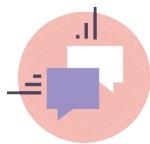




Maze Scavenger Hunt Unplugged



OVERVIEW

In this lesson, students learn the importance of giving clear and explicit directions. They practice sequencing code, writing code, and navigating their robot on a paper grid.



AGENDA

1. Warm Up: Students are introduced to the importance of writing clear instructions by writing a set of instructions for their teacher to make a peanut butter and jelly sandwich. (10 min)
2. Navigate the Maze: The class is introduced to sequencing code by navigating their teacher to a spot on a grid. (10 min.)
3. Maze Scavenger Hunt: Students practice sequencing code in groups by writing code to collect prizes on a grid. (20 min.)
4. Collect the Dots Extension: Students continue practicing in groups by writing code to collect dots on a grid. (15 min.)
5. Exit Ticket: Students write code to navigate a robot to a spot on a paper grid. (5 min)



VOCAB

- **Code:** A set of instructions designed to be carried out by a computer.
- **Validate:** To check if something is correct or does what it is intended to do.



MATERIALS

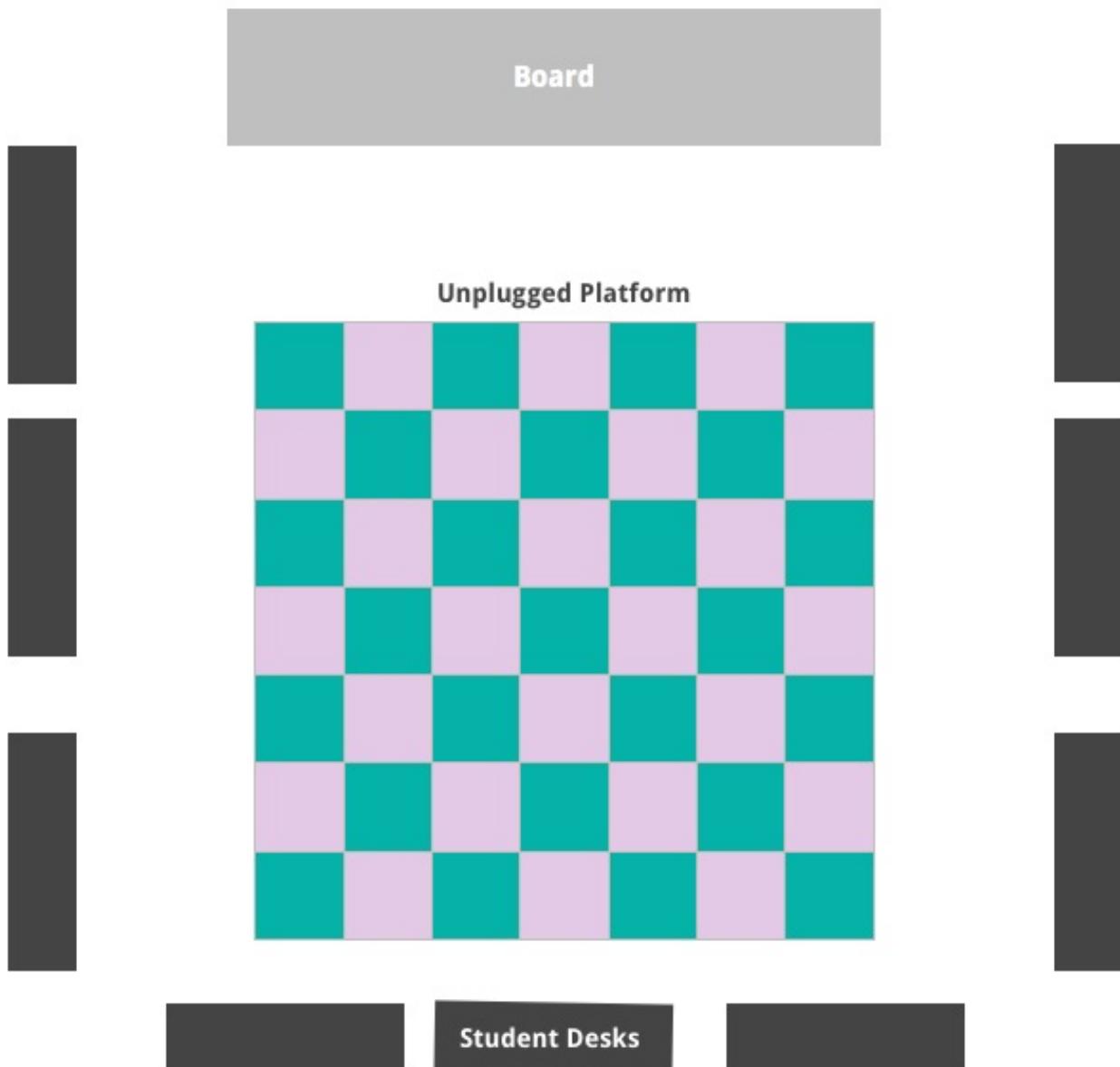
- Peanut butter

Maze Scavenger Hunt

- Plastic butter knife
- Jelly
- Bread
- Paper plate
- Warm up handout
- Paper maze worksheet
- Scavenger hunt maze worksheet
- Role cards
- Rover cutouts
- Brown paper bag
- Large maze cutouts
- Collect the Dots worksheet
- Exit ticket
- Unplugged platform
- Rover code blocks

Classroom Setup

Maze Scavenger Hunt





WARM-UP



Length: 10 minutes

Students learn about the importance of giving clear and precise instructions by writing step-by-step instructions to make a peanut butter and jelly sandwich.

Materials:

- Warm Up Handout
- Peanut Butter
- Jelly
- Bread
- Paper Plate
- Plastic Butter Knife

Participation: Individual

Teacher Actions	Student Actions
<p>1 Have students respond to the prompt below in 5 minutes.</p> <ul style="list-style-type: none">• Using the materials on the front table, write a set of step-by-step instructions for your teacher to make a peanut butter and jelly sandwich.	<p>1 Students write instructions for their teacher to make a peanut butter and jelly sandwich.</p>
<p>2 Ask for volunteers to share out their instructions in a step-by-step manner. Follow each step as the</p>	<p>2 Volunteers share their instructions with the class as the teacher attempts to follow</p>

