Top 10 Ways to Teach Your Kids to Code

Kris Boedigheimer

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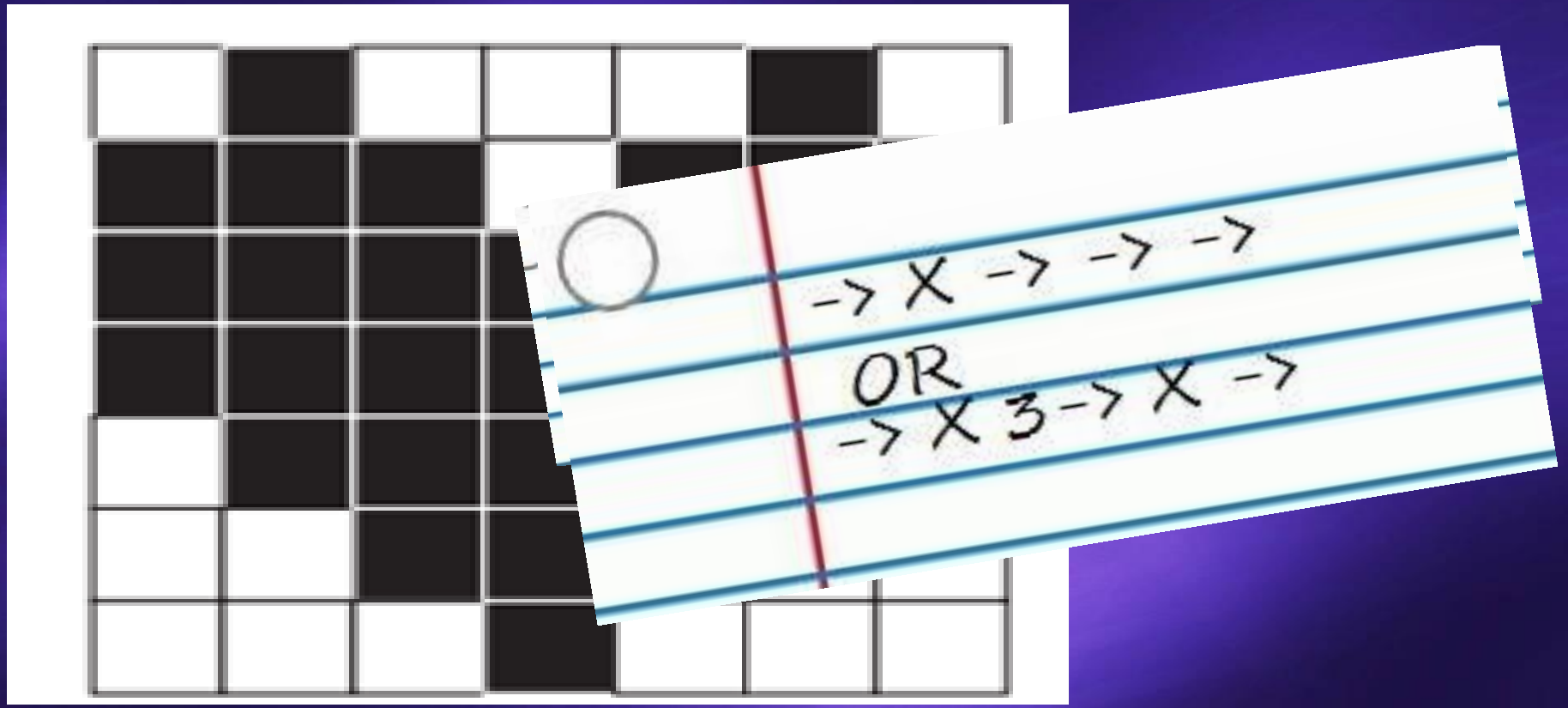
1 – Mazes



