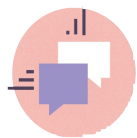


Lesson 5 In the Loop



Overview

In this lesson students explore and predict how they can use loops to more efficiently write code. They will begin to transfer their coding concepts from a paper world to the unplugged platform and in the end will have code they are ready to test online in the next lesson.



Objectives

- I can use the debugging process to debug my code.
- I can replace a repeating sequence with a loop to increase code efficiency and readability.



Agenda

1. Do Now (10 min)
2. Engage: Sequence Through a Maze (5 min)
3. Explore & Explain: Introducing Loops (7 min)
4. Elaborate: Loops in the Real World (5 min)
5. Extension: Coding the Enemy (10 min)

Independent Coding Practice:

<https://studio.code.org/s/course2/stage/3/puzzle/1>



Materials

Teacher Materials:

[Lesson 5 Slides](#)

Projector

Unplugged Foam
Maze

Whiteboard

Teacher Scratch
Blocks magnetic

Student Materials:

[Maze Handout](#)

(class set) - Editable
version here

Scratch block strips
(1 set per group)

Felt (1 per group)

Role Cards (1 set
per group)

Dry erase markers
(class set)

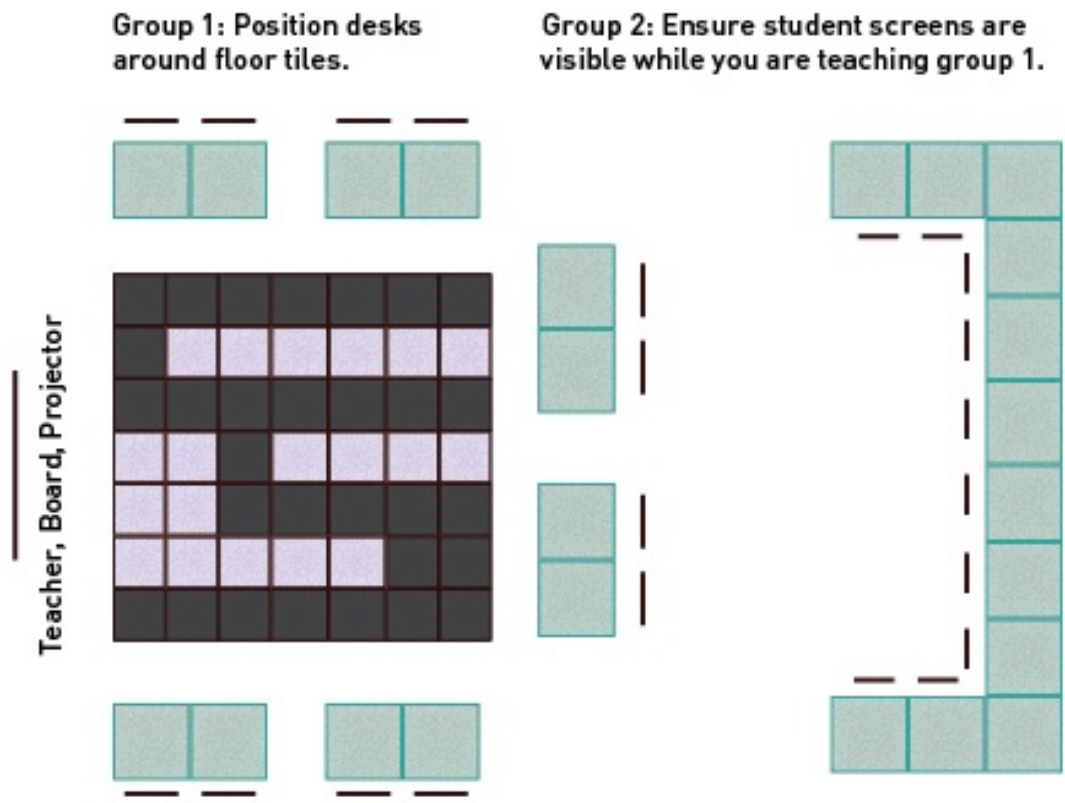
Rovers (class set)



Vocabulary

- **Loop:** A sequence of instructions that is continually repeated until a certain condition is reached.
- **For-Loop:** A type of loop that specifies the number of times to repeat the nested sequence of instructions.

Room Design



Symbols Key

- help
- question
- check_circle
- answer
- action item

Do Now (10 min)

Explain the new format of our lessons:

- The class will be in 2 groups assigned by the teacher.
- While one group completes a coding lesson with the teacher, the other group practices a coding concept independently.
- Halfway through class the groups will switch so that everyone completes both sets of activities.

lightbulb_outline

tip

For younger students and students not used to moving around the classroom, have them practice the transition between groups while practicing moving quickly and safely to their new seat. Use a timer to encourage speed.

Demonstrate the independent work

- Show students code.org using the tinyurl for the assigned lesson.
- Review expectations for using the computers independently. It is important students work silently and troubleshoot independently so that the group in the front of the room can hear the lesson.