student reads it. If a student says to put the peanut butter on the bread, put the jar of peanut butter on top of the bag of bread. The point is to show the importance of giving clear and precise instructions. Allow at least two different students to share.

along.

3

Key Points

- Giving clear and precise instructions is important.
- Humans can often interpret the meaning and intentions behind a set of instructions in ways computers can't.

Example: A person can say “you open door” to another person and that person would be able to determine that they are being instructed to open a door.

- In this class we will be writing clear and precise instructions that a computer can follow.



NAVIGATE THE MAZE



Length: 10 minutes

Students are introduced to sequencing by coding instructions to navigate their teacher through a maze.

Prep:

- Paper maze worksheet
- Rover cutout
- Unplugged platform
- Rover code blocks

Participation Whole Group and Individual

Teacher Actions	Student Actions
<p>1 Introduce the class to Rover the robot. Just like other computers, Rover can only follow clear and precise instructions in the form of code. Code is a set of instructions designed to be carried out by a computer. Rover the robot can only follow three instructions.</p> <ul style="list-style-type: none">• move 1 step• turn left• turn right	<p>1 Students listen to the introduction to Rover the robot.</p>
<p>2 Rover's Instructions</p>	<p>2</p>

Maze Scavenger Hunt

Explain Rover's three instructions.

- move 1 step: makes Rover move one square in the direction it is facing (direction its headlights are pointing).
- turn left: makes Rover turn to its left. Have students point to their left. Then have them point to the direction Rover would turn if it was instructed to turn left.
Explain that Rover's left is different than ours when it is facing in a different direction than we are.
- turn right: makes Rover turn to its right. Have students point to their right. Then have them point to the direction Rover would turn if it was instructed to turn right. Emphasize that our left and right is different than Rover's when it is facing in a different direction than we are.

Students follow along by responding to teacher's prompts.

3

Check for Understanding

Perform a check for understanding. Show the first Check for Understanding slide and ask the class to point to the direction Rover would turn if it was asked to turn left. Show the next slide and repeat the same prompt.

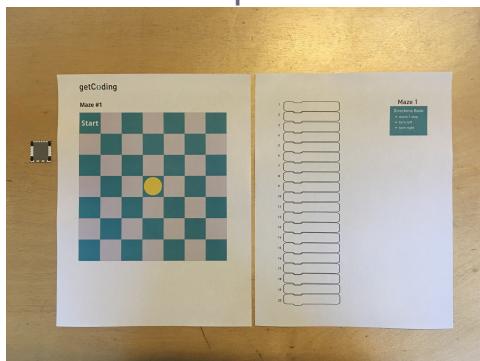
3

Students respond to the teacher prompts by pointing in the direction Rover would turn.