- Solve a Puzzle/Maze -

Little Codr game – littlecodr.com

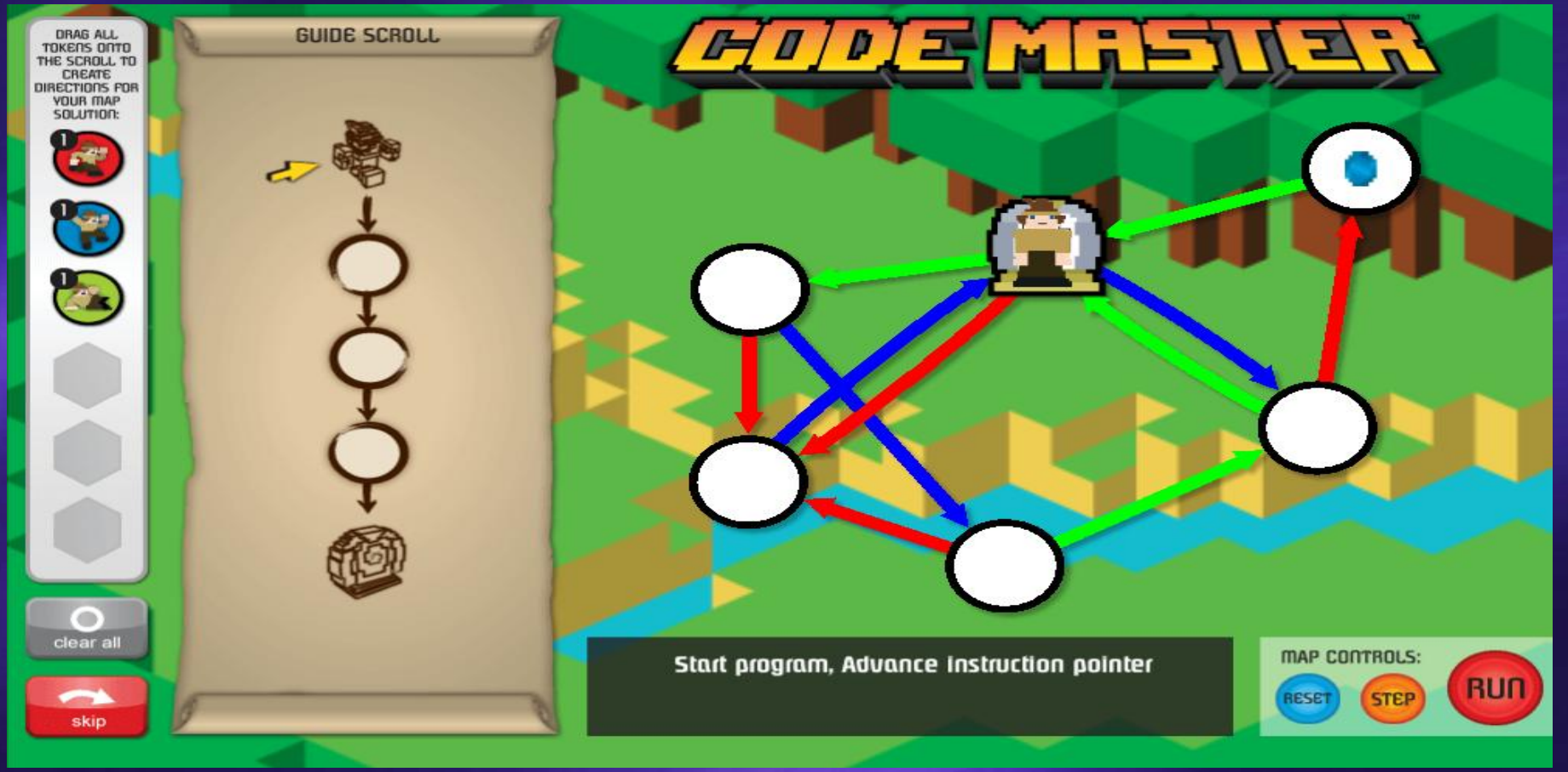
2 – Board Games

- Robot Turtles- thinkfun.com

Robot Turtles

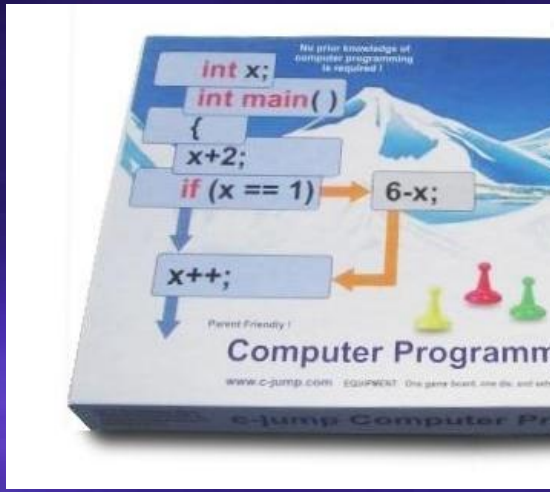
- *The Galapagos and mazes for older kids/adults- http://www.robotturtles.com/*

Code Master – thinkfun.com



- Code Monkey Island – codemonkeyplanet.com

C-JUMP– http://c-jump.com/



3 – Block Coding Puzzles

- Hour of Code - Code.org

Minecraft Hour of Code