Move students into groups

Engage: Sequence Through a Maze (5 min)

Practice Sequence Debugging: Instruct students to move their rover around their paper maze to identify where in the given sequence there is a bug. Students can use a dry erase marker to tick off each line of code as it is completed.

Do Now - Maze

1. move 6 steps
2. turn 90 degrees
3. move 2 steps
4. turn 90 degrees
5. move 2 steps
6. turn 90 degrees
7. move 2 steps
8. turn 90 degrees
9. move 3 steps
10. turn 90 degrees
11. move 6 steps

history

reminders

- Students may need to be reminded what a sequence is: the order in which the code is given.
- Students may also need a remind of what 90 degrees clockwise and counterclockwise means.

Students Propose Solutions:

help

If the code works as it is, stand up. If the code does not work, put your hands on your head.

check_circle

Students stand up/sit down to respond. No, the code does not work.

help

How would you change the sequence of the code to get your hero to the finish line?

check_circle

Answer: Students should identify that after line 10 there needs to be another move 2 steps and then turn right 90 degrees.

vpn_key

Key Points

- Validating your code is an essential step in writing code.
- When you test a sequence, point to

each block and act
it out on the stage
in order, one line at
a time.

Perform Solution: Assign students to group roles to act out the code.

help

What did the code do before that wasn't working?

check_circle

Answer: At line 11 the hero moved 6 steps instead of 2 so it walked off the board.

Explore & Explain: Introducing Loops (7 min)

Assign Group Roles: Students are working in groups of 4 for this lesson and should pull group roles. Review each role's responsibilities.

Discover Loops: Working in groups

- **Plan:** Students use dry erase marker to draw the path the rover will take around their maze.
- **Code:** Students put together a sequence of code on their felt to circumnavigate the grid. Do not give them enough move and turn blocks. Each group will only have 2 of each type of block.



- **Validate:** Run your code from the beginning to test it.

lightbulb_outline

Tip

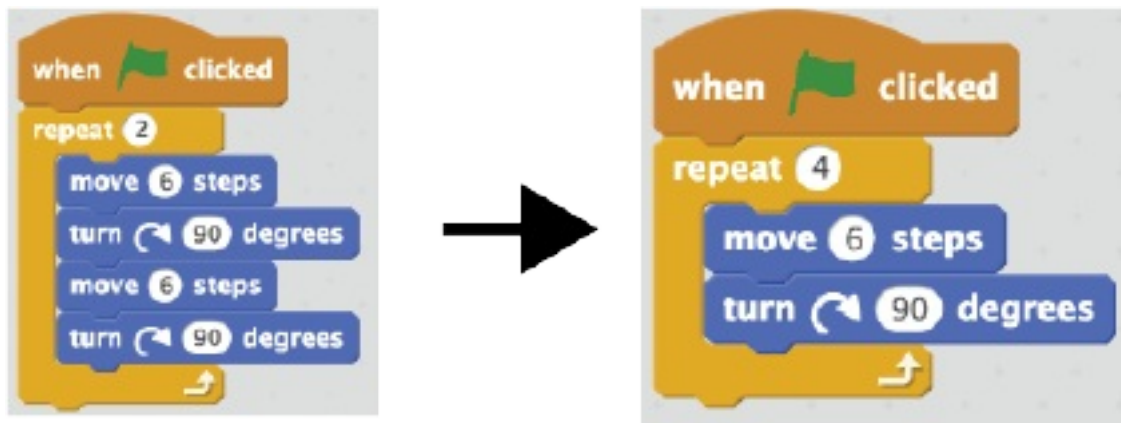
Younger students may need to be told to write in 90 degrees on turn blocks.

Add Loop Blocks: Wait until students identify that there are not enough blocks before introducing loops. Without introducing them verbally, place loop strips on each group's table:

Demo Code: Call on one group to demo their code by bringing their felt up to the board and acting it out on the unplugged maze.

help

Extension: Can you rewrite your code with fewer blocks



Predict Vocabulary Definitions: Each group's driver holds up each loop as you introduce it.

help

For each loop: What do you think this loop will do?



check_circle

Forever: Repeats the nested sequence forever

check_circle

Repeat Until _: Repeats the nested sequence until an action happens

check_circle

Repeat __: Repeats the nested sequence that number of times

vpn_key

Key Points

- These structures are called loops.
- Loops make it so we don't have to write a sequence of code over and over to make it repeat.
- In other programming languages we call

these for loops,
forever loops, and
while loops.

Elaborate: Loops in the Real World (5 min)

Teach the Loop Gesture: Have students move their hand in the loop gesture to remember to read each nested line of code and then return to the start of the loop.

Examples of loops in real life: Have students identify the type of loop you would use for each of the examples below.

help
The School Week

check_circle
Repeat Until Summer Break

help
The Seasons

check_circle
Forever

help
Washing Dishes

check_circle
Repeat Until No More Dirty Dishes

help
Riding The Tower of Terror 5 Times

check_circle
Repeat 5

help
Riding The Tower of Terror Until the Park Closes

check_circle
Repeat Until Park Closes

Think Pair Share: What other examples of loops can you come up with?

