Getting Kids Involved in Programming

Beth Tucker Long

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Beth Tucker Long

- PHP Developer
- Stay-at-home Mom
- User Group Leader
- Mentor & Apprentice

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Why?

- Improve math skills
- Improve problem solving skills
- Improve computer skills for school
- Improve job skills
- Creative outlet
- Understand what goes into making every day things

Why not?

"Today's artificial intelligence software is powerful enough to create other A.I. software – which means it won't be long before we replace coders with code that codes."
--Andrew Nusca, *Teaching Kids to Code is Overrated*

Format

Infants and Toddlers

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Exploring New Toys

- Encourage independent exploration
- Teach new uses one at a time
- Introduce the idea that pushing buttons makes something happen

Pre-readers

Jokes and Riddles

- Finding multiple uses for things
- Finding discrepancies in logic
- Finding patterns in language

Trouble-shooting Stories

- Start a story
- Introduce a problem
- Turn the story over to them to solve it

Fisher Price Code-a-pillar

Teaches:

1. Using symbols to program actions
2. Order of actions

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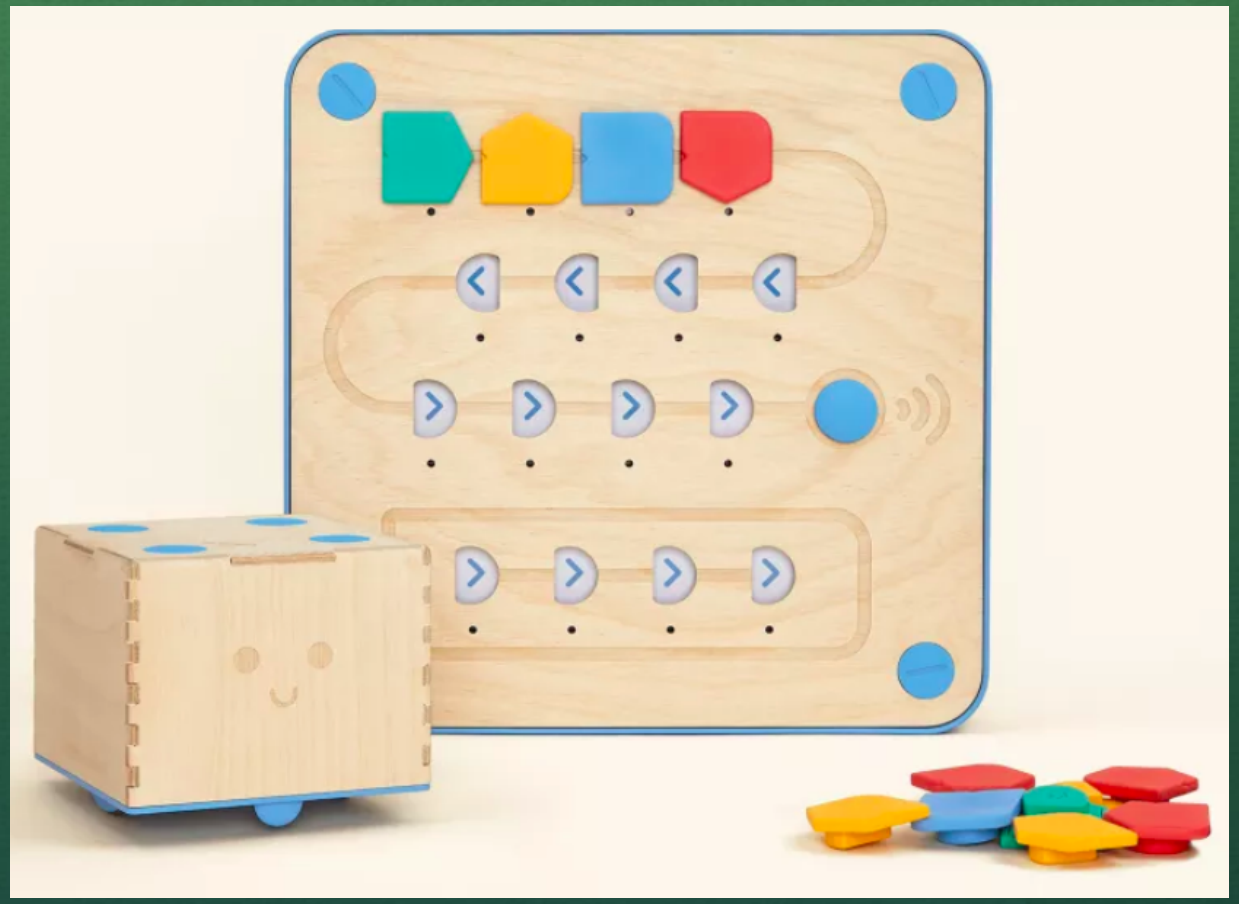
Cubetto

Teaches:
1. Sequencing
2. Patterns
3. Computational thinking



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Robot Turtles

Teaches:

1. Using symbols to program actions
2. Order of actions
3. Reusable Functions
4. "Running" your script

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Code & Go Robot Mouse

Teaches:

1. Using symbols to program actions
2. Order of actions
3. Running your script

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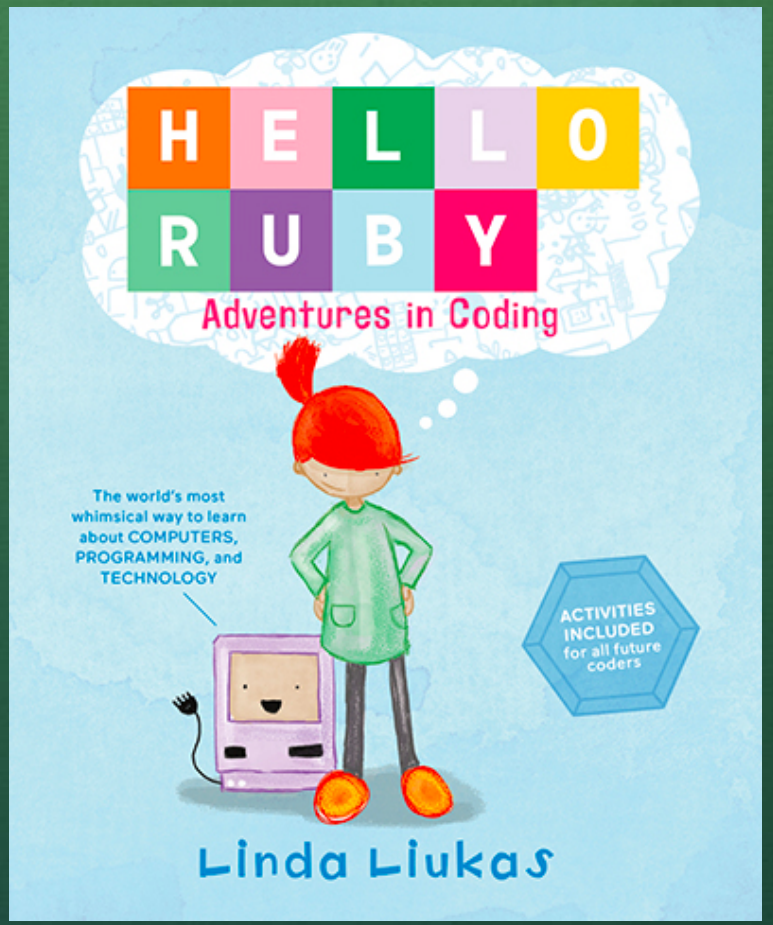
Hello Ruby

Teaches:

