

Week 2 - Overview

This week we will learn to navigate around the parking lot. We will start out by navigating using time as the parameter to control the robot's motion. Students will vary the power, steering, and duration parameters. Students will learn to use pseudocode to plan their actual computer programs in Blockly. They will navigate their robot into several parking spots, drive in a square, and drive around the perimeter of the parking lot. They will use repeat loops so they do not have to repeat portions of the code. An "until" loop will use sensor feedback to control the robot's motion.

Computer Science Skills

- Optimizing code for time, efficiency, simplicity
- Troubleshooting
- Iteration
- Documentation
- Navigation with Dead Reckoning
- Pseudocode
- Variables
- Loops and indices
- Compare values

STEM Skills

- Symmetry
- Breaking complex missions into smaller tasks
- Angles: acute, obtuse, and 90 degrees
- Multiplication
- Using data tables to analyze results
- Analyzing error propagation

CoderZ Techniques

- Adjusting Motor Block parameters
- Using the Head's Up Display

Implementation Thoughts

Using pseudocode to plan the actual code is one of the most important lessons of this week. Pseudocode is a way of writing your programs goals in a natural language. The use of data tables allows students to move beyond just pure trial and error and gets them thinking about what they are coding. Students will start to use math to plan their navigation.

Lesson 1: Follow a Curve

- Driving into a parking spot
- Coding the robot to follow a curve
- Iterating and troubleshooting
- Changing parameters

Lesson 2: Driver's Ed

- Breaking a complex mission into a sequence of steps
- Driving and backing into several parking spots
- Using pseudocode
- Using the HUD to navigate
- Comparing speed vs accuracy

Lesson 3: Don't Be a Square

- Driving in a square
 - Using pseudocode
 - Analyzing errors
 - Geometry of a square
 - Using data tables
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Lesson 4: Square Loops

- Using a repeat times loop
- Using the HUD to diagnose errors
- Analyzing error propagation
- Nested loops
- Loop indices and variable blocks
- Math blocks

Lesson 5: Walk in the Park

- Driving around the perimeter
- Using an UNTIL Loop
- Analyzing sensor values in the HUD
- Get touch sensor and ultrasonic sensor blocks
- Compare value blocks