Unit 0: Coding Unplugged

Lesson: LEGO Maze Algorithms

Intro and Discussion Points:

As discussed in the PB&J challenge, computers can only follow instructions EXACTLY. In this lesson, students will work with a partner to find their way through a maze and check each other's work.

Preparation and Materials:
- Flowchart poster
- LEGO mazes
- LEGO mini-figs
- LEGOs (optional)

Timeframe:

1 class period

Student Learning Targets:
- I can write an algorithm in steps and/or as a flowchart.
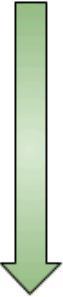- I can follow an algorithm written in steps and/or as a flowchart.

Project Goals:
- ➢ Understand and use the term algorithm.
- ➢ Understand that a computer is not "intelligent" and will only do EXACTLY what you tell it to do.
- ➢ Write repeatable instructions that another user can understand and execute.
- ➢ Use flowcharting to write an algorithm.

Lesson Sequence:
- ➔ Optional set-up, using pre-made or a blank maze, students will use LEGOs to make the wall of the maze. (Otherwise, dark gray boxes represent the maze "walls.")
- ➔ Place mini-fig on Start, facing North. It is important everyone starts facing the same direction.
- ➔ From the assigned starting point, use the commands move forward, turn left, and turn right to lead the mini-fig to the End space. (Note- turn means turn IN PLACE, not turn and take a step left or right.) Students may write in "pseudocode" or in flowchart depending on your preference.
- ➔ As they finish, partner up to check each other's work and debug.
- ➔ Extension - Can you find the most efficient path? The least efficient path without retracing steps?
- ➔ Review the terms algorithm, debug, and flowcharting symbols.

Symbol	Name	Function
(oval)	Start/End	An oval represents the starting or ending point.
(arrow)	Arrow	An arrow is a connector that represents relationships and the flow from one shape to the next.
(parallelogram)	Input/Output	A parallelogram represents an input or output.
(rectangle)	Process	A rectangle represents a process.
(diamond)	Decision	A diamond indicates a decision.