1. Computational thinking
2. Sequencing
3. Patterns recognition
4. Loops



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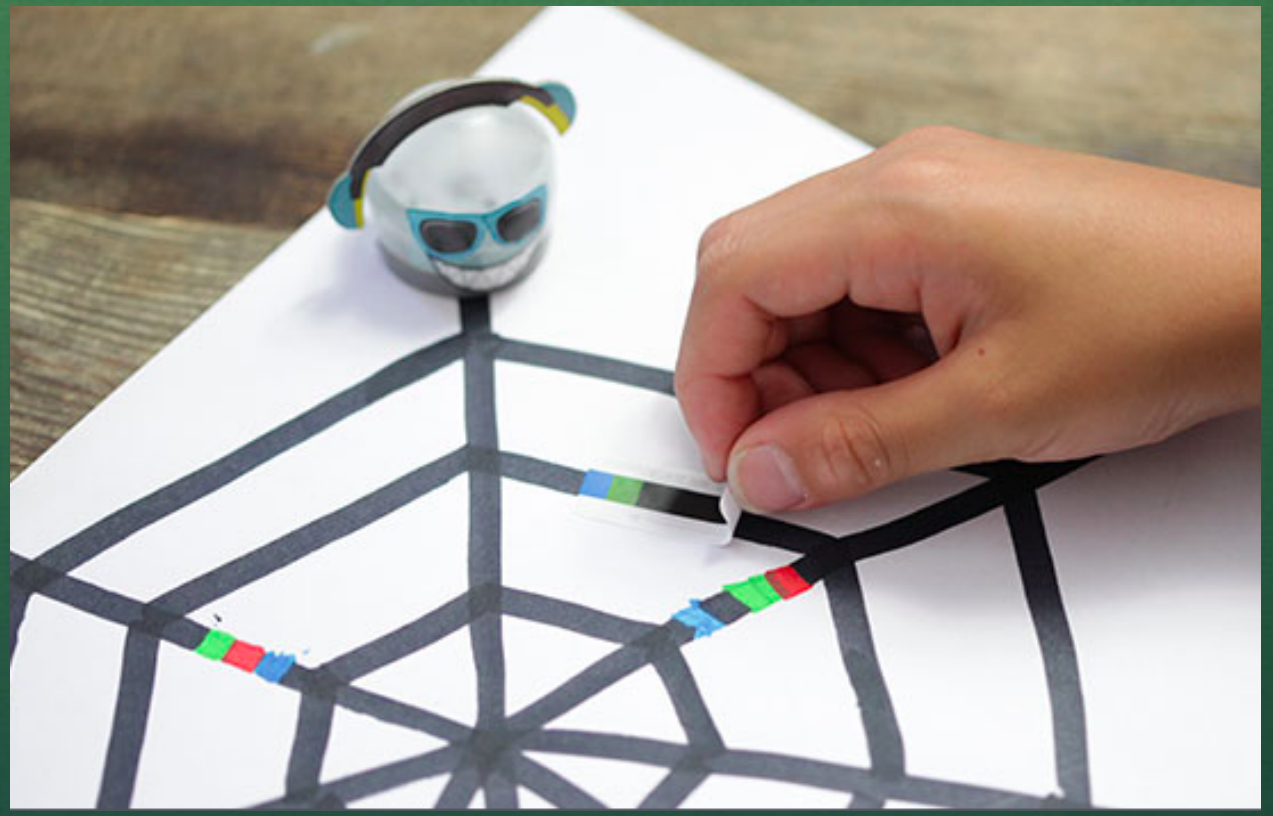
Ozobot Bit

Teaches:
1. Sequencing
2. Patterns
3. Computational thinking



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Cubelets

Teaches:

1. Sequencing
2. Patterns
3. Computational thinking

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Botley

Teaches:
1. Sequencing
2. Patterns
3. Looping
4. Computational thinking

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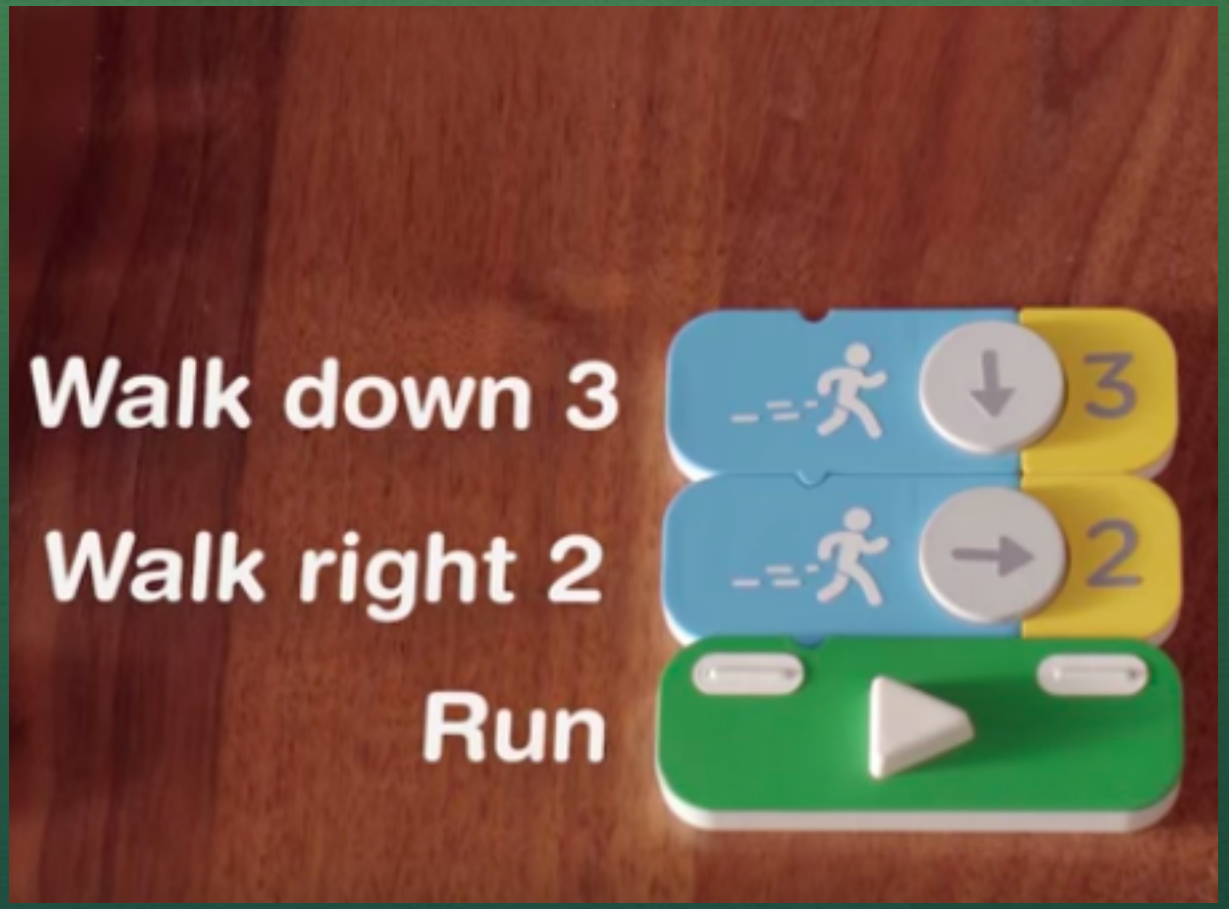
OSMO Coding Blocks

Teaches:

