Section I: Robots & You

Code & Go Robot Mouse

Lesson Title: Algorithm & Debugging

Grade Level: Pre-K to 2nd

Lesson Overview

The lesson is an opportunity for students to program a physical robot mouse to complete pre-designed mazes. The robot mouse uses buttons on top of the robot that students will press in the appropriate sequence needed to move the robot mouse from the starting point to the cheese.

Student Outcomes

Analyzing:

Explorer

- Interpret the components, patterns, and characteristics of a concrete computing problem or idea.
- Interpret the clarity and completeness of instructions.
- Examine the commands and rules of a programming language.
- Interpret how the computer uses data from sensors or datasets.

Prototyping:

Explorer

- Ask how a problem or idea can be broken down into components and imagine how they can build on one or more of those components.
- Plan, create/use, & test a set of instructions that completes a concrete task.
- Create a tangible or digital program with the commands and rules of a programming language.

Communicating:

Explorer

- Explain how the components and characteristics of a tangible computing problem or idea are identified.
- Explain why and how a set of instructions completed a tangible task.

- Explain how programming language commands and rules were used in a program.

Vocabulary

robot: are machines that gather information about their environment (senses) and use that information (thinks) to follow instructions to do work (acts). Robots sense, think, and act.

command: an instruction for the computer. Many commands put together make up algorithms and computer programs.

program: An algorithm that has been coded into something that can be run by a machine.

sequence: a particular order in which related events, movements, or things follow each other.

Suggested Materials, Technology, and Resources (Other materials may be substituted as desired / needed. Use whatever materials are handy.)

- Code & Go Robot Mouse Activity Set
- Robot Mouse Algorithm & Debugging slideshow
- Robot Mouse Demo Video
- Paper and pencils
- Computer & projector

Lesson Procedures

Introducing Cody: Begin the lesson by introducing the students to Cody, slide 2, the robot mouse. Explain to students that Cody needs their help finding his cheese. Explain that Cody can be programmed using the buttons on the top of the robot. Cody can remember up to 40 different commands.

- Students can draw the robot mouse and label the different buttons.
    - forward - blue arrow

    - reverse - yellow arrow
    - rotate left - orange arrow
    - rotate right - purple arrow
    - go - green button
    - clear - yellow button
    - action - red button (noise/eyes light up)

Maze Sequence: Slides 4 to 13 are a series of mazes derived from the cards that came with the Activity Set. The goal of each maze is to lead Cody to the cheese in the fewest number of steps. Students should write out the sequence of commands prior to programming Cody.

- The maze slides can be projected on a screen and students can write down the algorithm in their coding journal or a printed copy of the slide.

Students will work in groups of two or three per kit. One student should build the maze, one student will provide the algorithm using the coding cards and one student programs the robot.

- Students should rotate through the different roles.

Build A Maze: Students can build their own mazes and invite another group of students to try and create a program to get Cody to the Cheese.

Maze Debugging: Slides 15 to 24 use the same set of mazes with the algorithm provided. However, each set of commands has a bug. Students will look at the algorithm and try to identify the bug and debug the program.

- Students should run the algorithm on the robot to help them determine where and what is/are the bug(s).

Build A Maze: Students can build their own mazes, providing an program with an error(s), and invite another group of students to try and create a program to get Cody to the Cheese.

Student Summative Assessment

Journal Questions:

- What challenges did you have programming the robot mouse?
- How did you work through those challenges?
- Did you learn anything new about robots?

Maze Printouts w/ Student Coding

Differentiation / Accommodations

Mazes: The mazes can start basic and build on complexity.

Resources

Code-a-pillar App
BeeBot App
BlueBot App
Robot Turtles Board Game