NextWaveSTEM | Course Guide

## COURSE: Introduction to Robots: What is a Robot?

Designed for learners in Grades K-2.

## COURSE DESCRIPTION

Early learners answer the questions “What are robots?” “How do work?” and “What can they do?” Young learners are encouraged to combine creative thinking and intrinsic motivation using cutting-edge technology and Scratch, a free-to-use drag-and-drop creative learning environment developed by MIT Media Lab.

## LESSON SEQUENCE AND LEARNING TARGETS

**Lesson One: Meet Colby!**
- ❑ I can explain Colby’s robot functions.
- ❑ I can write a command for Colby to follow.

**Lesson Two: Sequencing**
- ❑ I can create a sequence of instructions.
- ❑ I can program a robot to move to a specific point.

**Lesson Three: Draw Numbers**
- ❑ I can write a line of code.
- ❑ I can program and debug Colby to follow my line of code.

**Lesson Four: Retelling a Story with Colby**
- ❑ I can retell stories orally.
- ❑ I can retell stories by creating a coding sequence.

**Lesson Five: Unplugged Coding and Robotics**
- ❑ I can understand sequences and give precise directions.
- ❑ I can engage in collaborative teamwork to problem solve.

**Lesson Six: Going on a Treasure Hunt**
- ❑ I can give directions and read a map.
- ❑ I can code Colby to get from one place on a map to another.

**Lesson Seven: Colby is A-Mazing**
- ❑ I can make a creative maze for Colby.
- ❑ I can write a sequence for Colby to go through the maze.

**Lesson Eight: Write and Code with Colby**
- ❑ I can code a sequence.
- ❑ I can use sequence words to describe the order of events.

**Lesson Nine: Math with Colby**
- ❑ I can explain how to add and subtract on a number line.
- ❑ I can write a code to move Colby to find sums and differences.

**Lesson Ten: Look I’m a Robot!**
- ❑ I can follow exact directions given verbally and written down.
- ❑ I can recognize a computer bug and create a solution.

  

## COURSE OVERVIEW AND PACING GUIDE

| **Lesson** | **Learning Targets** | **Materials Needed** | **Pacing** (60 min.) |
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| Meet Colby! | ❑ I can explain Colby's robot functions.<br>❑ I can write a command for Colby to follow. | - Pencils, Crayons, or Colored Pencils<br><br>- 5 x 5 inch cardstock squares-enough for 9 per group<br><br>- Copy of Coding Cards for each student/group<br><br>- Code and Go Mouse "Colby" | **Engage**: Pique Interest and Prior Knowledge (5 min.)<br>**Explore**: Who is Colby? (10 min.)<br>**Explain**: Input Means Go! (15 min.)<br>**Elaborate**: Let's Move (25 min.)<br>**Evaluate**: Learning Review (5 min.) |
| Sequencing | ❑ I can create a sequence of instructions.<br>❑ I can program a robot to move to a specific point. | - Crayons/Pencils<br><br>- 2 x 2 Grid for each group<br><br>- Cheese graphic printable for each group<br><br>- Colby's Key from Lesson 1 one per student or displayed<br><br>- Copy of Coding Cards for each student/group<br><br>- Code and Go Mouse "Colby" | **Engage**: Pique Interest and Prior Knowledge (5 min.)<br>**Explore**: Get Control (10 min.)<br>**Explain**: Locate Objects (15 min.)<br>**Elaborate**: Improve and Move (25 min.)<br>**Evaluate**: Learning Review (5 min.) |