1. Using symbols to program actions
2. Order of actions
3. Number of repeating actions
4. "Running" your script



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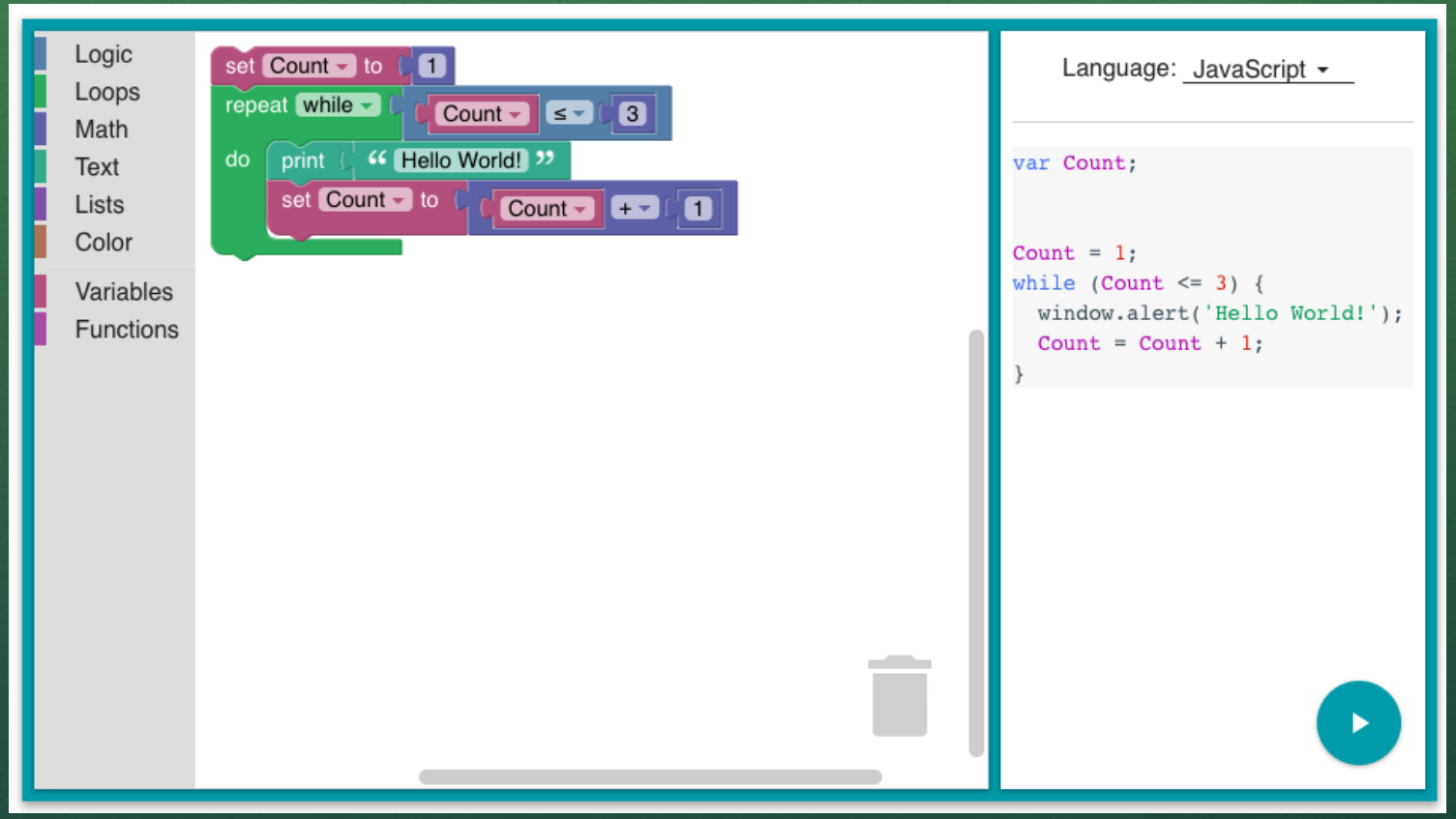
Reading

Blockly

- Block programming
- Outputs code in many languages
- Browser-based or built into many apps



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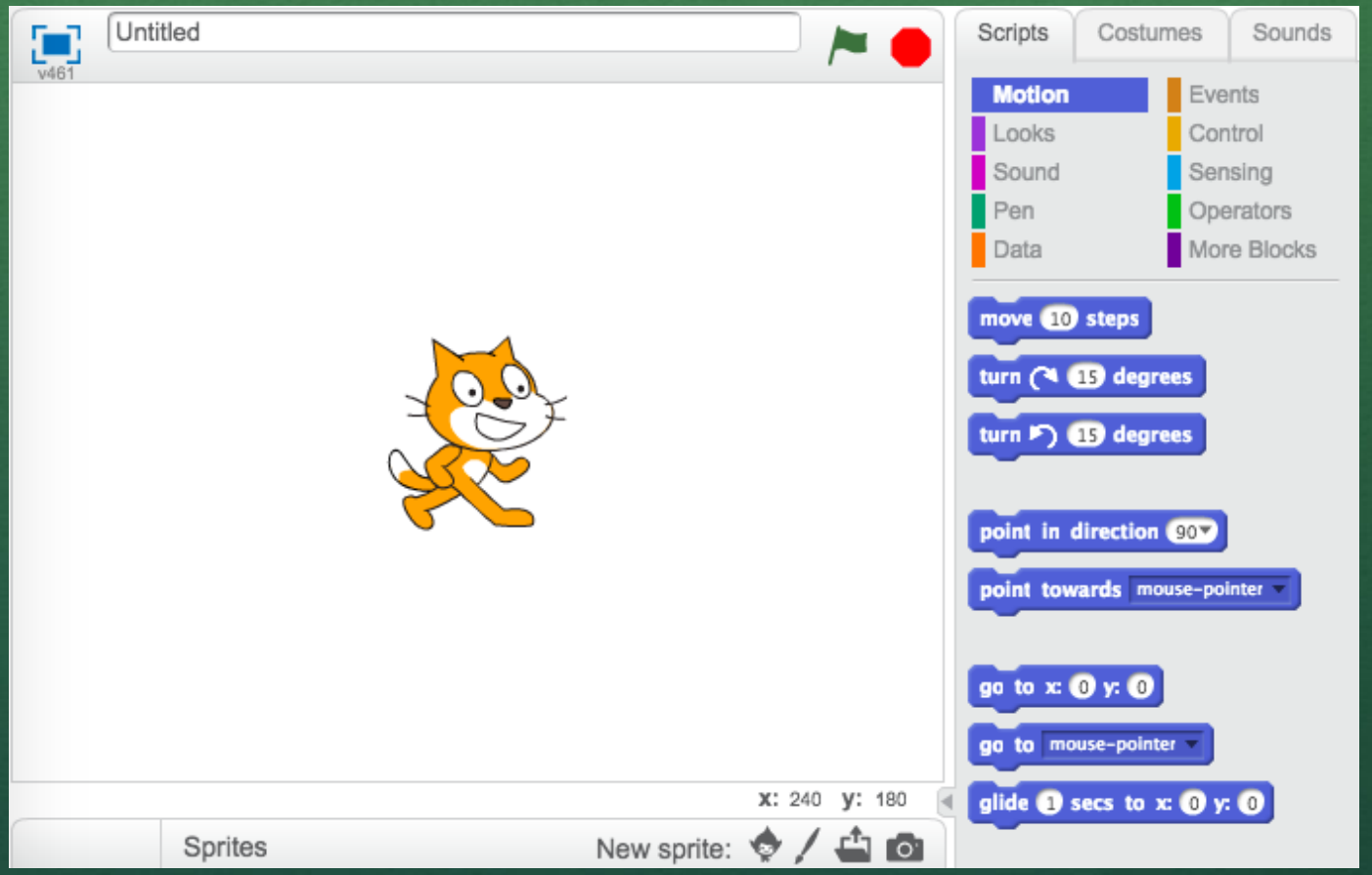
Scratch

