Practicing arguments
Plugged

OVERVIEW

Students practice utilizing function calls with arguments offline in coders and bots, and then on pixelbots.io.

OBJECTIVES

1. Students will be able to use arguments to solve programming challenges.
2. Students will become proficient at assembling JavaScript commands in sequence.

AGENDA

Length: 45 minutes

1. Warm-up with large pixel bot exercise (5 minutes)
2. Coders and Bots with arguments (30 minutes)
3. Individual work (10 minutes)

MATERIALS

1. Lesson 8 | Warm-up Worksheet
2. Lesson 8 | Worksheet 1
3. Lesson 8 | Worksheet 2
4. Lesson 8 | Worksheet 3
5. Laptops/Computers
6. Scratch paper grids
7. Small turtle cutout for each student
8. Magnetic turtle
9. Scratch paper grids
10. Pencils

11. Whiteboard
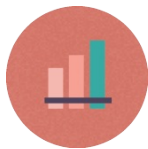
ACTIVITY TITLE

Length: 5 minutes

Students warm up by completing exercise on Lesson 8 | Warm-up Worksheet

Prep: Distribute Lesson 8 | Warm-up Worksheet

Teacher Actions	Student Actions
1. Individual Work: Ask students to write the code to produce the Pixel Bot image in the [Lesson 8 | Warm-up Worksheet][warm-up]. Consider reminding students of the proper JavaScript syntax (see Elements on the worksheet).	1. Students individually fill out the Warm-up Worksheet.
2. Draw the Pixel Bot image on the whiteboard and code the solution with the students, randomly calling on one student at a time to provide each next line of code. (Note the problem can be solved in different ways. Students should follow the class' ongoing code which may differ from their own solution).	2. If called on, students call out the next line of code.

CODERS AND BOTS

Length: 30 minutes

Students explore more complex coding problems in groups using the coder and bots protocol.

Prep: Distribute Lesson 8 | Worksheet 1

Teacher Actions	Student Actions
1 Teacher breaks students into groups of four and randomly assigns roles for the Programming Team and the Computer Team. (Consider handing each group a paper bag with the four roles inside – students reach into the bag and grab a role.) In this first round, groups either get [Lesson 8	Worksheet 1] [worksheet1]. Bots should always help the Coders during the code writing phase of the activity.	**1** Students enact their Coders and Bots roles. They write code to create the pixel bot image.
2 Explain that this problem can be solved more than one way. The goal is for students to develop code that solves the problem using the FEWEST lines of code.	

3 Follow the Coders and Bots Protocol by having the Bot Team switch to a new group when it comes time to check the code. Make sure that the Coders fold back their paper to hide the provided pixel bot image before the Bots arrive (ensuring that the Bots are not biased in their reading). The Bots should test the code on an empty scratch paper grid. If the Bots notice an error, they should report the error to the programming team and tell them what line the error happened on.

3 The Bots switch to a new group to assess code. If the Bots find an error, report it to the Coders and tell them what happened and the line number the error happened on.

4 Discuss as a whole class how many lines it took to complete the image. Then, the group with the fewest lines shares writes their code on the whiteboard. In their groups, students have 2 minutes to discuss the optimal solution. How was this program able to use less lines of code?

4 Students discuss the code and develop new strategies for the next round.

5 After one round, pass out [Lesson 8 | Worksheet 2] [worksheet2] to the groups and repeat the Coders and Bots Protocol.

5 Students repeat the above process with new coding challenges.

6

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In whole class mode, ask students to share out any disagreements they had in the write and read process. Use this as an occasion to firm up any misconceptions.

Students summarize and describe the disagreements they could not resolve.

7 What strategies did the groups come up with to write the least lines of code?

Answer: The best strategy is to make sure that each move takes the pixel bot to a square that needs to be painted.

7 Students raise their hands to offer solutions.

ONLINE ARGUMENTS

Length: 10 minutes

Students practice using arguments to create images on pixelbots.io

Prep: Distribute Lesson 8 | Worksheet 3

Teacher Actions	Student Actions
1 Individual work: Students work on the problems on Lesson 8	Worksheet 3 on pixelbots.io. Remind students to use arguments to solve the problems more efficiently.	**1** Students get on their computer and navigate to pixelbots.io to complete the challenges on Lesson 8	Worksheet 3