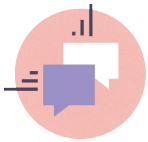
Write Some Code
Unplugged



OVERVIEW

Students learn the different components of reading and writing code by exploring the roles (writer, reader, navigator, and stepper) of Coders & Bots.

OBJECTIVES

- Students will be able to read basic code.
- Students will be able to write basic code.
- Together as a class, students will be able to enact the Coders & Bots roles of Writer, Navigator, Reader, and Stepper to write and read code.

AGENDA

Length: 45 mintues

1. Pixel Bots: Practice Reading Code
2. Pixel Bots: Write Code
3. Pixel Bots: Write Code Together

VOCAB

- Computer - A device that can be instructed to do something.
- Program - A list of statements that a computer can perform.

MATERIALS

1. Lesson 2 | Warm-up Worksheet
2. Lesson 2 | Worksheet 1
3. Small pixel bot cutout for each student
4. Magnetic pixel bot
5. Scratch paper grids
6. Pencils
7. Whiteboard

PIXEL BOTS: PRACTICE READING CODE

Length: 15 minutes

Students practice reading basic block code sequences.

Prep: Draw on the whiteboard the grid and the lines of code from the example problem on the front page of Lesson 2 | Warm-up Worksheet

Teacher Actions	Student Actions
1 Remind students of the value of revisiting ideas explored in previous lessons. Revisiting past ideas helps to see them in a new light and makes sure they are not forgotten.	
2 Step through the example problem as a whole class, talking through the process of reading code.	
3	3

	Hand out [Lesson 2 | Warm-up Worksheet][warm-up].	Students place their pixel bot at the starting square. Students read the code and move their pixel bot. Students do this a few times to get into a rhythm.
4	Individual Work: Ask students to place the movable pixel bot at the start block of the example problem just demonstrated on the board. Students should work individually, reading the code and moving their pixel bot along. Ask the students to get into a rhythm of reading and stepping.	
5	Individual Work: Ask students to flip the page and perform the same exercise with the new problem. Ask students to shade in the appropriate squares and trace the pathway of the pixel bot.	5 Students turn the page and attempt to solve the problem.

6	On the board, draw the empty grid and the code from the problem students have been working on. Read the code and step the pixel bot (tracing its pathway and shading in squares), narrating your thought process.	

PIXEL BOTS: WRITE CODE

Length: 10 minutes

Students write code to produce a simple pixel bot image.

Prep: Hand out Lesson 2 | Worksheet 1.

Teacher Actions	Student Actions
1 Talk to students about how they have already learned to read code that other people have written. Now they are going to explore writing code.	
2 Individual Work: Have students place their pixel bot at the start square. Ask students to write code that produces the provided pixel bot image. The students should think through their plan for their code, write their code, and move their pixel bot along.	2 Students place their pixel bot at the starting square, write code that creates the picture, and enact the pixel bot actions each step of the way.

3 As a whole class, solicit ideas from multiple students about how they designed their code to solve the problem. Hold off on presenting the correct answer until the next activity.	3 Students share their code, especially if they have solved the problem a different way.

PIXEL BOTS: WRITE CODE TOGETHER

Length: 20 minutes

Teacher shows student how to write code, emphasizing roles of the Writer, Navigator, Reader, and Stepper (see Coders and Bots Protocol). The students then enact these roles together as a whole class solving a new problem.

Prep: Draw the problem from Lesson 2 | Worksheet 1 on the whiteboard.

Teacher Actions	Student Actions
1 Code the solution to [Lesson 2 | Worksheet 1] [worksheet1] on the whiteboard. Voice your code writing process along the way: write and number a new line of code and only then move the pixel bot on the whiteboard. Use this as an opportunity to discuss how there are different ways to solve the same problem. After the code is written, introduce the idea	

that the computer reads code in sequence.	
2 After coding the solution, explain that you are switching gears into Bot mode. Read each line and step the pixel bot, checking to see if you coded the correct solution. Add a new problem on the board: a checkerboard pattern. Divide the class in half and follow the process spelled out in the whole class section of the Coders and Bots Protocol. Students start as Coders. Assign half of the students to be writers and half to be navigators; one person from each team walks up to collaboratively add and enact a line of code. The two students then tag in a member of their team to walk up and write the next line of code. Allow the class to code a wrong solution.	2 Students take turns walking up to the board to write and navigate code.

3 The whole class then switches roles to become Bots. Use this opportunity to emphasize the definition of a computer (see vocabulary section above). Following the same procedure as above, ask students to come up to the board to take turns reading and stepping through one line of code at a time before tagging in a new classmate.	3 Students take turns walking up to the board to read and step through the solution.
4 Have students switch back and forth between Coders and Bots until they code the solution on the checkerboard.	4 Students switch back and forth between Coders and Bots to complete the puzzle.
5 Summarize any conceptual difficulties. Introduce and define a Program (see vocabulary section above), and explain how it connects to the code the students just wrote.	

6 Ask students to write down on a piece of paper what each of the the four roles does, focusing on one role at a time. After each role definition, ask students to share their definition with the whole class. Pool the students' ideas into overall definitions of the roles.	6 Students provide descriptions of what each role entails.