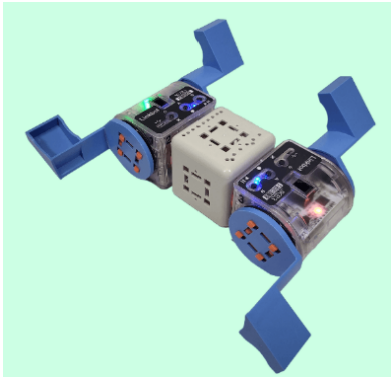
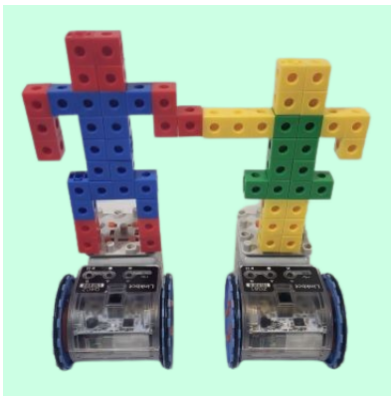






4.2 Robot Machines with Multiple LinkBots for Grades TK-2

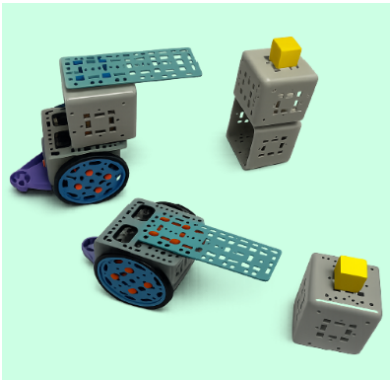


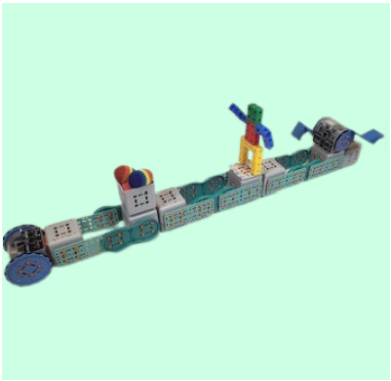



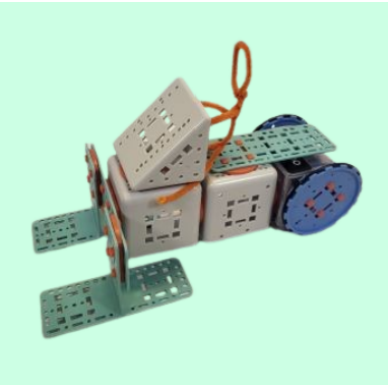
5. Robot Machines for Grades 3-5

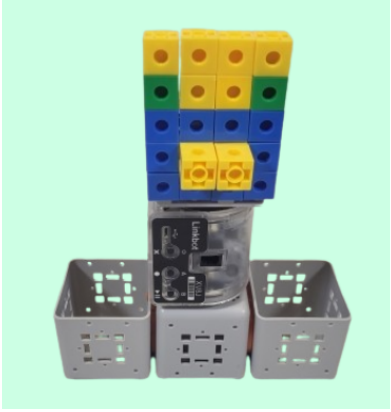
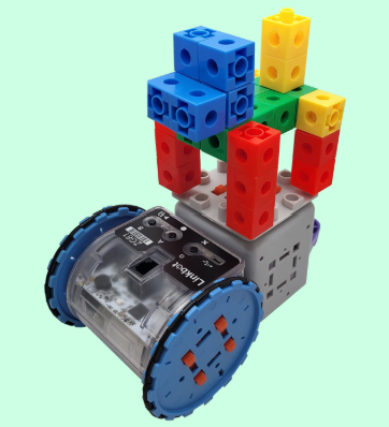
Although these robot machines are appropriate for students in grades 3-5, they can also be used by students in grades 6-12.

5.1 Robot Machines with Single LinkBot for Grades 3-5

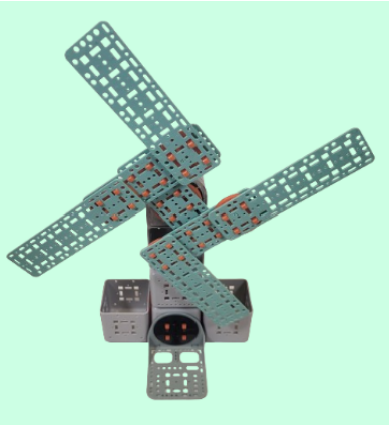
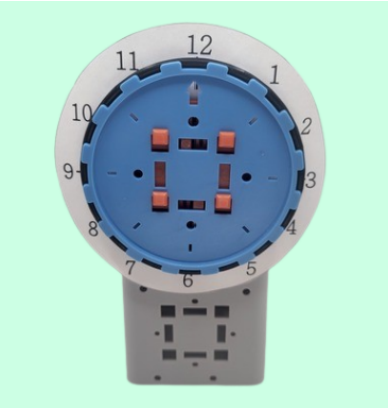


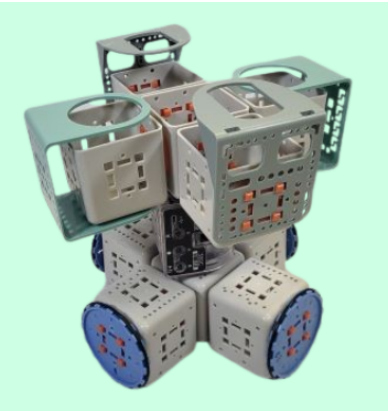
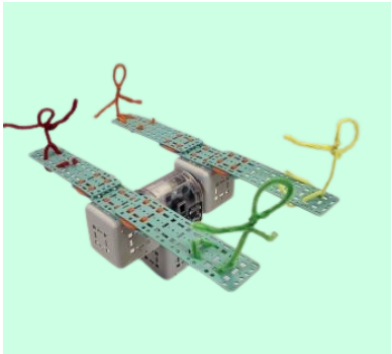




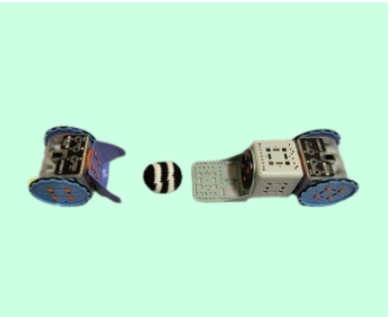



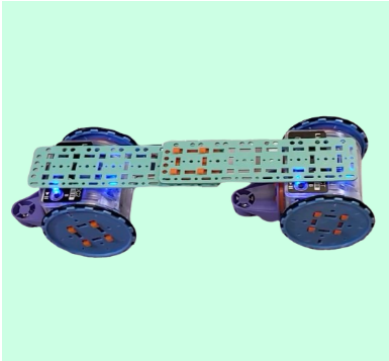


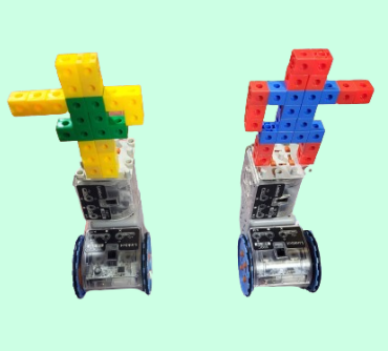



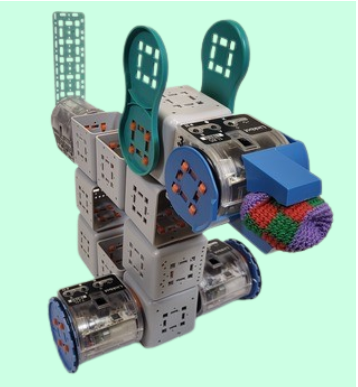
5.2 Robot Machines with Multiple LinkBots for Grades 3-5

