

I am a Coder
Unplugged



OVERVIEW

In this lesson, students discover the importance of code in today's world. Additionally, students will repeatedly encounter failure in a positive way through an interactive problem-solving game. They should begin to view failure as a step towards succeeding.



AGENDA

- Do Now: Students write their names and their career (5 min)
- Attention Getting Signal: Teach or review your signal to move from small group to whole group (1-5 min)
- River Crossing Activity: Students repeatedly encounter failure and connect it to progress as they solve the river crossing challenge (25-30 min)
 - Introduce Challenge: Students learn what code is and understand the challenge they will be solving (5 min)
 - Small Groups: Students work in groups to solve the puzzle, returning whole class every few minutes to troubleshoot together and identify their progress through failed solutions.
- Norm Building: Students reflect on how it feels to fail and create a document that outlines how they will support themselves and each other when they encounter failure in the classroom (10 min)



VOCAB

Code: A set of instructions designed to be carried out by a computer

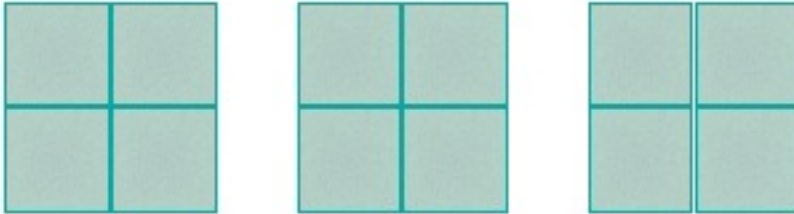


MATERIALS

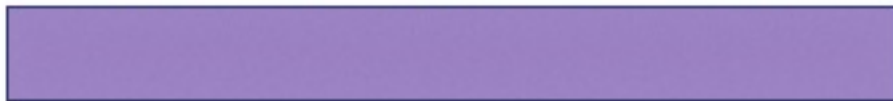
- Index Cards (class sets)
- Markers for index cards (class set)
- Code Cards (1 set for each group)
- Felt Strips (1 for each group)
- Paper River Crossing Worksheet (class set)
- Characters (1 set for each group)
- Classroom river (teal foam tiles)
- Teacher magnetic code cards & step arrow
- Teacher Magnetic Characters
- Chart paper (2 pieces)
- Sticky notes, 2 colors (class set of each color)
- Group Roles Sheet

Ideal Classroom Setup

DESKS IN GROUPS OF FOUR



RIVER MADE OF BLUE FOAM TILES

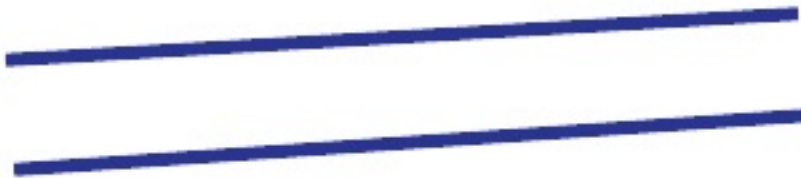


Ideal Board Setup

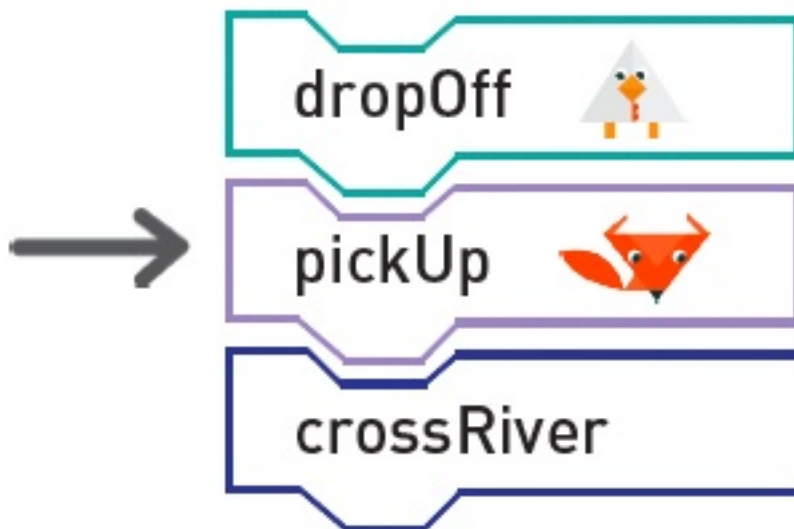
CHART FOR PROGRESS

Debugging Moments	Lines of Code

RIVER DRAWN ON BOARD



MAGNETIC CODE STRIPS, EXECUTION ARROW AND CLIPS FOR HANGING



Small Group Roles

When working in a group each student will have one of these roles assigned by the teacher. These roles will remain consistent throughout the school year, though students should be assigned different roles for different lessons.