- Block programming
- Designed for ages 8-16



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ScratchJr

- Block programming
- iPhone/Android app
- Designed for ages 5-7

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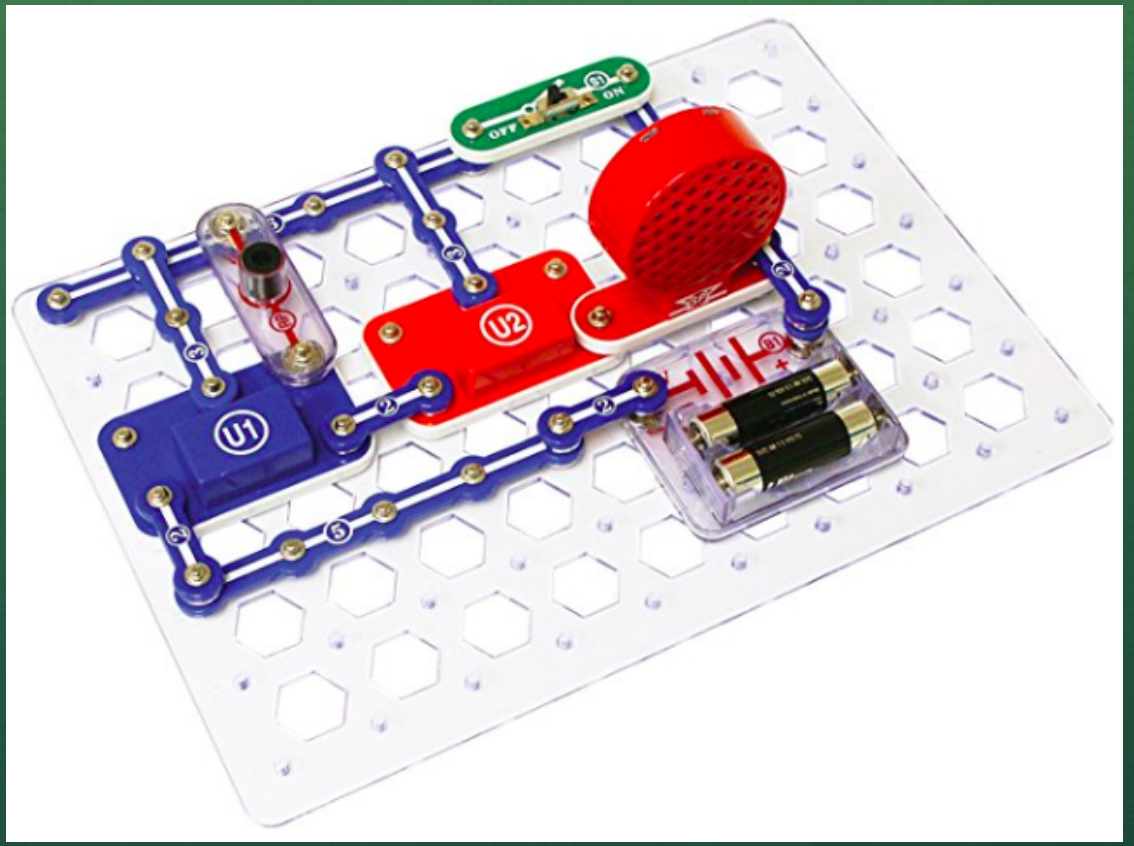
Snap Circuits Jr.

Teaches:

1. Following flow
2. Making sure redundancies are included
3. Following patterns
4. Debugging



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Ozobot Evo

Teaches:
1. Sequencing
2. Patterns
3. Computational thinking
4. Block programming

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Sphero

Teaches:

1. Intro block-based programming
2. Interacting with hardware components
3. Programming movement

Wonder Workshop Dot

Teaches:

1. Intro block-based programming
2. Interacting with hardware components

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Wonder Workshop Dash

Teaches:

1. Intro block-based programming
2. Interacting with hardware components
3. Programming movement

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Wonder Workshop Cue

Teaches:

1. Intro block-based programming
2. Interacting with hardware components
3. Programming movement

Photon

Teaches:

1. Intro block-based programming
2. Interacting with hardware components
3. Programming movement

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Tinker Crates

Teaches:
1. Mechanics
2. Electricity
3. Physics
4. Math

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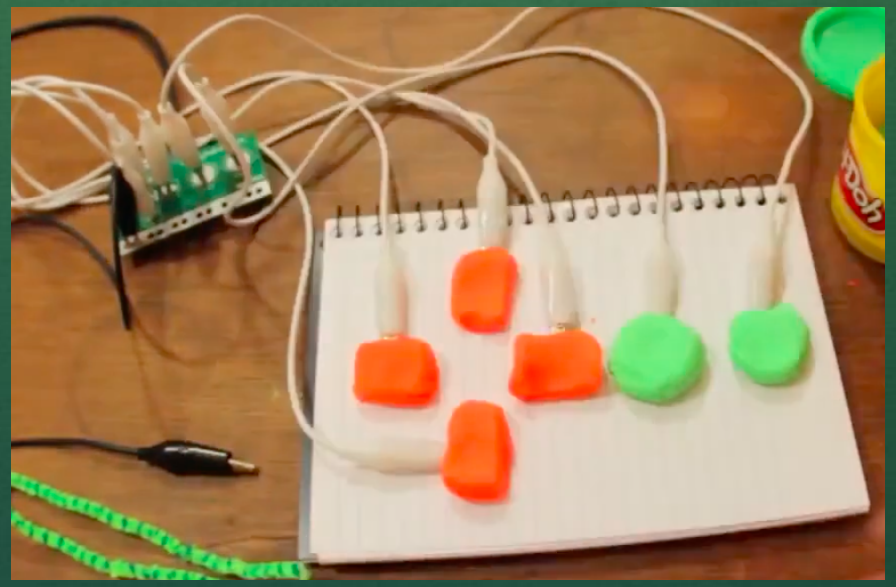
Makey Makey

Teaches:

1. Using programming with every day objects



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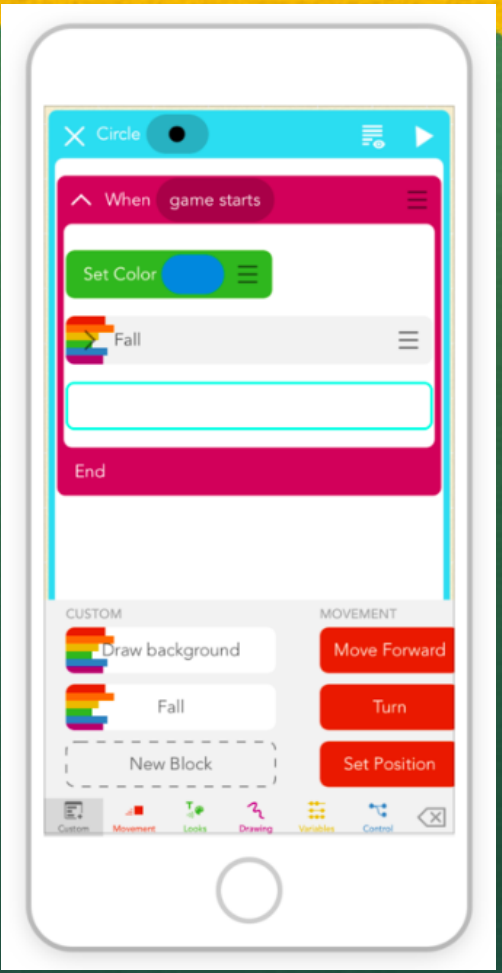
Hopscotch