Maze Scavenger Hunt

4

Have two student volunteers pass out robot cutouts and paper maze worksheets. Students should have their materials laid out in front of them like in the picture below.



4

Volunteers pass out materials and students lay out their materials in front of them.

5

Introduce the Maze Challenge
Explain the goal and rules of the first challenge.

- We will try to navigate Rover to the yellow spot on the grid by working together as a class.
- We can navigate Rover by using the only three instructions it can follow.
- We will sequence the code by writing the directions in the blank code blocks.

Describe the roles that students will play during the activity.

1. Driver: Proposes idea for new lines of code; group discusses
2. Writer: Writes the code.

5

Students listen to the introduction of the maze challenge.

Maze Scavenger Hunt

3. Stepper: Keeps track of what the code has done
4. Computer: Executes the code from the beginning.

Explain who will play each of the roles during the activity.

- The driver will be played by volunteers in the class.
- The writer will be a volunteer that will stick code blocks on the board.
- The stepper will be a volunteer that moves Rover on the unplugged platform.
- The computer will be played by the whole class when we read the code out loud.

6

Ask the class for volunteers to play the role of the writer and stepper.

6

Students volunteer to play the role of the stepper and writer during the maze challenge.

7

Complete the Challenge:

Have students place their Rover cutout at the starting square of their paper maze. Explain that the first step in completing this challenge is planning the path the Rover will take to get to the yellow spot. Show that there are many paths that can be taken by displaying three different choices in the slides.

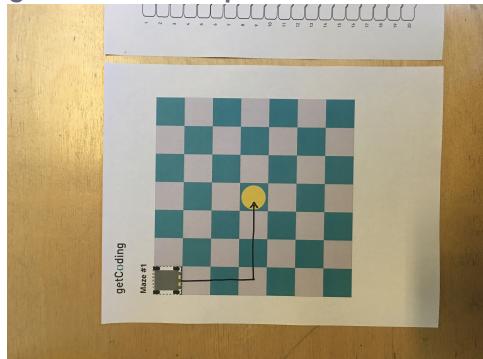
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Students place their Rover cutout on the starting spot on the grid.

Maze Scavenger Hunt

8

Have the class vote on the path they will take and have them trace the path on their paper grid like in the picture below:



8

Students vote on the path to take to get to the yellow spot on the grid and trace the path on their paper mazes.

9

Ask the class what the first instruction should be.

Highlight that this is an example of the class playing the role of the driver.

9

Students share out possible instructions.

10

Once the class has settled on an instruction, have the writer place a code block on the board and have the stepper move Rover in response to the instruction.

10

The writer places a code block on the board and the stepper moves Rover on the unplugged platform.

11

Instruct students to write the instruction into the first blank code block on their worksheet and to move their Rover cutout on their paper maze. Continue this process each time an instruction is chosen by the class.

11

Students write the code into their code block and move Rover on their paper maze to match the position of Rover on the unplugged platform.

Maze Scavenger Hunt

- Inform the class that you will be cold calling students for instructions after a volunteer shares the second instruction for Rover.

12 After the volunteer shares the second instruction for Rover, have the writer place the second code block on the board and have the stepper move Rover in response to the instruction.

12 A volunteer shares out the next line of code. The stepper updates the code on the board and the stepper moves Rover on the unplugged platform. All students update their code and move Rover on their paper mazes.

13 Cold call different students for the rest of the sequence.

13 Students called on share out the next line of code.

14 When the sequence is complete, have the stepper place Rover back at the starting square. Have the class read the code in unison and have the stepper move Rover as each block of code is read to check if the code is correct.

Highlight that this is an example of the class playing the role of the computer.

14 The stepper moves Rover back to the starting spot. The class reads the code in unison as the stepper moves Rover in response to the lines of code that are read.

15 Plan, Code, Validate Process

15

Describe the process the class just used to plan, write, and check the code.

1. Plan: Explain that the class first planned how to complete the challenge by choosing a path and tracing it out on the paper grid.
2. Code: Explain that the class coded the path one step at a time.
3. Validate: Explain that the word validate means to check if something is correct or does what it is intended to do. In this process the class validated the code by reading the code starting at the beginning to see if it did what it was intended to do (get Rover to the yellow spot).

Students listen to the process they just went through together.

16

Maze 2

Change the position of Rover and the yellow spot on the grid to match maze two. Explain that in this challenge students will work independently to get Rover to the yellow spot by writing their own code using the paper maze and Rover cutout.

