

# ROPE CLIMBING ROBOT

CAT# 80-54-W051



The Climbing Robot Kit offers an exciting opportunity for students to delve into robotics and understand the principles of locomotion and motion physics. By building and experimenting with this climbing robot, students can explore the mechanics of climbing and develop their problem-solving skills.

## PRIMARY DIVISION: GRADES 1-3

### Overall Expectation: STEM, Structures and Mechanisms Focus

Explore structures and mechanisms, including the roles of materials in supporting structures and making devices work.

### Specific Expectation

Identify and describe the purpose of simple machines such as levers and pulleys.



### Activity

Students use the Climbing Robot Kit to understand the basic principles of motion and mechanisms involved in climbing. They learn how the robot's design allows it to climb ropes and explore the role of simple machines in its operation. This hands-on activity enhances their understanding of structures and mechanisms.

## JUNIOR DIVISION: GRADES 4-6

### Overall Expectation: STEM, Matter and Energy Focus

Investigate the principles of forces, energy, and control in simple machines and structures.

### Specific Expectation

Explore the relationships between the components of simple machines and the forces acting on them.

### Activity

With the Climbing Robot Kit, students investigate how forces and balance are essential for the robot to climb effectively. They experiment with different designs and materials to optimize the robot's climbing ability. This activity promotes understanding of mechanical principles and the application of force and motion concepts.

## INTERMEDIATE DIVISION: GRADES 7-8

### Overall Expectation: STEM, Matter and Energy Focus

Investigate how technological problem-solving meets human needs and leads to innovation.

### Specific Expectation

Analyze the impact of friction and lubrication on the efficiency of mechanisms.

### Activity

Students use the Climbing Robot Kit to explore the impact of friction on the robot's climbing performance. They experiment with lubricants and different surfaces to understand how friction affects motion. Talcum powder can work as a lubricant. This project enhances problem-solving skills and deepens their understanding of mechanical systems.

## SECONDARY DIVISION: GRADES 9-12

### Overall Expectation: Physics Focus

Apply principles of physics to understand the operation and efficiency of mechanical systems.

### Specific Expectation

Analyze mechanical advantage and efficiency in simple and compound machines.

### Activity

Using the Climbing Robot Kit, students analyze the physics behind the robot's climbing motion. They explore the mechanical advantages of the robot's design and discuss how energy is transferred to climb efficiently. This project provides insights into robotics, mechanics, and physics principles.

## CROSS-CURRICULAR CONNECTIONS

### Mathematics

Students can calculate forces and angles involved in the robot's climbing motion.

### Technology

They explore different designs and materials to optimize the robot's climbing performance.

### Science

Students learn about the principles of electricity and circuits if the kit involves motorized components.

### Summary

By experimenting with the Climbing Robot Kit, students engage in hands-on learning experiences that deepen their understanding of mechanical principles, robotics, and engineering concepts. This project encourages critical thinking and problem-solving, and fosters curiosity in STEM disciplines, preparing students for future technological challenges.