Teaches:
1. Block-based programming
2. Object-oriented programming



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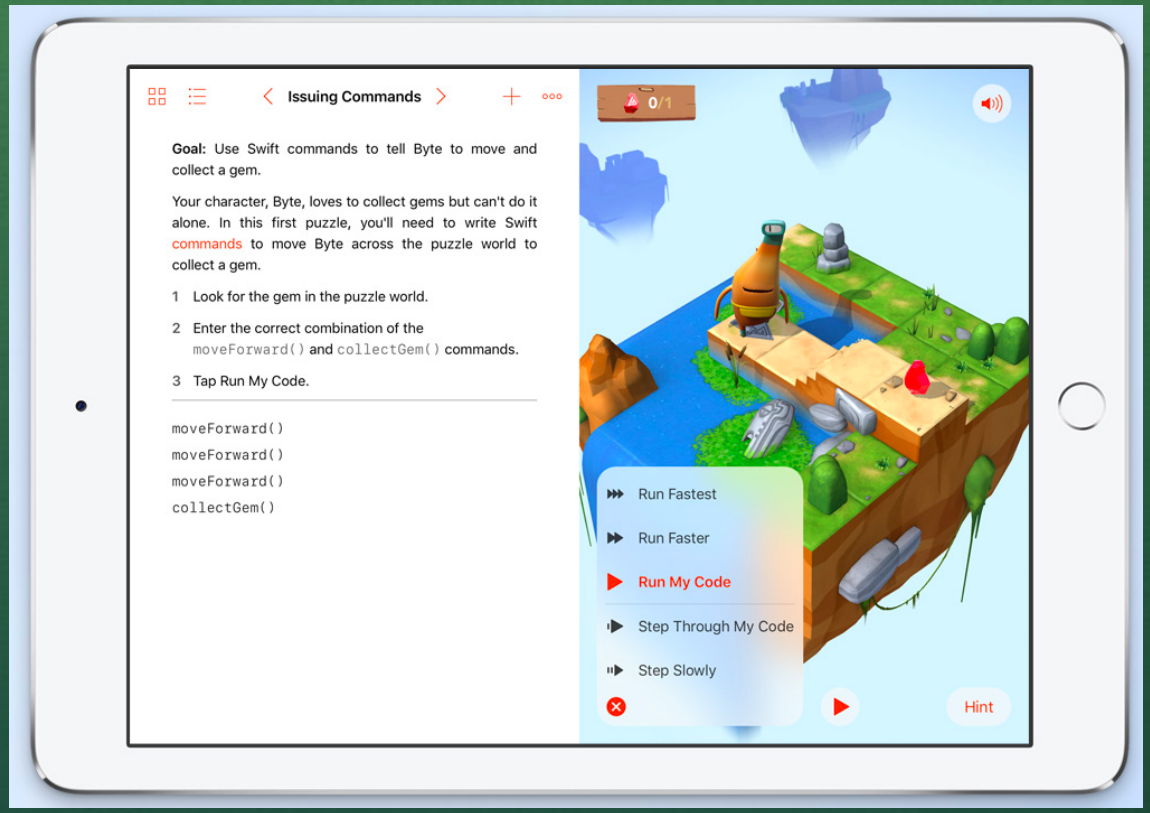
Swift Playgrounds

Teaches:
1. Mobile-based development



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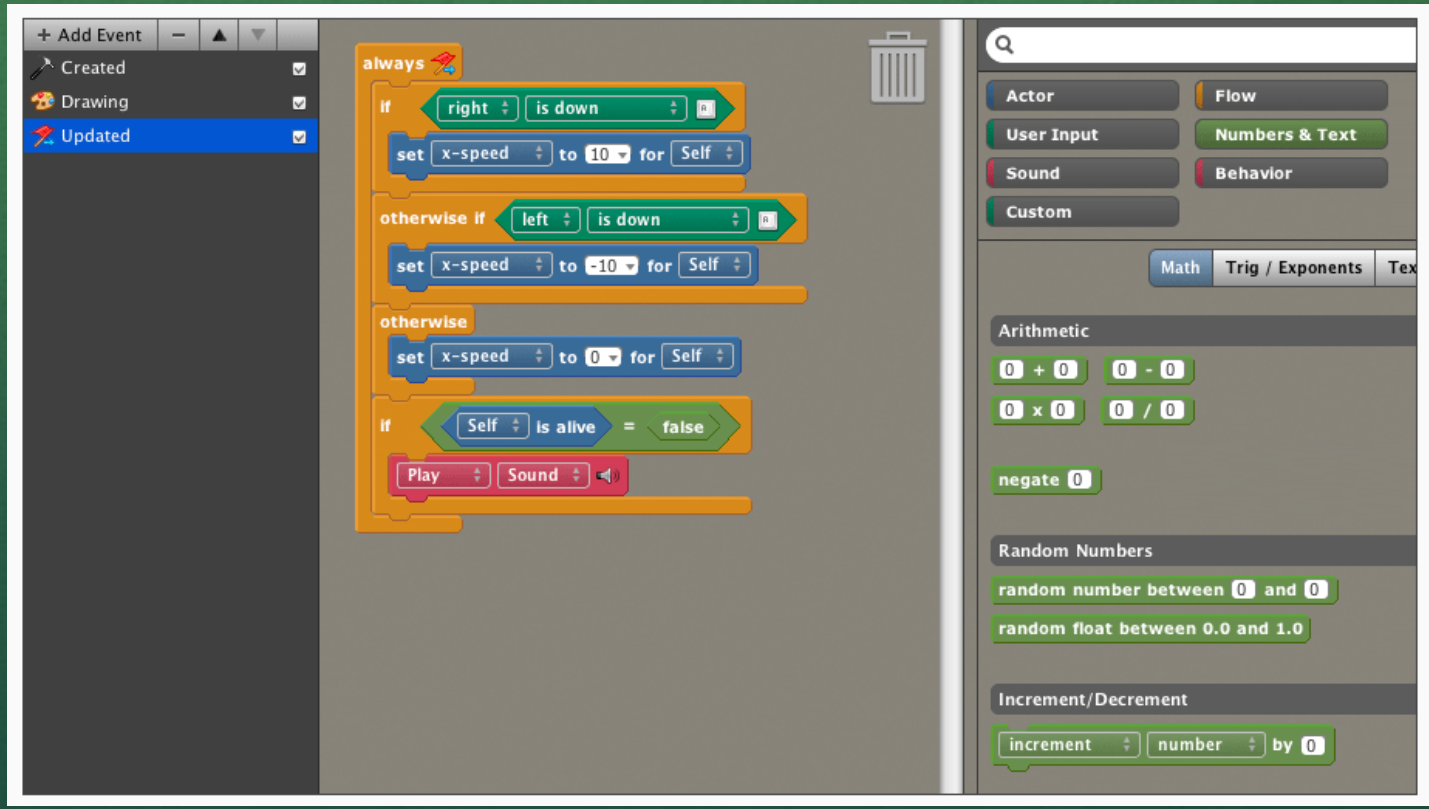
Stencyl

Teaches:

1. Block-based programming
2. Mobile phone development



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Alice

Teaches:

1. Block-based programming
2. 3D environment programming

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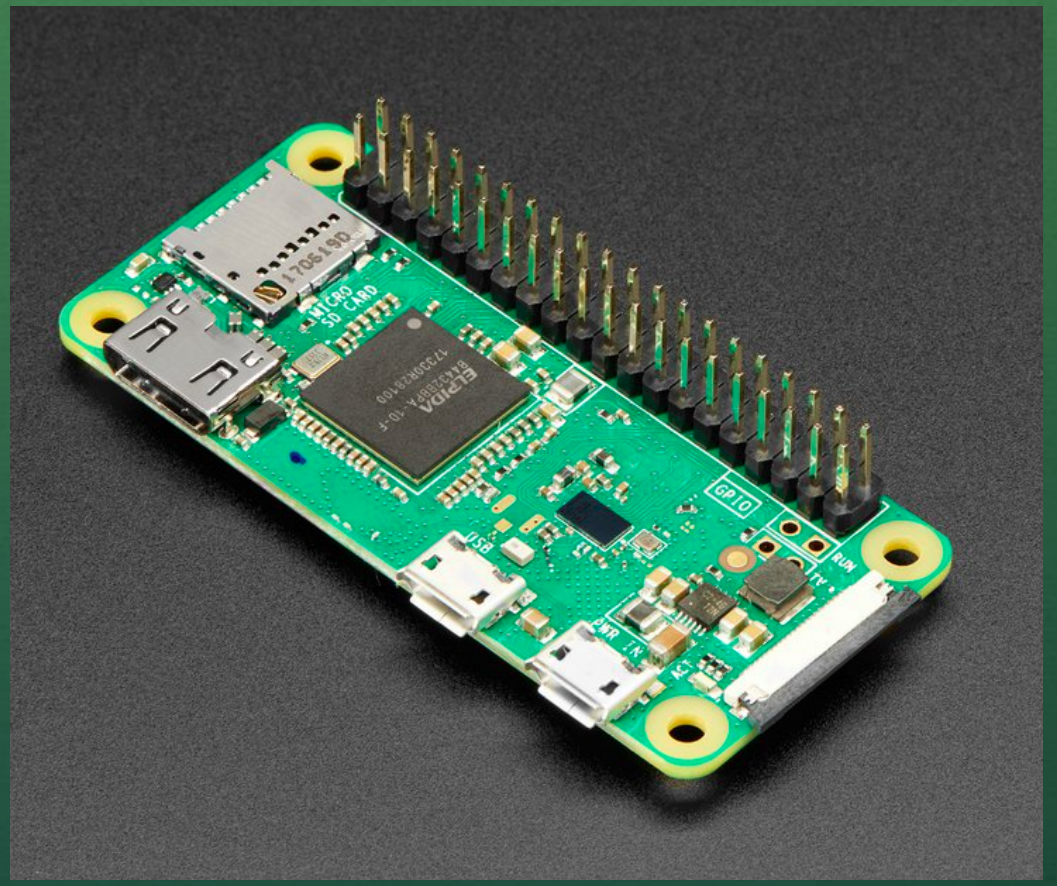
Raspberry Pi