Role	Description	Tools
Stepper	Keeps track of what the code has done	Execution Arrow
Computer	Executes the code from the beginning	Manipulatives
Writer	Writes the code.	Pencils or Blocks
Driver	Proposes ideas for new lines of code; group then discusses.	All

Resources

Attention getting signals:

- [One](#)
- [Two](#)
- [Three](#)
- [Four](#)
- [Five](#)

Working in groups:

- [Teaching Channel](#)

Choral Response:

- [Video](#)



DO NOW



Length: 5 minutes

Introductions, students make name cards you can use for cold calling.

Prep:

- Index Cards
- Pen or Pencils

Teacher Actions	Student Actions
<p>1 Circulate room as students answer the do now on their paper. (3 min)</p>	<p>1 Students write their name on one side of their tent and on the other side they draw or write the answer to this question: When I grow up I want to be a(n) ** ____ **.</p>
<p>2 Whole group: (2 min)</p> <ul style="list-style-type: none">• Introduce yourself• Have one student at each table collect the name cards and hand them to you.	<p>2 Students place index cards at the top of desk.</p>



ATTENTION GETTING SIGNAL



Length: 2 minutes

Teach class your attention getting signal.

Teacher Actions	Student Actions
<div>1</div> <p>There are many times during this lesson where you will need to use an attention getting signal. Use a signal that you already have or grab some ideas from our Resources.</p>	<div>1</div> <p>Students practice the attention getting signal.</p>



CROSSING THE RIVER



Length: 30 minutes

River Crossing Activity: Students repeatedly encounter failure and connect it to progress as they solve the river crossing challenge.

Prep:

- Code Cards
- Felt Strips
- Paper River Crossing Worksheet
- Characters
- Classroom River
- Teacher Magnetic Code Cards & Step Arrow
- Teacher Characters

Teacher Actions	Student Actions
<p>1 Introduce What is Code: (1 minute)</p> <ul style="list-style-type: none">• Over this school year we are going to meet as a class once a week to build our skills as computer coders.• Can anyone tell me what is code?• As a __ (profession a student wrote on their card) how could you use code?	<p>1 Students raise their hands to share their ideas about what is code and what is a coder.</p> <ul style="list-style-type: none">• Answer: A set of instructions designed to be carried out by a computer. It is the instructions someone wrote to make your website, app, game, etc. run.• Answer: Design your own website, build your own app, etc.

It is important that students d

	<p>on't say that using a website or computer is code. The distinction is that learning to code allows them to produce, not just consume.</p>
<p>2 Introduce Productive Failure: (1 minute)</p> <ul style="list-style-type: none"> • Today we're going to become coders as we tackle a difficult challenge. • Our code will not be carried out by a computer today, but it is going to mimic the process of writing code for a computer. • We are probably not going to get it right the first time. It may take us getting it wrong a lot before we find our solution! That is what happens when you write code. • When coders get it wrong it is called a bug. • Debugging is at the heart of the practice of coding. So today it is ok when your solution is wrong. Nothing bad is going to happen. 	<p>2 Students choral respond keywords on teacher's queue to increase engagement.</p>
<p>3 Reveal the Mission: (3 minutes) A farmer needs to cross a river with a chicken, a fox, and a bag of grain. However, his boat can only hold him and one other object. If left together, the fox will eat the chicken and the</p>	<p>3 Students follow along with mission on the board and answer CFUs.</p> <ul style="list-style-type: none"> • Answer: The fox will eat the chicken.

chicken will eat the grain. You need to get the farmer across the river without losing any of them.

If a student has done this puzzle before it is not likely they have the solution memorized. Ask the student to write out the solution and if they have it that student can become your helper for the day.