- Display the plan, code, validate process on the board and remind students

16

Students listen to the instructions for the next maze challenge.

Maze Scavenger Hunt

<p>that they should use this process to complete the challenge.</p> <ul style="list-style-type: none">• Inform students that they will have 5 minutes to complete the challenge and that you will call on volunteers to share their code.	
<p>17 Allow students to begin planning and writing their code.</p>	
<p>18 After 5 minutes have passed, have volunteers share out their code and act it out as they read it.</p>	<p>18 Volunteers share out their code.</p>



MAZE SCAVENGER HUNT



Length: 20 minutes

Students practice sequencing instructions by navigating a classmate to collect a series of prizes in a maze.

Prep:

- 1 Scavenger hunt maze worksheet per group
- 1 Rover cutout per group
- Brown paper bag
- 1 set of Role cards per group
- Prizes
- Unplugged platform

Participation: Groups of 4

Teacher Actions	Student Actions
<p>1 Introduce the Scavenger Hunt</p> <p>Introduce the class to the scavenger hunt challenge.</p> <ol style="list-style-type: none">1. Divide the class into groups of 4.2. Pass out 1 scavenger hunt worksheet and Rover cutout per group.3. Each group will have 7 minutes to write code to get Rover to collect prizes on the unplugged platform.	<p>1 Students move into groups of</p>

Maze Scavenger Hunt

4. Each person in the group will play one of the roles described earlier in the lesson.

2 Have a student reach into the bag and pass out the role cards to the rest of his/her groupmates.

2 Students receive the role they will play in the group from a group mate.

3 Explain the roles each person will play in the group.

- Driver: proposes lines of code and asks if the group agrees
- Writer: writes the code on the worksheet
- Stepper: moves the Rover cutout on the paper maze and plays the role of Rover when the team presents its code
- Computer: checks another group's code for by walking through their code from the beginning and presents his/her team's code by reading it out loud as the stepper acts out Rover's movements.

- Emphasize that this is not a competition.
- Project the scavenger hunt maze on the board and explain that each group will

3 Students listen to the roles they will play.

Maze Scavenger Hunt

have 1 minute to trace the path they will try to code to collect prizes on the platform.

- 4 Start the 1 minute timer and allow teams to plan and trace their path on the scavenger hunt paper maze.
- After 1 minute has passed check in with each group to ensure that they have a path traced out.

- 4 Groups plan and trace the path they will take to complete the challenge.

- 5 After 3 minutes have passed, have all of the groups put down their materials and have the computers rotate to the next group to walk through the code.
- After 1 minute has passed, have the computers go back to their original group and allow each group to work for 3 more minutes.

- 5 The person playing the role of the computer rotates and checks the code of a neighboring group.

- 6 After 3 minutes have passed, have groups put down their materials and call on groups to present their code.

- 6 Groups present and act out their code on the unplugged platform.



EXTENSION ACTIVITY



Length: 15 minutes

The class practices sequencing by writing code to collect dots on a grid without barriers.

Prep:

- 1 Collect the Dots paper worksheet per group
- 1 Rover cutout per group
- Unplugged platform

Participation: Groups of 4

Teacher Actions	Student Actions
<p>1 Explain that in this activity students are collecting dots by navigating a classmate (Rover) around a grid that is free of obstacles. Inform the class that they will be working with the same teams, but they will be choosing new roles.</p>	<p>1 Students listen to directions.</p>
<p>2 Instruct students to place their role cards back in the paper bag. Have them re-select cards from the bag in order to choose their new role.</p>	<p>2 Student place their role cards back in the brown paper bag and re-select roles</p>

Maze Scavenger Hunt

<p>3 Present the new grid layout and explain that there are many ways to complete the task. Inform students that they will only have 5 minutes to plan and code their route.</p>	<p>3 Students listen to instructions.</p>
<p>4 Set the timer for 5 minutes and allow groups to begin.</p>	<p>4 Groups plan and code their routes.</p>
<p>5 After five minutes have passed, have groups present their code in the same manner that the scavenger hunt code was presented.</p>	<p>5 Groups present their code.</p>



EXIT TICKET



Length: 5 minutes

The class completes an exit ticket.

Prep: Exit ticket

Participation: Individual

Teacher Actions	Student Actions
<p>1 Say: Complete the exit ticket independently at your desk. This is your opportunity to show off what you know.</p> <p>Start 5 minute timer</p> <p>Collect exit tickets.</p>	<p>1 Students complete the exit ticket independently.</p>