

# Tiny Tech 3 Lesson Plan

## Class 1

### FRAGMENT

Story: Puzzlehead by James Yang

Discussion: Everyone here has worked a puzzle before. A puzzle is a big picture broken into smaller pieces that you must fit together. A smaller piece is a FRAGMENT. When you use our coding apps, you need to see the big picture of the grid/maze, but you also need to see the smaller pieces of how to get there or picking out patterns. In a computer program, you need to see the big picture, what you want your program to do, and you need to see the pieces of code, FRAGMENTS, that will fit together to make your program work the way you want it to.

Game: Tangram – Work in teams of two. Take the tangram pieces from the bag use all the pieces together to form a square.

Discussion: You see the big picture of the puzzle (the square) and the smaller pieces that make it up (the FRAGMENTS). When you work through our coding apps, look for the big picture and for the patterns or smaller commands that will work together.

Action: Pass out iPads locked into Lightbot Jr. Walk through first level for students since it is a new app. Students continue through as many levels as possible. Record the level each student completed, so they can start in right place next week.

# Tiny Tech 3 Lesson Plan

## Class 2

### LOGIC

Story: Anno's Hat Tricks by Akihiro Nozaki and Mitsumasa Anno

Discussion: LOGIC – a way to figure out a problem. When you use logic to figure out a problem, you don't just guess, you use facts, things we know to be true. We use reasoning and elimination. (If we only have a white hat and a red hat, and you are wearing the red hat, then my hat must be white.) Sometimes in logic we use If...then statements, like our computers use conditions. Our computers cannot guess, so they look for facts and if....then situations to figure out solutions. So we will practice using LOGIC like a computer.

Game: Katie's Block Tricks – I don't have hats, but I do have some blocks. I have two red blocks and one yellow block. If I put one in a secret box, can you figure out what block is in the box when you see the other two? Easy. If I put one in MY secret box and one in YOUR secret box, can you figure out which of us has which block? Easy if we can see the yellow block and know the other two are both red in the boxes. Harder if we can see a red block; we don't know which of us has yellow and which of us has red. If I tell you that I know my secret block, and it is red, what color do you have in your secret box? You have yellow. If I know my secret block is yellow? You know you have red.

Discussion: When you have enough information, you can figure out the problem based on what you already know is true. That's LOGIC.

Action: Pass out iPads locked into Lightbot Jr. Start students on levels they stopped on last week. Students continue through as many levels as possible.

# Tiny Tech 3 Lesson Plan

## Class 3

### LOGIC

Story: (second part of) Anno's Hat Tricks by Akihiro Nozaki and Mitsumasa Anno

Discussion: Review: LOGIC – a way to figure out a problem. When you use logic to figure out a problem, you don't just guess, you use facts, things we know to be true. Remember our computers cannot guess, so they look for facts and if....then situations to figure out solutions. So we will practice using LOGIC like a computer. When you have enough information, you can figure out the problem based on what you already know is true. That's LOGIC.

Activity: Logic Puzzle – Use Animal Lovers logic puzzle. Give clues and mark the facts on the logic puzzle worksheet, so all can see. Class will work together to give answers. Show how process of stating facts you do know and process of elimination can give you all the answers. If time, also do Pet Adoption Mix-up logic puzzle (more difficult).

Discussion: Today we are going to use some facts we do know to continue in Lightbot Jr. What do we know?

- We are trying to help lightbot turn on lights.
- Whenever he is standing on a blue tile, he needs to light it up using the lightbulb command.
- One step forward means he moves one tile. You can count how many steps you need by counting tiles. The step command always moves forward.
- You have to make him face the right direction to take steps. He can turn right or left. To turn all the way around, you have to use two turn commands together.

Action: Pass out iPads locked into Lightbot Jr. Start students on levels they stopped on last week. Students continue through as many levels as possible.

# Tiny Tech 3 Lesson Plan

## Class 4

### OVERLOADING

Story: The Giving Tree by Shel Silverstein

Discussion: In our story, the boy had different needs at different times of his life. His friend, this one tree, could be used in lots of different ways. What are some of the ways the tree was used? When we are writing our programs for the computer, sometimes it gets confusing to have so many commands to remember. If we OVERLOAD a function, it just means we can use one command to do more than one thing. In the case of our Lightbot today, we are going to OVERLOAD the light bulb command. What do we usually use the light bulb for? When we are standing on a blue tile, the light bulb command will turn the light on. That still works. But now, if we are standing on a tile that lifts, we can use the light bulb command to turn that lift on; it will act as an elevator and raise you up one level. If you want to rise up two levels, you will use two light bulb commands together. Then the light bulb command will also be used to teleport you when standing on a teleport tile (with a green arc). So our light bulb command will be OVERLOADED and used 3 different ways.

Action: Pass out iPads locked into Lightbot Jr. Students start at Overloading section (3) and continue through as many levels as possible hopefully reaching Procedures.

Discussion: IF students reach Procedures section, point out that these Proc 1 folders are similar to using FUNCTIONS in Kodable. A piece of code is put in the folder and can be used whenever it's needed in the main program.

# Tiny Tech 3 Lesson Plan

## Class 5

### IMAGINE

Story: Olivia Saves the Circus by Ian Falconer

Discussion: IMAGINE – to think and dream whatever your mind can come up with

Programmers must use imagination to have the computer solve problems and to make fun games for us to play – a computer can open the door to different worlds and different languages and different ways of thinking about things

Story: Instructor creates a story on Scratch Jr. and plays it for students

Discussion: CREATE – to make something

Programmers create all kinds of games and useful applications for our devices using their coding skills and their imaginations. Today we are going to create our own stories.

Review: Words learned in previous weeks

Sequence – a particular order in which things follow each other

Condition – what needs to happen before something else is allowed to happen (If...then)

Repetition – doing or saying something over and over = Loops

Function – a set of directions/piece of code that can be used over and over but not necessarily in a row like a loop – placed in curly brackets

Binary – computer language using two input variables

Fragment – a small piece of a larger whole

Logic – using facts to figure out a problem

Action: Create a story in Scratch Jr. using at least one condition and one loop. Students will work individually with assistance as needed. Instructor will use keywords when assisting students to help review programming concepts.