Use blocks of code to take Steve or Alex on an adventure through this Minecraft world. (Ages 6-106)

Teacher's Notes
https://hourofcode.com/mc

Go

Star Wars: Building a Galaxy with Code

Learn to program droids, and create your own Star Wars game in a galaxy far, far away. (Ages 6-106)

Teacher's Notes
https://hourofcode.com/star

Go

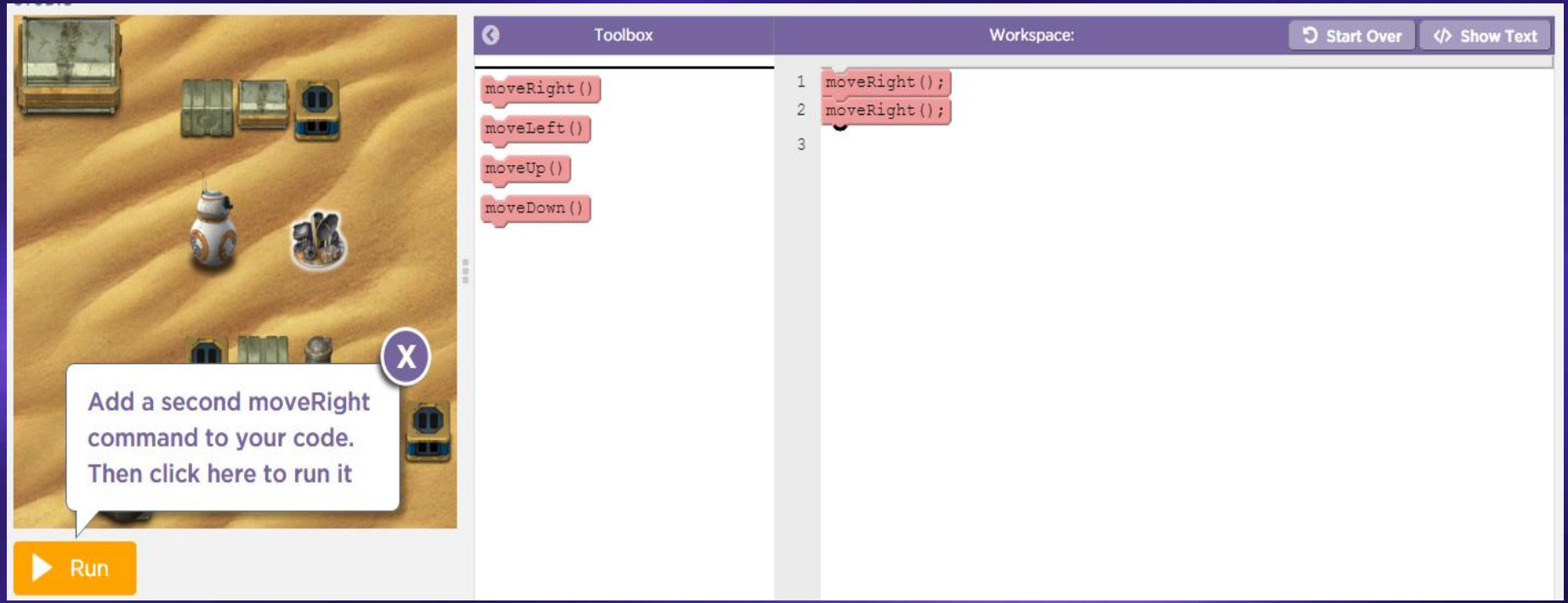
Code with Anna and Elsa

Let's use code to join Anna and Elsa as they explore the magic and beauty of ice. (Ages 8-108)