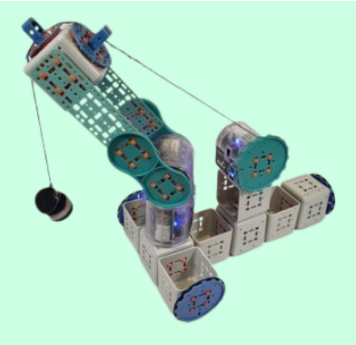



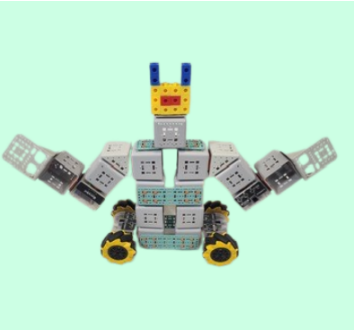
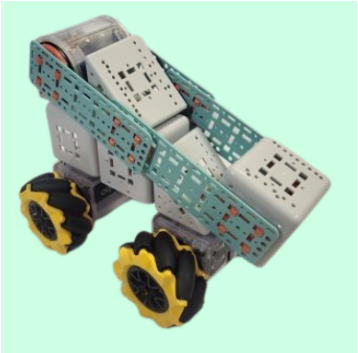
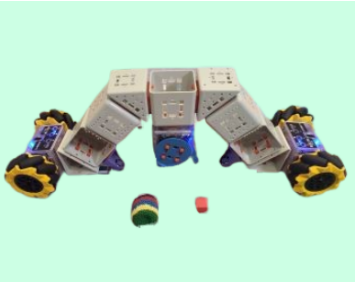








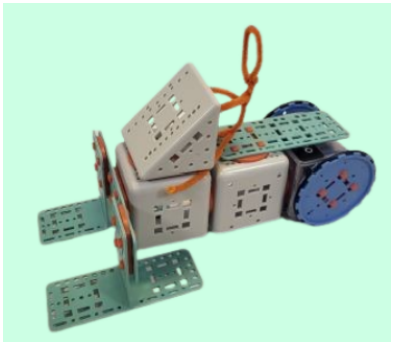


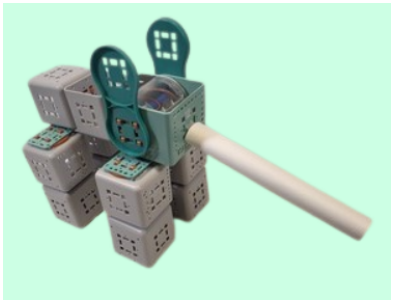




6. Robot Machines for Grades 6-8

Although these robot machines are appropriate for students in grades 6-8, they can also be used by students in grades 9-12.