- What happens if the chicken and the fox are left alone while the farmer goes in the boat?
- If left alone, what will the chicken eat?
- If the farmer is with them, will the chicken still eat the grain?

- Answer: The chicken will eat the grain.
- Answer: No, the fox and chicken only act up if the farmer crosses the river.

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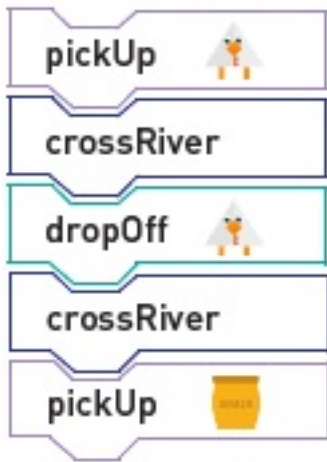
Demo a round of problem solving with roles as a whole class: (5 mins)

Driver: (teacher) Ask students to propose a solution. Writer: Move the code cards to match the proposed solution. Stepper: Move the execution arrow and read each line of code one at a time. Computer: Move the magnetic pictures on the board.

Suggested script when our solution is wrong:
Our solution is wrong. We've got to start over. It's part of being a programmer!

4

Student volunteers act as:
Writer: Move the code cards to match the proposed solution.
Stepper: Move the execution arrow and read each line of code one at a time. Computer: Move the magnetic pictures on the board.



- Instruct students to draw their roles and connect them to their peer models in step 4
- Instruct students to pull materials from envelopes and work in their groups
- Pause every 3-5 minutes to troubleshoot as a whole class and reveal the following hints:
 1. Chicken has to cross the river first.
 2. A character can cross the river more than once.
 3. The farmer has to take either the chicken or the other item back across the river on his fourth trip.

6 Come to a solution: (5 min)**5** Working in groups:

Students draw roles from the bags. Students follow their roles to assemble their code linearly on the felt. Groups that have the correct answer early: there are multiple solutions. Challenge them to find another solution.

6

<p>Call on a different group to share their solution. Follow the guidelines on whole group sharing.</p> <ul style="list-style-type: none">• Help students come to the solution.• Act out the solution as you step through each code card on the board.	<p>One group brings solution to the board and perform it using their roles.</p>
<p>7 Direct students to return materials to the envelopes.</p>	<p>7 Students return materials to envelopes.</p>



NORM SETTING



Length: 10 minutes

Students reflect on how it feels to be wrong as they set norms for how they will treat themselves and their peers when they encounter failure.

Prep:

- Sticky Notes (2 colors, class set of each color)

Teacher Actions	Student Actions
<p>1 Whole class have students identify how it felt to get a solution wrong.</p> <ul style="list-style-type: none">• How does it feel when you are wrong?• As coders, we are going to be wrong. It is part of the process of creating good code.• It is about how we act and what we do when we fail that defines the kind of coder we are.	<p>1 Students raise their hands to share their answers to the question.</p>
<p>2 Answer questions on stickies:</p> <ul style="list-style-type: none">• We are going to define how we can support each other when we have a bug.	<p>2 Individually students answer the two questions on their sticky notes.</p>

<ul style="list-style-type: none"> Students may need more prompting with “how does it look like/sound like when...” as follow up questions to oversimplified answers. 	<ol style="list-style-type: none"> How do you want to be treated when you’re wrong? How can you manage your fear when you’re wrong?
<p>3 By the end of this activity you should have a succinct set of norms for how the class wants to be treated when they fail.</p> <ul style="list-style-type: none"> Collect stickies on board Group together similar ideas and read aloud. Students give thumbs up when they agree 	<p>3 One student in each group collects the stickies and brings them up to the appropriate place on the board. Students respond with a silent thumbs up if they agree with a statement.</p>
<p>4 Close out the lesson by acknowledging their great ideas and work they have accomplished.</p> <div data-bbox="302 1299 777 1848"> <p>Suggested script:</p> <p>You have such great ideas! I am going to write these up so that everyone can see your work and bring it to our next class. This is going to help guide us this year as we become coders in how we are going to treat ourselves and each other when we encounter bugs in our code or an idea of ours fails. The lesson is that you have to fail before you succeed. Thank you so much for sharing your time and ideas with us today. I can’t wait to tackle our next coding problem next week.</p> </div>	

I am a coder

