Maze: Sequencing Directions

COMPUTATIONAL THINKING: SEQUENCING, DEBUGGING

Every child is different. Do what works best for encouraging each child's exploration of this suggested activity.

OBJECTIVE OF THIS INVESTIGATION:

One child will sequence a set of arrows on a premade, blank strip to guide another child through a grid maze.

VOCABULARY:

- Code
- Sequence
- First
- Next
- Last
- Programmer
- Robot

MATERIALS:

- Painters tape to make grid and sequence strip on the ground
- Pieces of printer paper with one large arrow per paper printed or drawn on
- One piece of paper with a "treasure" on it. (This could be a sticker or drawing. Something that can't be seen through the paper.)

PROGRESSION STEPS (COMPUTATIONAL THINKING: SEQUENCING, DEBUGGING):

Visit **STEMIE Learning Trajectories** for details

- Complex Sequencer
- Sequence Planner
- Early Decomposer
- Guided Error Recognizer
- Error Identifier
- Early Debugger

THIS INVESTIGATION:

- Prior to the activity, set up a 2x3 grid with painter's tape on the floor as well as a sequence strip to place arrows beside the maze. Designate a starting point. (Note: Ensure that the strip is beside the maze so that the orientation of the arrows corresponds to the direction in which the children will move.)

  "Today we are going to be robots and programmers!"

  "One person is going to be a robot and one person is going to be a programmer. The programmer tells the robot which way to go . And the robot can only move the way the programmer says."
- Demonstrate using arrows to lay out a simple sequence in the designated sequence strip.

  For example, put two arrows pointing straight ahead: **"If I put two arrows like this, that means go forward, go forward, and stop. And then we can look under the paper we're standing on to see if we find the treasure."**

  Model what direction to place an arrow in order to turn**: "If I put three arrows like this, that means go forward, go forward, turn left."**

ADAPTATIONS:

See **A Guide to Adaptations** for general ideas and strategies

Materials:

- Ensure grid is large enough for children to fit their bodies in each square, including if children use adaptive mobility devices such as wheelchairs.
- If possible, add Velcro and complete activity on the carpet so arrows and paper don't move.

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THIS INVESTIGATION (CONTINUED):

- Designate a robot and programmer.
- Have the robot hide/hide their eyes.
- Have the programmer choose a square to place the treasure in. Then ask programmer to sequence the arrows into the separate sequence strip as a code to get the robot to the treasure.
  - Do children plan their path prior to laying down the set of arrows ? **(Sequencer Planner)**
  - Do they sequence correctly? (**Complex Sequencer)**
  - Do they notice and fix any errors that they make as they sequence? **(Early Debugger)**
- Hide the treasure by turning the piece of paper over so that you can no longer see the treasure and fill the empty grid box squares with blank sheets of paper so that every square has a piece of paper.
- Have the robot return and ask them to follow the directions in the programmer's sequence strip.
- If the sequence is incorrect and the robot does not make it to the treasure, have the robot hide again and scaffold debugging the sequence strip with the programmer. **(Guided Error Recognizer; Error Identifier)**
- Rotate so all children get a chance to be both the robot and the programmer.

ADAPTATIONS (CONTINUED)

Instruction:

- Narrate children's movement as they follow the arrows (e.g., forward, forward, left). Use cue cards or hand gestures as needed.
- Support understanding of the arrow symbol by a) bringing attention to the tip of the arrow, b) encouraging children to point in the direction of the arrow tip, or c) pointing forward, left, and right and asking if your point matches the arrow (yes/no).
- If children step outside of the maze because they move in an incorrect direction, bring attention to the fact that they're not in a grid square. **"Uh oh. We must have taken a wrong turn. Let's try again. Where is the arrow pointing?"**

HOW TO CONTINUE THIS INVESTIGATION:

- Encourage children to hide the treasure further in the maze so that the sequence to get to the treasure is more complicated.
- Ask programmers to determine another path through the maze to get to the same treasure **(Early Decomposer)**

Maze: Debugging Directions

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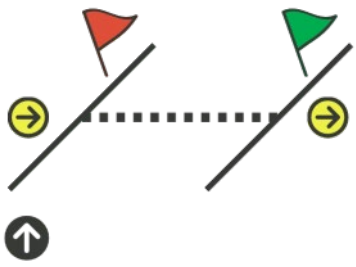
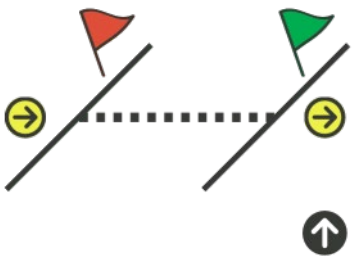
SUPPORT MATERIALS:

Use the blank ones to make your own!



Begin/Start



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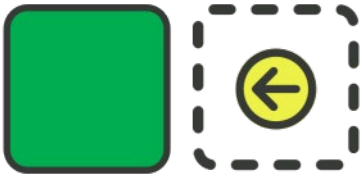

Back/Left

Forward/Right

Up

Down

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SUPPORT MATERIALS: