NextWaveSTEM | Course Guide

COURSE: DISCOVERY OF ROBOTS: CODING mBOT

Designed for learners in Grades 3-5.

COURSE DESCRIPTION

Young learners answer the questions "What are the types of robots?" and "How do they work?" Students will learn how to code in the mBlockly application and program their own mBot robots.

LESSON SEQUENCE AND LEARNING TARGETS

Lesson One: What is a Robot?

- ❑ I can explain what a robot is.
- ❑ I can design a robot to solve a problem.

Lesson Two: Meet mBot

- ❑ I can name the components of the mBot.
- ❑ I can describe the function of mBots components.

Lesson Three: Build mBot

- ❑ I can assemble an mBot.

Lesson Four: Coding Unplugged

- ❑ I can explain what a sequence and algorithm are.
- ❑ I can create an algorithm for someone to follow.

Lesson Five: Block Coding

- ❑ I can use the mBlock Blockly app to program a robot.

Lesson Six: Something New

- ❑ I can use an increasing number of features in mBlock Blockly to program my mBot.
- ❑ I can improvise and use creativity to find solutions to programming challenges.

Lesson Seven: Line Follower

- ❑ I can explain what a line follower is.
- ❑ I can design a line follower track for the mBot.

Lesson Eight: Robots at Work

- ❑ I can form and support an opinion about robots doing human jobs.

Lesson Nine: What's Your Plan?

- ❑ I can explain the choices I made for programming the mBot.

Lesson Ten: Time to Compete

- ❑ I can work with my team to program the mBot to complete a series of tasks.

COURSE OVERVIEW AND PACING GUIDE

Lesson	**Learning Targets**	**Materials Needed**	**Pacing** (60 min.)
What is a Robot?	❑ I can explain what a robot is. ❑ I can design a robot to solve a problem.	- Classroom whiteboard and markers - Chart paper or poster board to record prior knowledge	**Engage**: Prior Knowledge and Pique Interest (5 min.) **Explore**: Types of Robots (5 min.) **Explain**: What can a robot do? (15 min.) **Elaborate**: Design Process and Robots (30 min.) **Evaluate**: Learning Review (5 min.)
Meet mBot	❑ I can name the components of the mBot. ❑ I can describe the function of mBots components.	- Classroom whiteboard and markers - Notebook paper or blank white paper - 1 per student - mBot (unassembled; 1 per team of 3-4 students) - Assembled mBot for teacher	**Engage**: mBot (5 min.) **Explore**: Introduction to mBot (10 min.) **Explain**: Components of mBot (30 min.) **Elaborate**: mBot Parts Matching Activity (10 min.) **Evaluate**: Learning Review(5 min.)
Build mBot	❑ I can assemble an mBot.	- Classroom whiteboard and markers - mBot Assembly Instructions	**Engage**: Prior Learning (10 min.) **Explore**: Building the mBot (30 min.) **Explain**: Draw and Label (10 min.) **Elaborate**: Explore the Robot (5-10 min)

		- mBot (unassembled; 1 per team of 3-4 students) - Sheets of white construction paper (2 per team) - "License Plate" Stickers (1 per team) - Markers or colored - pencils - AA Batteries	**Evaluate**: Learning Review(5 min.)
Coding Unplugged	❏ I can explain what a sequence and algorithm are. ❏ I can create an algorithm for someone to follow.	- Assembled mBot - 2 different color writing utensil (per child) - Whiteboard or chart paper - Piece of paper (1 per child) - Classroom whiteboard and markers	**Engage**: Prior Learning (10 min.) **Explore**: Sequences and Algorithms (15 min.) **Explain**:Unplugged Coding (15 min.) **Elaborate**: Reflect and Revise (10 min.) **Evaluate**: Learning Review (5 min.)
Block Coding	❏ I can use the mBlock Blockly app to program a robot.	- 1 assemble mBot per team - 1 table/device per team - Classroom whiteboard and markers	**Engage**: Pique Interest and Prior Knowledge (5 min.) **Explore**: Block-based Coding (10 min.) **Explain**: Block-based Coding (15 min.) **Elaborate**: mBlock Blocky Challenges (25 min.)

			Evaluate: Learning Review (5 min.)
Something New	❑ I can use an increasing number of features in mBlock Blockly to program my mBot. ❑ I can improvise and use creativity to find solutions to programming challenges.	- Assembled mBot - 2 different color writing utensil (per child) - Whiteboard or chart paper - Piece of paper (1 per child) - Classroom whiteboard and markers	**Engage**: Pique Interest and Prior Knowledge (10 min.) **Explore**: How do robots move? (5 min.) **Explain**: Introduce Loops, Wait, & Branching (15 min.) **Elaborate**: Dancing Robots (20 min.) **Evaluate**: Learning Review (5 min.)
Line Follower	❑ I can explain what a line follower is. ❑ I can design a line follower track for the mBot.	- Assembled mBot (1 per team) - White chart paper/poster board - Black markers or Electrical tape - Classroom whiteboard and markers	**Engage**: Watch-Write-Wonder (10 min.) **Explore**: Line Follower (10 min.) **Explain**: Design a Track/Test (15 min.) **Elaborate**: Revise and Rerun (10 min.) **Evaluate**: Reflection and Learning Review (15 min.)
Robots at Work	❑ I can form and support an opinion about robots doing human jobs.	- Advantages and Disadvantages of Robots at Work Worksheet (1 per pair of students)	**Engage**: Prior Knowledge (5 min.) **Explore**: Robots at Work (15 min.) **Explain**: Consider the Pros and Cons (15 min.) **Elaborate**: Should

		- Classroom whiteboard and markers	Robots Replace Human Workers? (15 min.) **Evaluate**: Learning Review (5 min.)
What's Your Plan?	❑ I can explain the choices I made for programming the mBot.	- Assembled mBot (one per team) - Computer or tablet (one per team) - mBlock Blockly application - AA Batteries - Blank paper (for team notes) - Classroom whiteboard and markers	**Engage**: Prior Learning (5 min.) **Explore**: Plan for Competition (20 min.) **Explain**: Share the Program (15 min.) **Elaborate**: Reflect and Revise (10 min.) **Evaluate**: Learning Review (5 min.)
Time to Compete	❑ I can work with my team to program the mBot to complete a series of tasks.	- Assembled mBot (one per team) - Computer or tablet (one per team) - mBlock Blockly application - AA Batteries - Classroom whiteboard and markers	**Engage**: Prior Learning (5 min.) **Explore**: Plan for Competition (5 min.) **Explain**: mBot Competition (35 min.) **Elaborate**: Course Review (10 min.) **Evaluate**: Learning Review (5 min.)

COURSE PREPARATION

Students will program mBot using mBlock Blockly application. Download and install the application on all mobile devices being used by the students.

mBot requires 2 AA batteries. Make sure students turn off the robot after each lesson and have plenty of AA batteries on hand throughout the course.