Teaches:

1. Everything computing – inside and out



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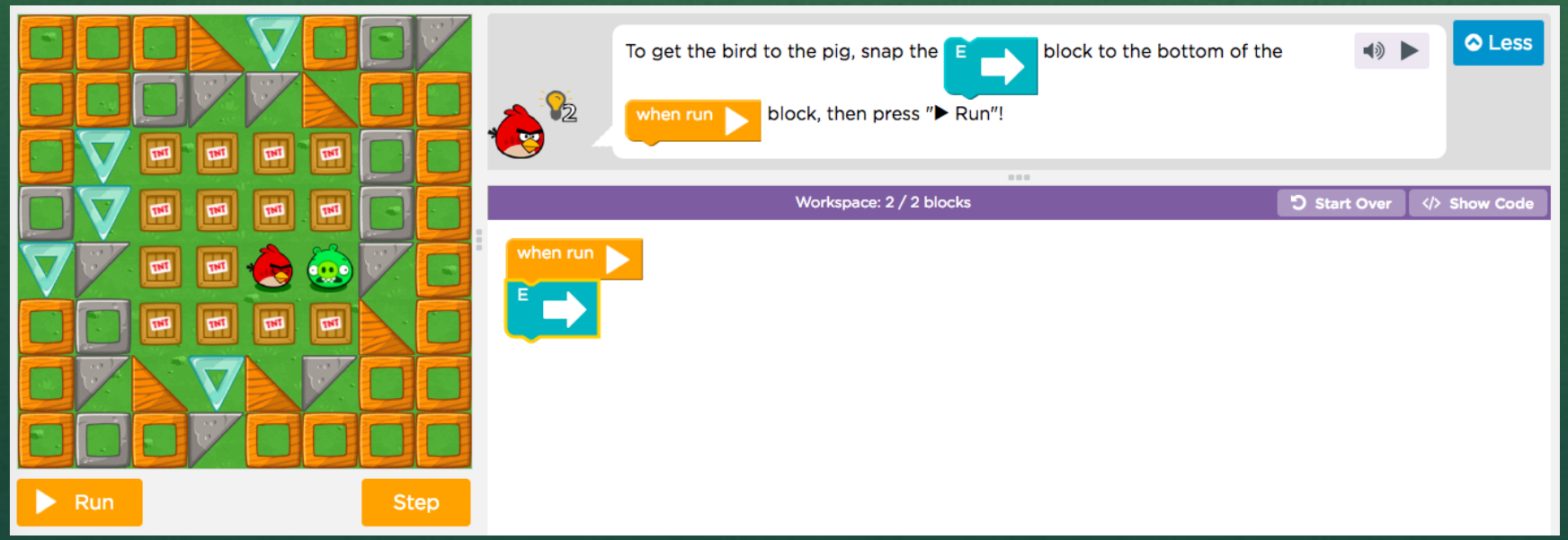
Online Resources

Code.org

- Online Computer Science and Internet Safety Courses (Free)
- Has Programs for K through High School

https://code.org



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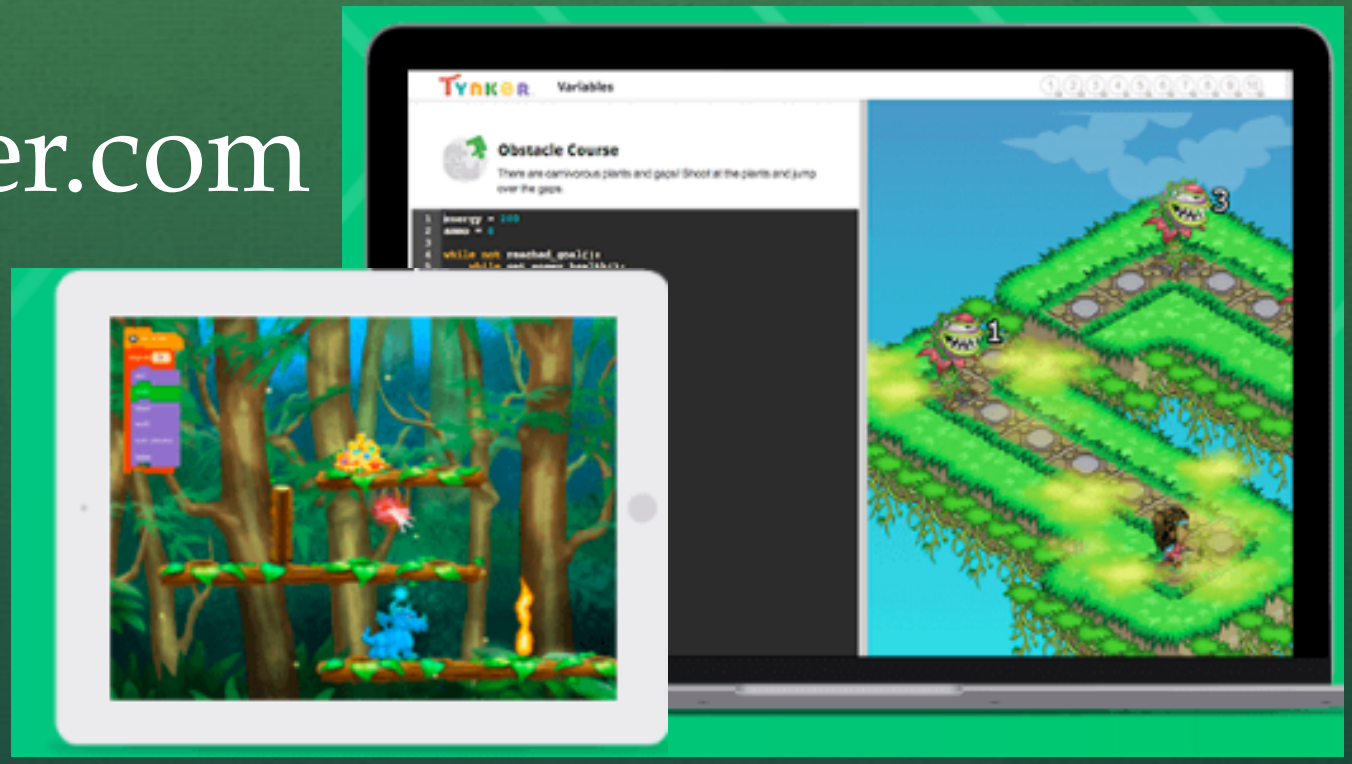
Tynker

