

App Authors Public Library Curriculum

Notes:

- All Unplugged lessons can be found at <http://code.org/curriculum/unplugged>
- Code.org lessons have moved since the writing of this curriculum. The easiest way to get to lessons is now to type into address bar: <http://studio.code.org/s/course2> (or /course3/, etc.)

Session 1

Coding Concept: Algorithms & Sequence

Objectives:

- Students will be able to (SWBAT) explain to a partner what an algorithm is.
- SWBAT code practice algorithm activities in Code.org.
- SWBAT work independently during the lab hour to either start or remix their own app in play lab.

Supplies:

- Student login cards
- Worksheet for Paper Planes Activity (1 for each participant)
 - Scissors
 - Glue
 - Blank Paper to practice making planes
- Worksheets for Graph Paper Activity (3 sheets in packet, 1 packet for each participant (possibly work in pairs depending on number of participants))
 - Pens/Markers
- Laptop/slides ready
- Snack
- Whiteboard & Markers

(5 min.) Introduce Program and People, Ice breaker

(5 min) What is an algorithm?

- ***A list of steps to complete a task/solve a problem.***
- *"Tell me about an algorithm you used this morning"*
 - Getting ready for school
 - Making a sandwich

(45 min) Unplugged Lesson:

- Paper planes (Unplugged Course 2, Lesson 2)
 - Hand out worksheets, blank paper, scissors glue sticks

- Each participant cuts, orders, and glues their own set of instructions, then trade with a partner to see if the algorithm works (hand out more blank paper to make airplanes)
- Graph paper (Unplugged Course 2, Lesson 1)
 - Do one together as a group (explain commands (arrows, fill in square) use picture on slide and whiteboard to write code and test it), then:
 - If they seem to grasp the concept, fill out sheets individually and trade
 - If they are struggling, work in pairs

(60 min) Code.org

(10 min) Introduce Code.org, Hand out login cards, Get logged in

(50 min) Practice on Code.org:

- Course 2, Lesson 3 & 4
- Course 3, Lesson 2 & 3

(Okay if they don't finish everything. Start with C2, L3&4, move on if they finish that)

(5-10 min) Break/Snack Time

(60 min) Lab time:

(2:30) Video: Intro to Play Lab: <https://code.org/hourofcode/playlab>

(15 min) Group Learning: have students come up to the front one by one to complete the basics

- Add an actor
- Set background
- When actor clicked, say "hi" or something similar
- Arrow keys
- Show them how to run the app to make sure it works

(35 min) Independent work on Play Lab

- If they are confident, have them start creating (<http://studio.code.org/projects/playlab/>)
- If they want more guided practice, have them start working through the tutorial (<http://studio.code.org/s/playlab/>)

Before They Leave:

- Reminder to bring back Login Cards
- Send home parental consent forms.
- Extra practice Graph Paper Programming (Assessment) worksheets if they want

Session 2

Coding Concept: Loops and Conditionals

Objectives:

Students will be able to explain to a partner what loops are.

SWBAT explain to a partner what conditionals are.

SWBAT use loops and conditionals in Code.org lessons and in Play Lab.

Supplies:

- Deck of cards OR online dice (I used <https://www.online-stopwatch.com/random/dice/full-screen/>)
- Bluetooth speaker

Icebreaker/Introductions

Introduce self, the program, the research aspect, hand out forms to sign.

- *"App Authors is a program that provides technology, tools, and skills so that young people can learn to code apps that represent yourselves... Because the world needs more diverse coders, starting with younger people like you guys!"*
- *"The App Authors program is part of a research study that the University of Illinois is doing, basically we're researching whether this is a good program, and we'd like to observe you to figure that out" *Hand out forms to sign**

Game Time: Tell us your name and one weird fact about you!

