





OVERVIEW

Students review writing code offline. Then, students demonstrate their learning by writing programs to complete online pixel bot challenges.



OBJECTIVES

- Students will write programs using JavaScript.
- Students will continue to develop proficiency in writing and reading code.



AGENDA

Length: 45 minutes

1. Pixel Bots: Warm-up
2. Introduce Pixel Bots Online
3. Pixel Bots Online Practice
4. Pixel Bots: Exit Ticket



VOCAB

- Program - A list of statements that a computer can perform.



MATERIALS

1. [Lesson 4 | Worksheet 1](#)

2. [Lesson 4 | Exit Ticket Worksheet](#)
3. Scratch paper grids
4. Small pixel bot cutout for each student
5. Magnetic pixel bot
6. Scratch paper grids
7. Pencils
8. Whiteboard



PIXEL BOTS: WARM UP



Length: 10 minutes

Create a medium difficulty pixel bot image for the students on the whiteboard. Students solve the problem individually and then check the work of a peer.

Prep: Create a medium difficulty pixel bot image on the whiteboard.

Teacher Actions	Student Actions
<p>1 Individual Work: Ask students to get a blank piece of paper, write line numbers, and write the code that creates the pixel bot image on the board.</p>	<p>1 Students work individually on coding a solution to the challenge.</p>
<p>2 Students discuss the coding solution with a peer.</p>	<p>2 When they finish, students check their work with a partner after both have finished.</p>



INTRODUCE PIXEL BOT ONLINE



Length: 10 minutes

Show students how to solve a problem on pixel bot online. Also revisit **program** as a vocabulary word.

Prep: Browse to www.pixelbots.io and project onto the wall.

Teacher Actions	Student Actions
1 Now that students have practice creating code sequences on paper, they are ready to start writing programs.	1 Add student actions here and match numbers to teacher actions
2 Revisit the idea that a program is a sequence that a computer is able to understand.	
3 On a projector, show students www.pixelbots.io	
4	

<p>Use the problem you created in the warm-up to demonstrate how to solve the problem in the online interface. Show students a variety of features in the pixel bot interface:</p> <ul style="list-style-type: none"> • How to add code • How to delete code • How to run program • How to reset after run • How to insert code 	
<p>5 Ask students, "What do you think we should do if we get stuck on a problem?"</p>	<p>5 Answer: Step through code starting at the beginning like you do as a Bot.</p>



PIXEL BOT ONLINE PRACTICE



Length: 20 minutes

Students are given a set of pixel bot images to reproduce on the computer. Partners star the ones that are completed. Remind students that the images with lots of shaded squares will be difficult, but they should remember to read code from the beginning when things go wrong.

Prep: Distribute the [Lesson 4 | Worksheet 1](#) worksheet and write www.pixelbots.io up on the board.

Teacher Actions	Student Actions
<p>1 Explain the exercise:</p> <ul style="list-style-type: none">• The goal is to recreate each of the images from the worksheet by creating a program on the website.• Tell students that they will act as testers for the person sitting next to them:<ul style="list-style-type: none">◦ When they finish writing a program, students have their	<p>1 Students are faced away from their computers toward the teacher.</p>

	<p>partner check to make sure the images match up. If they are a match, the tester puts a checkmark next to the image.</p> <ul style="list-style-type: none"> ◦ The programm er should then explain how their code works to the tester. If the tester is satisfied with the explanatio n, the tester checks the explain box. ◦ The programm er can now continue on to the next challenge.
<p>2 Students work on completing the challenges.</p>	<p>2 Students get on their computers and go to www.pixelbots.io. Students work</p>

	<p>individually on recreating each of the images with code.</p> <ul style="list-style-type: none"> • When they finish a puzzle, students have their partner (student sitting next to them) check to make sure the images match up. If they are a match, the checker puts a checkmark next to the image and the programmer can continue on to the next challenge.
<p>3 When students get stuck, ask them to imagine being on the Coder team from the group activities. They should try to play the roles of the writer and navigator. Then, ask students to imagine being a Bot to understand how the computer is reading the code.</p>	<p>3 Students raise their hands to provide answers.</p>

4

Discuss: Which was the hardest coding challenge? Why? Was there more than one way to solve the problem?



PIXEL BOTS: EXIT TICKET



Length: 5 minutes

Students complete Exit Ticket.

Prep: Distribute [Lesson 4 | Exit Ticket Worksheet](#).

Teacher Actions	Student Actions
<div>1</div> Individual Work: Tell students they are going to work individually on coding the answer on the worksheet.	<div>1</div> Students write their answers on the worksheet.