- Online Computer Programming courses
- Elementary School level (7+)

https://www.tynker.com



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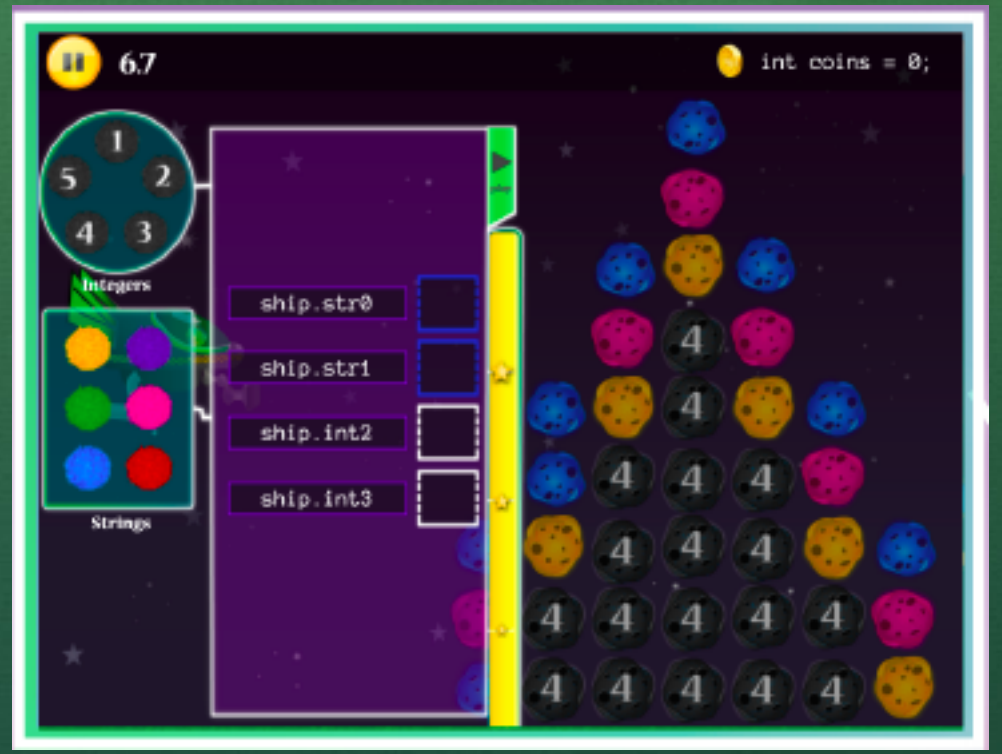
Kodable

- Games and activities (free)
- Ages 4 -10

https://www.kodable.com



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More Online Options

- Code Avengers
- Code Combat
- Code Monster
- CodeAcademy
- Codemoji
- Khan Academy

In-person Resources

CoderDojo

- Live courses on a variety of topics
- Ages 7-17

https://coderdojo.com

Girls Who Code

- Clubs, courses, and camps
- Grades 3-12

https://girlswhocode.com

ScratchJr Family Days

- One day event for families

https://www.scratchjr.org/outreach/about

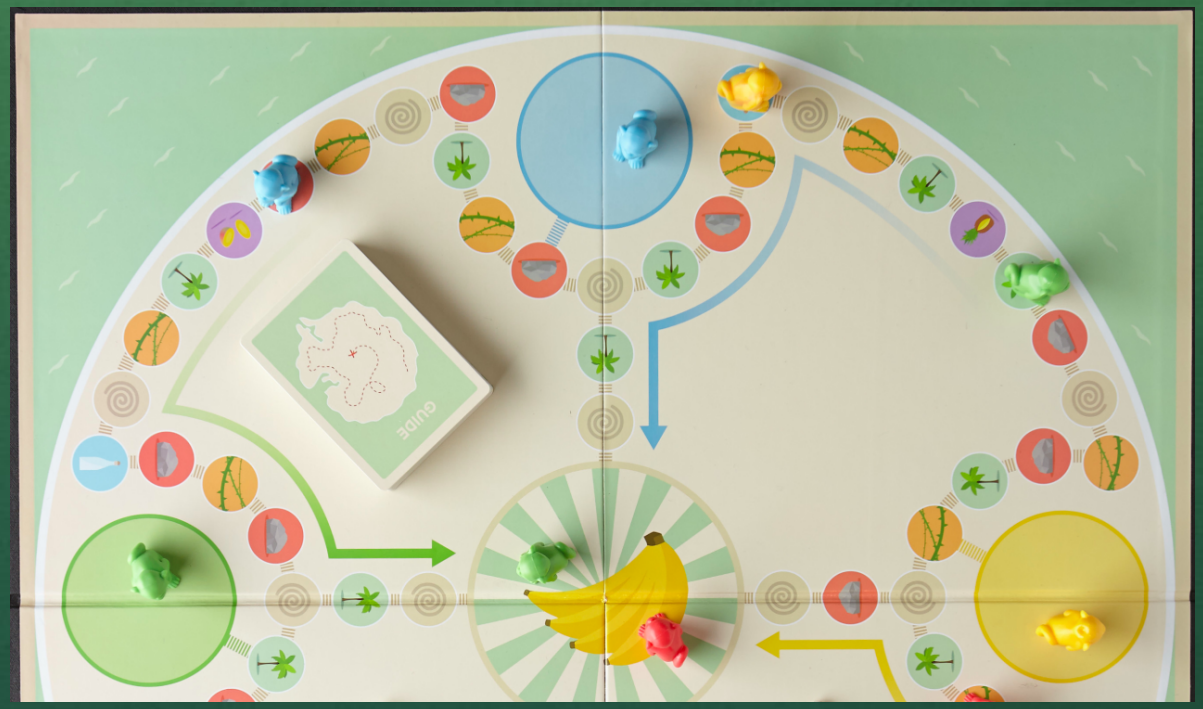
User Groups

https://www.meetup.com/

Upcoming Projects

Code Monkey Island

- Board game to teach programming concepts like Boolean operators, condition statements, and more.



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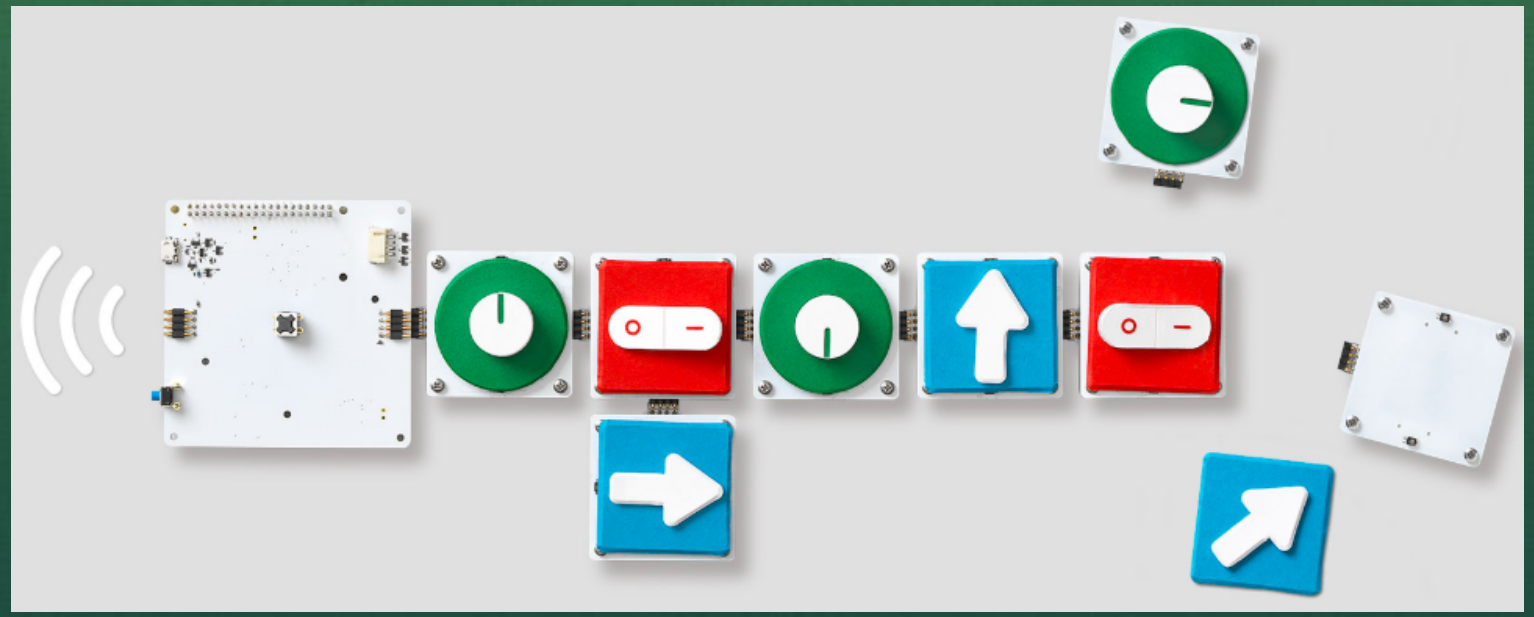
Project Bloks

