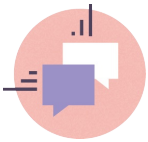
# Lesson 1: I am a Coder
## Unplugged



# 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.

# Print PDF

Print this lesson

## 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

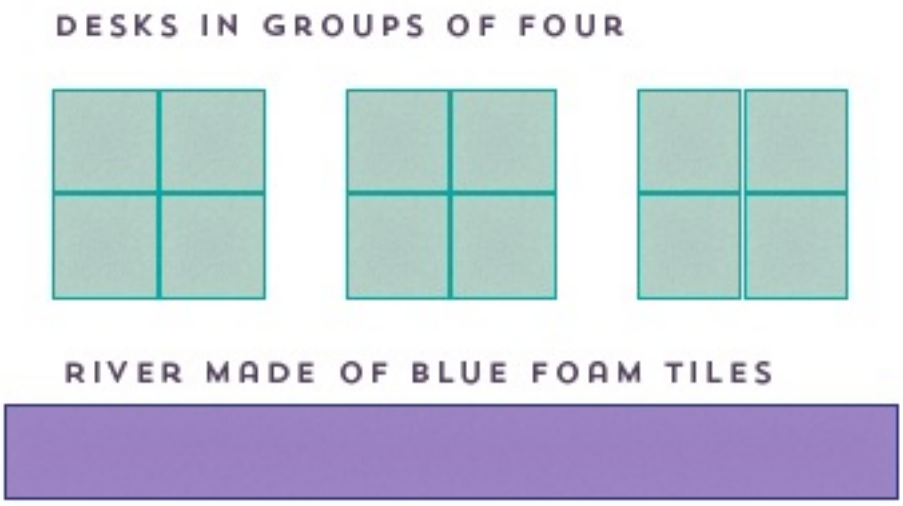
Code: A set of instructions designed to be carried out by a computer

## 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



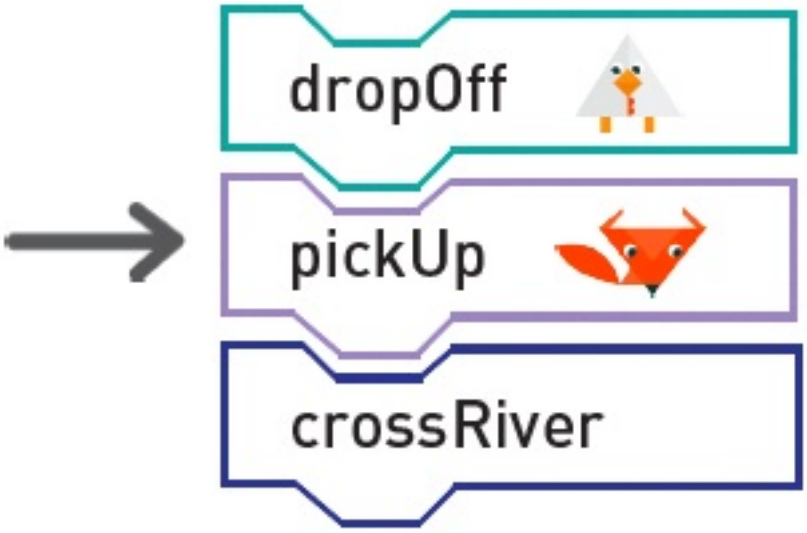
# Ideal Board Setup

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

Powerpoint:Lesson 1

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 |
| --- | --- |
| 1 Circulate room as students answer the do now on their paper. (3 min) | 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) ___. |
| 2 Whole group: (2 min)<br>• Introduce yourself<br>• Have one student at each table collect the name cards and hand them to you. | 2 Students place index cards at the top of desk. |

# ATTENTION GETTING SIGNAL

## Length: 2 minutes

Teach class your attention getting signal.

| Teacher Actions | Student Actions |
| --- | --- |
| 1 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. | 1 Students practice the attention getting signal. |

# 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 |
| --- | --- |
| 1 Introduce What is Code: (1 minute)<br>• Over this school year we are going to meet as a class once a week to build our skills as computer coders.<br>• Can anyone tell me what is code?<br>• As a __ (profession a student wrote | 1 Students raise their hands to share their ideas about what is code and what is a coder.<br>• 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. |

| | | | |
|---|---|---|---|
| | on their card) how could you use code? | | • Answer: Design your own website, build your own app, etc.<br><br>It is important t hat students don’ t say that using a website or comp uter is code. The distinction is t hat learning to c ode allows them t o produce, not ju st consume. |
| 2 | Introduce Productive Failure: (1 minute)<br>• Today we’re going to become coders as we tackle a difficult challenge.<br>• 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.<br>• 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 solu tion! | 2 | Students choral respond keywords on teacher’s queue to increase engagement. |

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.

| | |
|---|---|
| 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 chicken will eat the grain. You need to get the farmer across the river without losing any of them. | 3 Students follow along with mission on the board and answer CFUs.<br>• Answer: The fox will eat the chicken.<br>• Answer: The chicken will eat the grain.<br>• Answer: No, the fox and chicken only act up if the farmer crosses the river. |

```
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?

| | | |
|---|---|---|
| 4 | Demo a round of problem solving with roles as a whole class: (5 mins)<br><br>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 | 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. |

the magnetic pictures on the board.

```
Suggested script
when our solution
 is wrong:
Our solution is w
rong. We've got t
o start over. It'
s part of being a
 programmer!
```

5 Group Tackle: (15 minutes)

- 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

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.

| | | |
|---|---|---|
| | a whole class and reveal the following hints:<br>1. Chicken has to cross the river first.<br>2. A character can cross the river more than once.<br>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)<br><br>Call on a different group to share their solution. Follow the guidelines on whole group sharing.<br><br>• Help students come to the solution.<br>• Act out the solution as you step through each code card on the board. | 6 One group brings solution to the board and perform it using their roles. |
| | | |

| | |
|---|---|
| 7 Direct students to return materials to the envelopes. | 7 Students return materials to envelopes. |

# 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 |
|---|---|
| 1 Whole class have students identify how it felt to get a solution wrong.<br>• How does it feel when you are wrong?<br>• As coders, we are going to be wrong. It is part of the process of creating good code.<br>• It is about how we act and what we do when we fail that defines the kind of coder we are. | 1 Students raise their hands to share their answers to the question. |

| | | | |
|---|---|---|---|
| 2 | Answer questions on stickies:<br>• We are going to define how we can support each other when we have a bug.<br>• Students may need more prompting with "how does it look like/sound like when..." as follow up questions to oversimplified answers. | 2 | Individually students answer the two questions on their sticky notes.<br>1. How do you want to be treated when you're wrong?<br>2. How can you manage your fear when you're wrong? |
| 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.<br>• Collect stickies on board<br>• Group together similar ideas and read aloud.<br>• Students give thumbs up when they agree | 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. |
| 4 | | | |

Close out the lesson by acknowledging their great ideas and work they have accomplished.

```
Suggested script:
You have such gre
at ideas! I am go
ing to write thes
e up so that ever
yone can see your
 work and bring i
t to our next cla
ss. This is going
 to help guide us
 this year as we
become coders in
how we are going
to treat ourselve
s and eachother w
hen we encounter
bugs in our code
or an idea of our
s fails. The less
on is that you ha
ve to fail before
 you succeed. Tha
nk you so much fo
r sharing your ti
me and ideas with
 us today. I can'
t wait to tackle
our next coding p
roblem next week.
```