40 min: Unplugged

- **Loops**
- ***The action of doing something over and over again***
 - Getting Loopy (Unplugged Course 1, Lesson 12)
 - Ask a volunteer to stand at the front of the room, then spin around in a circle. Spin around in a circle. Spin around in a circle. Spin around in a circle.
 - *"Can anyone think of an easier way for me to ask him/her to do the same action, but without having to say the same thing over and over?"*
 - "Spin around in a circle four times!"
 - As a class, do the dance from the Getting Loopy activity, making sure to focus on the parts that repeat.
 - Talk about loops on code.org with slide illustration (This is what a loop command will look like on code.org)
 - *"Can anyone come up with another command using loops?"*
- **Conditionals**
- ***Statements that only run under certain conditions***
 - Conditionals with cards: (Unplugged Course 2, Lesson 12)
 - IF the card I draw is a 7, clap.
 - We can also have IF ... ELSE statements. So IF the card I draw is a 7, clap. Or ELSE, stomp your feet.
 - Conditionals Game (Simon Says variation)
 - Get everyone standing in an open space. Use conditionals to get students moving.

- (IF you are wearing a green shirt, step forward. IF you are older than 8, spin around)
- Throw in some if...else statements (IF you are 10 years old, step forward. ELSE step back)
- Have participants take turns being the leader and giving commands

1 hr 15 min: Practice on Code.org

- Loops
 - Course 2, Lesson 6 (7&8 if they finish one Loops lesson and one Conditionals lesson)
- Conditionals
 - Course 2, Lesson 13

5 min: Break/Snack Time

1 hr: Lab

- Play Lab
 - Do a quick refresher tutorial
 - Show how to use loops and conditionals in Play Lab

Session 3

Coding Concept: Functions

Objectives:

Students will be able to explain functions in terms of coding and songwriting.

SWBAT use functions to complete Code.org lessons.

SWBAT use function in App Lab to create apps.

Supplies:

Suncatcher/Jingle Bell materials (small beads, larger beads, bells, twine) and worksheets

Songwriting worksheets

Bluetooth speaker

Snacks

Pencils

Icebreaker/Introductions

1 hr: Unplugged

- What is a **Function**?
 - *A piece of code that you can easily call over and over again*

- Songwriting (Unplugged Course 3, Lesson 9)
 - Teach the chorus of the song “I’m a Nut”
 - Show lyrics on the screen, make sure students understand that when we see the word “chorus,” we will sing the lines we have defined as the chorus (instead of the word ‘chorus’)
 - Sing through the song together
- Functional Suncatchers - Jingle Bells (Unplugged Course 3, Lesson 4)
 - (Instead of a suncatcher, I made Jingle Bells with the class. The craft is the same except I used a bell on the end instead of a suncatcher or charm)
 - Hand out supplies and have them make their own Jingle Bells
- (Optional) Songwriting with Jingle Bells
 - Jingle Bells
 - See if students can use what they’ve learned to pick out the “function,” or chorus, in the song Jingle Bells. You can also have them sing the song while jingling their jingle bell craft.

1 hr: Practice on Code.org

- Course 3, Lessons 5 & 6
- Course 4, Lesson 12 & 14

1 hr: Lab

- Play Lab
 - Show how to use functions in Play Lab, talk about functions with parameters (such as the “jump” function, which has a parameter for “actor” and a parameter for “height”)

Session 4

Coding Concept: Variables

Objectives:

Students will be able to explain to a partner what variables are in relation to coding.

SWBAT explain variables in terms of “MadLibs.”

SWBAT use variables to complete Variables lessons in code.org.

SWBAT use variables to create a game with a score in Play Lab.

Supplies

Whiteboard and Markers

Pencils

MadLibs worksheets

Icebreaker/Introductions

40 mins: Unplugged

- **Variables**
- **A placeholder for a piece of information that can change**
 - Poem: *"I'm going to write a poem about someone."* (Unplugged Course 4, Lesson 4, Warm Up)
 - Write on the whiteboard: Roses are red, Violets are blue, Coding is awesome, and ____ is too!
 - Rewrite the whole poem for the next student. Repeat once more, then say *"now if everyone wanted a poem written about themselves, this could take a while!"*
 - Students will notice that only one word is changing, explain that we can call that a variable and use a "placeholder" so we don't have to rewrite the whole poem every time. But we have to call it something descriptive so we know what that variable stands for.
 - Write out the poem again, this time use the placeholder [name] instead of writing a student's name
 - Write "set [name] to (next student's name)" and read the poem out again. So much easier!
- **MadLibs as Variables**
 - Give participants time to come up with their own values for variables [animal], [food], [drink], [adjective], [verb], and [number].
 - Have everyone fill out their worksheets (fill-in-the-blank worksheets for each student), then ask for volunteers to share their values for each variable
 - Have the story on a slide, make variables look more like they do in code.org (use a different color for each variable, make sure they notice that each [animal] variable is the same)
 - Write the values on the whiteboard and explain "everywhere we see the variable 'animal,' we replace it with the value that we've set for it"
 - Top of screen should look like "set 'animal' to ____"

How to take care of your pet [animal], by [name]:

Make sure that your pet [animal] has plenty of [food] and [drink]

[animal]s live in [adjective] environments, so make sure that your house is [adjective] and welcoming.