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| Draw Numbers | ❑ I can write a line of code.<br>❑ I can program and debug Colby to follow my line of code. | - Lesson 3 Number Cards 1 set per group<br><br>- Colby's Key from Lesson 1 one per student or displayed<br><br>- Code and Go Mouse "Colby"<br><br>- 3 AAA batteries per robot | **Engage**: Pique Interest and Prior Knowledge (5 min.)<br>**Explore**: Who's the Boss? (10 min.)<br>**Explain**: What's a line of code? (15 min.)<br>**Elaborate**: Make numbers (25 min.)<br>**Evaluate**: Learning Review (5 min.) |
| Retelling a Story with Colby | ❑ I can retell stories orally.<br>❑ I can retell stories by creating a coding sequence. | - Key Event Cards-1 large set per group<br><br>- Masking Tape 4x4 Grid (4 inch squares)<br><br>- Coding Cards | **Engage**: Pique Interest and Prior Knowledge (5 min.)<br>**Explore**: 3 Little Pigs (10 min.)<br>**Explain**: Find Key Events (15 min.)<br>**Elaborate**: Code and Retell (25 min.)<br>**Evaluate**: Learning Review (5 min.) |
| Unplugged Coding and Robotics | ❑ I can sequence and give directions.<br>❑ I can engage in teamwork to problem solve. | - Scissors<br><br>- Glue<br><br>- Coding Cards<br><br>- Crayons/Colored Pencils<br><br>- Robot Coding Grid<br><br>- Robot Pieces (cut out in advance depending on student age/ability) | **Engage**: Pique Interest and Prior Knowledge (5 min.)<br>**Explore**: Programmers (10 min.)<br>**Explain**: Coding and Sequencing (15 min.)<br>**Elaborate**: Code to Build a Robot (25 min.)<br>**Evaluate**: Learning Review (5 min.) |

  

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| Going on a Treasure Hunt | ❑ I can give directions and read a map.<br>❑ I can code Colby to get from one place on a map to another. | - Masking Tape 6 x 6 Grid (4 inch squares) Labeled<br><br>- Treasure Cards Pictures<br><br>- Coding Cards | **Engage**: Pique Interest and Prior Knowledge (5 min.)<br>**Explore**: Directions (10 min.)<br>**Explain**: Using the Grid (15 min.)<br>**Elaborate**: Find the Treasure (25 min.)<br>**Evaluate**: Learning Review (5 min.) |
| Colby is A-Mazing | ❑ I can make a creative maze for Colby.<br>❑ I can write a sequence for Colby to go through the maze. | - Cups or Cubes to create barriers for the maze<br><br>- Coding Cards<br><br>- Colby Code and Mouse | **Engage**: Pique Interest and Prior Knowledge (5 min.)<br>**Explore**: Challenge (10 min.)<br>**Explain**: Plan (15 min.)<br>**Elaborate**: Go (25 min.)<br>**Evaluate**: Learning Review (5 min.) |
| Write and Code with Colby | ❑ I can code a sequence.<br>❑ I can use sequence words to describe the order of events. | - Colby Code and Go Mouse<br><br>- Sequence Cards for each group<br><br>- Lesson 8 graphics for class grid<br><br>- Coding Cards | **Engage**: Pique Interest and Prior Knowledge (5 min.)<br>**Explore**: Routines (10 min.)<br>**Explain**: Look at the Pictures (15 min.)<br>**Elaborate**: Code and Retell (25 min.)<br>**Evaluate**: Learning Review (5 min.) |
| Math with Colby | ❑ I can explain how to add and subtract on a number line.<br>❑ I can write a code to move Colby to find sums and | - Addition/Subtraction Equation Cards<br><br>- Masking Tape Marked 0-10 (4 inches apart for total | **Engage**: Pique Interest and Prior Knowledge (5 min.)<br>**Explore**: Step by Step (10 min.)<br>**Explain**: |

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| | differences. | of 45 inches per group)<br><br>- Coding Cards<br><br>- Colby Code and Go Mouse | Adding/Subtracting (15 min.)<br>**Elaborate**: Code to Solve (25 min.)<br>**Evaluate**: Learning Review (5 min.) |
| Look I'm a Robot! | ❏ I can follow exact directions given verbally and written down.<br>❏ I can recognize a computer bug and create a solution. | - Lesson 10 Programmer Necklace Card-1 per group<br><br>- String or yarn for each necklace<br><br>- Robot Headbands for each student<br><br>- Scissors<br><br>- Crayons/Colored Pencils<br><br>- Tape/Stapler to assemble headbands | **Engage**: Pique Interest and Prior Knowledge (5 min.)<br>**Explore**: Becoming a Robot (10 min.)<br>**Explain**: Following Directions (15 min.)<br>**Elaborate**: Build a Tower (25 min.)<br>**Evaluate**: Learning Review (5 min.) |

## COURSE PREPARATION

Students will need several strips of masking tape of equal length to build their number lines and grids. If this is too time consuming, prepare the number lines and the grids in the classroom ahead of time.

Each Code and Go Mouse Robot requires 3 AAA batteries. Make sure that students turn off robots at the end of each lesson and plan to have extra batteries on hand throughout the course.