6.1 Robot Machines with Single LinkBot for Grades 6-8





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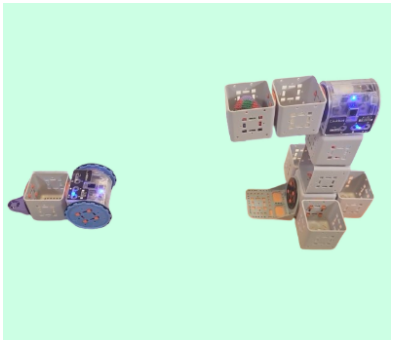
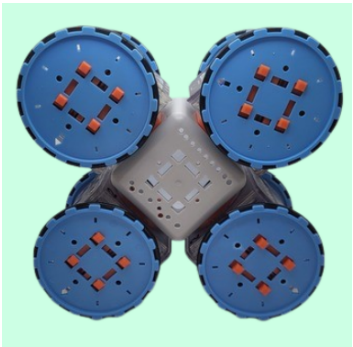
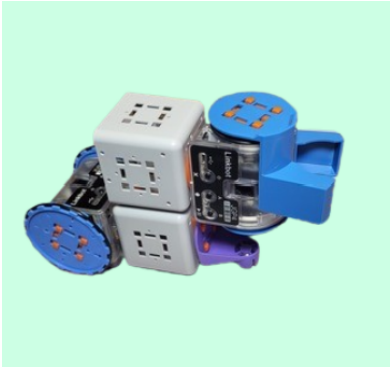
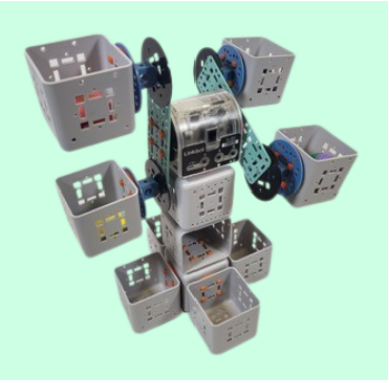
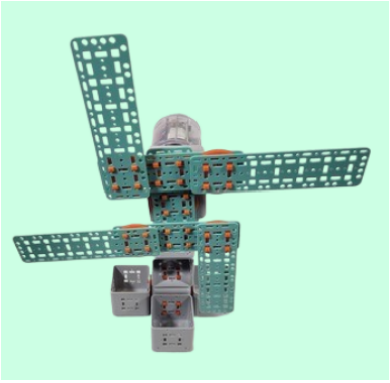
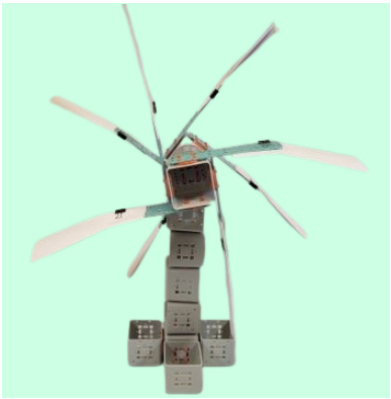
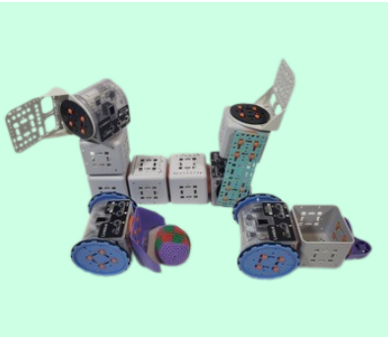
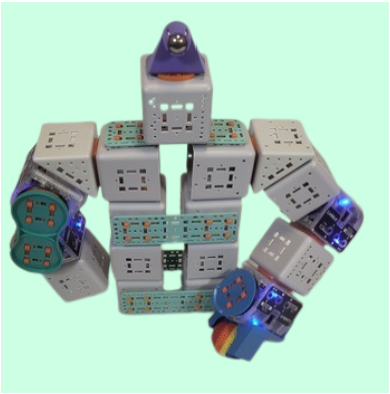
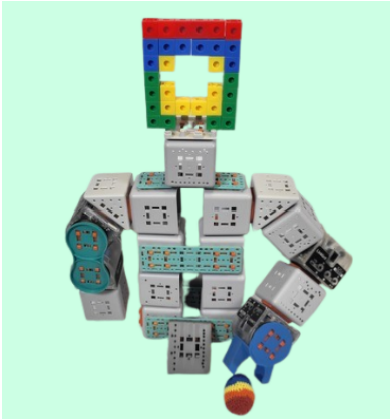




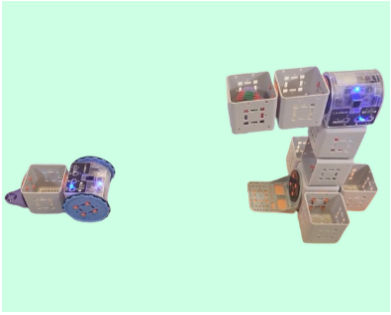
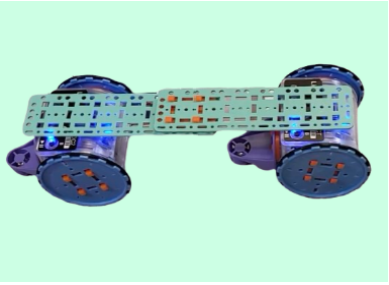