[animal]s need to [verb] every day, so be sure to [verb] with them.

[animal]s do not like to be alone, so if you want to have one as a pet, you must adopt [number]

1 hr 15 mins: Practice on code.org

- Course 4
 - Lessons 6&7

1 hr: Lab

Play Lab

- Use variables to create a game with a score

- Talk about how setting your actors and background uses variables - “Actor 1” is always the same value

Session 5

Coding Concept: Debugging

Objectives:

Students will be able to use graph paper designs to practice debugging in groups.

SWBAT complete Code.org debugging lessons.

SWBAT create, then test and debug each other’s apps on App Lab.

Supplies:

Pixo Debugging Worksheet (1 per student)

Code.org Debugging Packet

Blank paper

Pencils

Introductions/Icebreaker

30 min: Unplugged

- What is Debugging?
 - **Bug: Part of a program that does not work correctly.**
 - **Debugging: Finding and fixing problems in an algorithm or program**
- Sunburn Debugging (Real World Example! You can come up with your own or use mine)
 - *“So I just got back from the beach. And the last time I went to the beach, I got really sunburnt. This time I wanted to have a better beach experience, so I had to debug my situation. To debug it, I have to find the problem and come up with a solution. The problem is that last time I got really sunburnt, so how can I fix that this time?”*
 - Put on sunscreen before I go to the beach!
 - *“So this time when I went to the beach, I put on sunscreen. And you know what? I still got a little sunburnt! I didn’t get burnt as badly as last time, but the problem isn’t completely solved. So now I have to figure out the problem, and a solution. The problem is that the sunscreen helped, but I still got a little sunburn. What can I do to fix that?”*
 - Put on more sunscreen, reapply more often, stay out of the sun...
- Graph Paper Debugging in Groups (Unplugged Course 2, Lesson 9 Assessment)
 - Break into groups of 2-4 students
 - First person writes instructions to get to the next filled-in square, next person debugs program so far and also writes instructions to next filled square, etc.

1 hr: Practice on Code.org

- Course 2, Lessons 10 & 11
- Course 3, Lesson 14

1 hr 30 min: Lab (App Lab)

- Quick tutorial on App Lab
 - Show design vs. code mode
 - Show how to add your own images via Google Advanced Image Search (search by usage rights)
 - Show how to code your buttons to change screens, etc.
- (45 min) Creating with no help
- (45 min) Debugging
 - (15 min) Debugging worksheets from Pixa; one worksheet next to each computer. Students trade computers with a partner, make notes about possible bugs on worksheet.
 - (30 min) Come back to your own computer and work on fixing bugs.

Reminder about Showcase Next Week!

- Be here at 1:00 like normal (bring your friends and family!)
- Choose one of your apps you've been working on to show off and get it set up on a laptop
- Impress your friends and family!

Session 6: Showcase

Supplies

Tables set up in a U shape

Laptop for each participant

Pixa "Project Summary" Worksheet for each participant

Pencils

Recording device for participant interviews

Slideshow featuring screenshots of apps created during the program

Showcase Event (informal)

- Have slideshow playing so guests have something to entertain them while participants set up
- Participants arrive, log in to their Code.org accounts, and bring up an app they have made during the program that they want to show off
- Have participants fill out Project Summary Worksheets
- Invite guests to walk around to different computers, observe the apps, ask participants questions
- With student and parental consent, record participant interviews
 - What did you think about coding before the program?
 - What do you think about it now?
 - Tell me about what you made during the program.
 - What was the hardest part of the program?
 - What was your favorite part of the program?
 - Anything else you'd like to say about the program? Etc.