- Development Platform for creating new teaching tools

https://projectbloks.withgoogle.com/



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AlgoBrix

Teaches:

1. Using symbols to program actions
2. Order of actions
3. Number of repeating actions
4. Functions with parameters
5. Conditional statements

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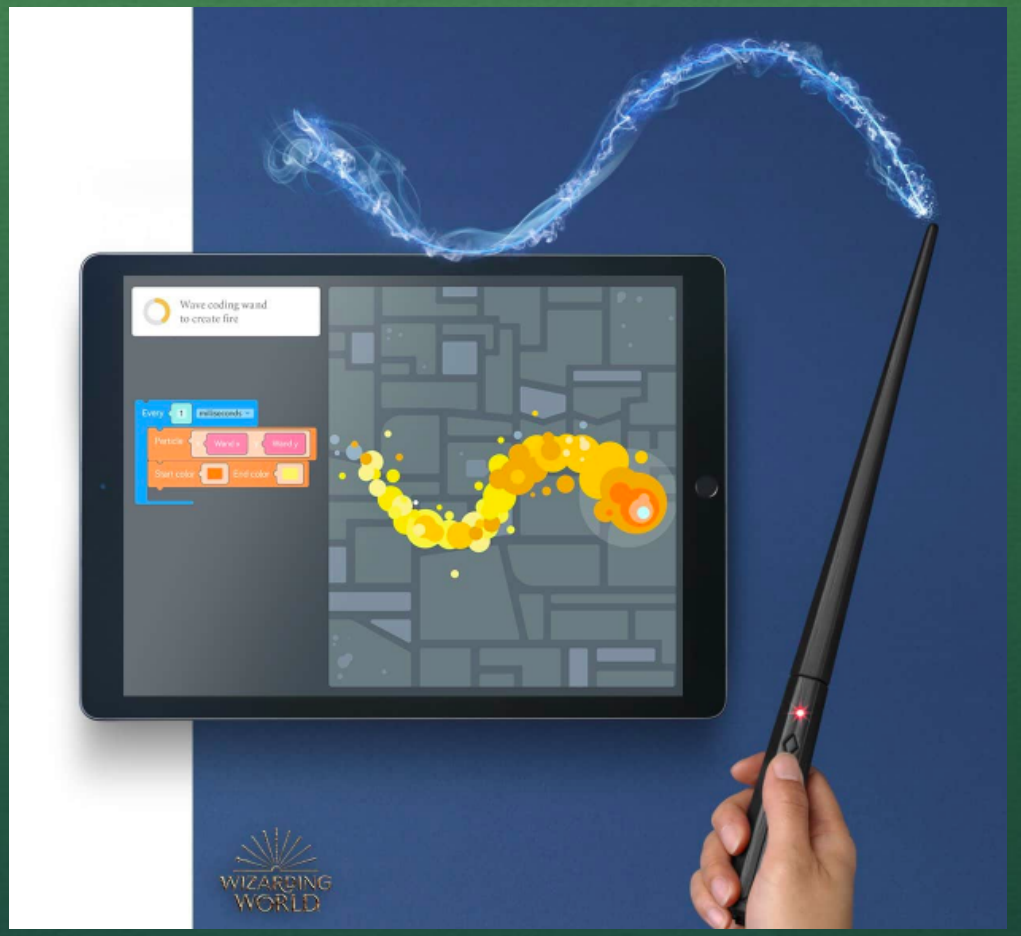
Kano Harry Potter Wand

Teaches:

1. Using symbols to program actions
2. Programming hardware components
3. Loops
4. Variables



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Resources

1. AlgoBrix - http://www.algobrix.com/
2. Alice - http://www.alice.org/
3. Blockly – https://developers.google.com/blockly/
4. Botley - https://www.learningresources.com/product/botley-the-coding-robot-activity-set-2935.do
5. Code & Go Robot Mouse - https://www.learningresources.com/product/learning+essentials--8482-+stem+robot+mouse+coding+activity+set.do
6. Code Avengers - https://www.codeavengers.com/
7. Code Combat - https://codecombat.com/
8. Code Monkey Island - http://codemonkeyplanet.com/
9. Code Monster - http://www.crunchzilla.com/code-monster
10. Code.org – https://code.org
11. Code-a-pillar - https://fisher-price.mattel.com/shop/en-us/fp/think-learn/think-learn-code-a-pillar-dkt39
12. CodeAcademy - https://www.codecademy.com/
13. CoderDojo - https://coderdojo.com/
14. Codemoji - https://www.codemoji.com/
15. Cubelets - https://www.modrobotics.com/cubelets/
16. Cubetto - https://www.primotoys.com/
17. Girls Who Code - https://girlswhocode.com
18. Hello Ruby - http://www.helloruby.com/

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Resources (cont.)

19. HopScotch - https://www.gethopscotch.com/
20. Kahn Academy - https://www.khanacademy.org/computing/computer-programming
21. Kano Harry Potter Wand - https://kano.me/store/us/products/coding-wand
22. Kodable - https://www.kodable.com/
23. Makey Makey - https://makeymakey.com
24. OSMO Coding Blocks - https://playosmo.com/en/coding-family/
25. Ozobot - https://ozobot.com/
26. Photon - https://photonrobot.com/
27. Programming = Better Math Skills + Fun – https://www.tynker.com/content/programming-better-math-skills-fun
28. Project Blox - https://projectbloks.withgoogle.com/
29. Raspberry Pi Zero WH - https://www.adafruit.com/product/3708
30. Robot Turtles - http://www.robotturtles.com/
31. Scratch - https://scratch.mit.edu/
32. ScratchJr - https://www.scratchjr.org/
33. Snap Circuits Jr. - https://www.amazon.com/Elenco-Snap-Circuits-Jr-SC-100/dp/B00DO9XIF8
34. Sphero - https://www.sphero.com/
35. Stencyl - http://www.stencyl.com/
36. Swift Playgrounds - https://www.apple.com/swift/playgrounds/

Resources (cont.)

37. Teaching Kids to Code is Overrated - http://fortune.com/2018/04/23/teaching-kids-coding-overrated/
38. Tinker Crates - https://www.kiwico.com/tinker
39. Tynker - https://www.tynker.com/
40. Wonder Workshop Dot, Dash, and Cue - https://www.makewonder.com/

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Madison PHP User Group (Meetup)
http://www.MadisonPHP.com (@MadisonPHP)

Madison Web Design & Development Meetup
http://www.MadWebDev.com (@MadWebDev)

Feedback:
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Beth@TreelineDesign.com

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AUGUST 5 - 7, 2019
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