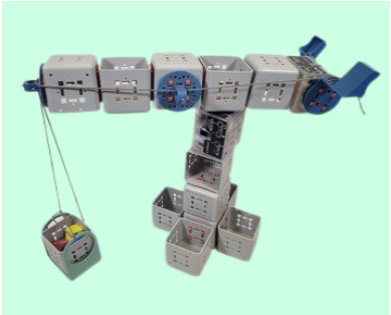
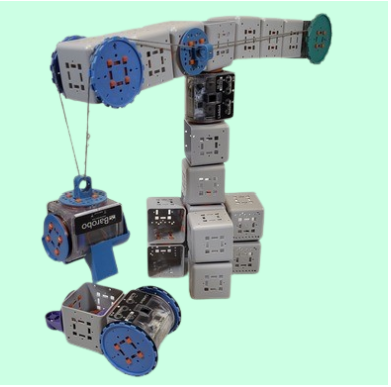
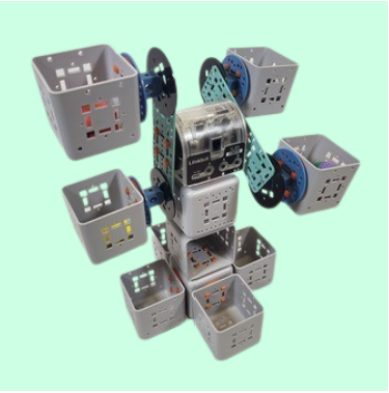
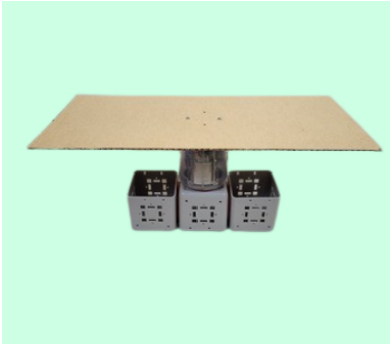
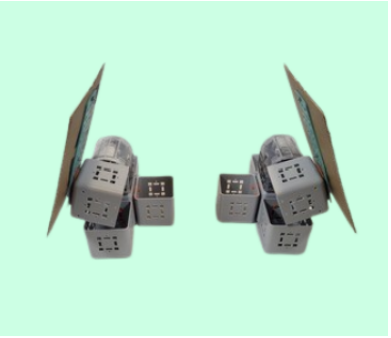
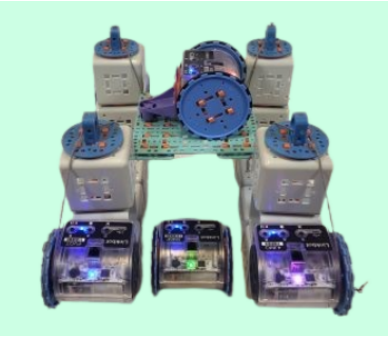






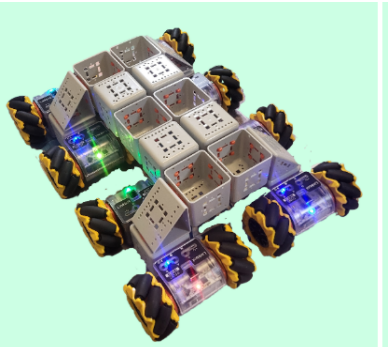


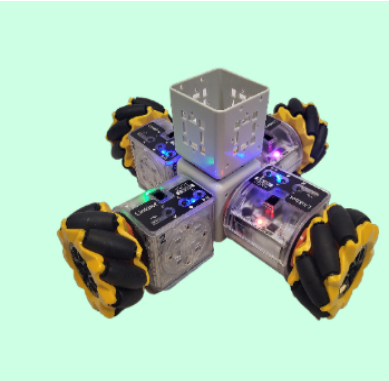
7. Robot Machines for Grades 9-12



8. Lego Connection

The Lego Connection Pack allows Lego parts to be connected with Linkbot. This pact features connections for both regular Lego Bricks and Lego Techic parts. These two connectors allow students to attach any existing Lego part to the Linkbot system, opening up a world of unlimited possibilities.

For those familiar with Lego SPIKE, EV3 Mindstorms, or NXT systems, students need to plug in external motors and sensors into the Lego brain, requiring them to keep track of cables and specific ports. The Linkbot has the actuators attached directly inside of the brain, making for easy, cable free building. In addition, Lego and other systems often restrict you to using a single robot brain for most projects, whereas the Linkbot robot system encourages you to use one, two, or even twelve Linkbots at once!

8.1 Robot Machines Using Lego Connection Pack and Lego Parts