Teacher's Notes
https://hourofcode.com/frzn

Go

3 – Star Wars Hour of Code



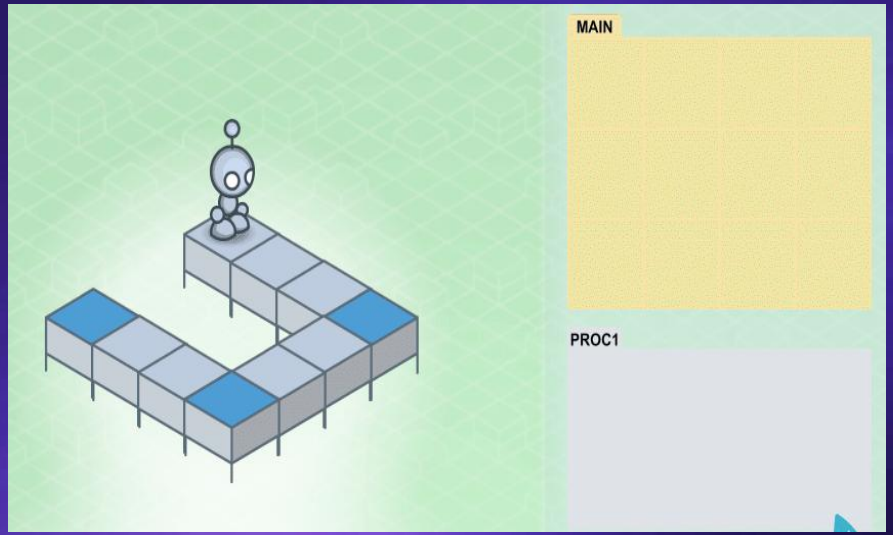

```
moveRight();
moveRight();
```

3 –Block Code - Younger Kids

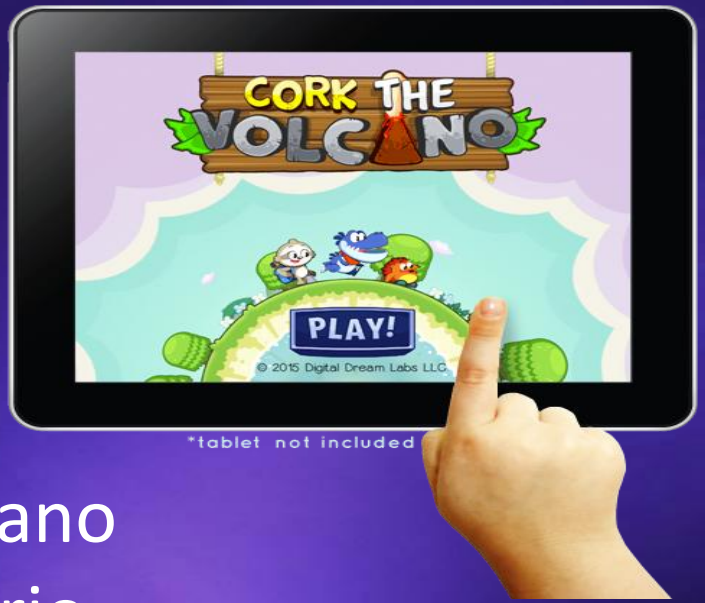
- The Foos –great for younger kids (4+)
- Tynker – block coding (7+)

3 – Block Code– More for Older Kids

- MadeWithCode = block – (9+)
- Lightbot – blocks/arrows– (9+)



3 – Puzzlets from digitaldreamlabs.com

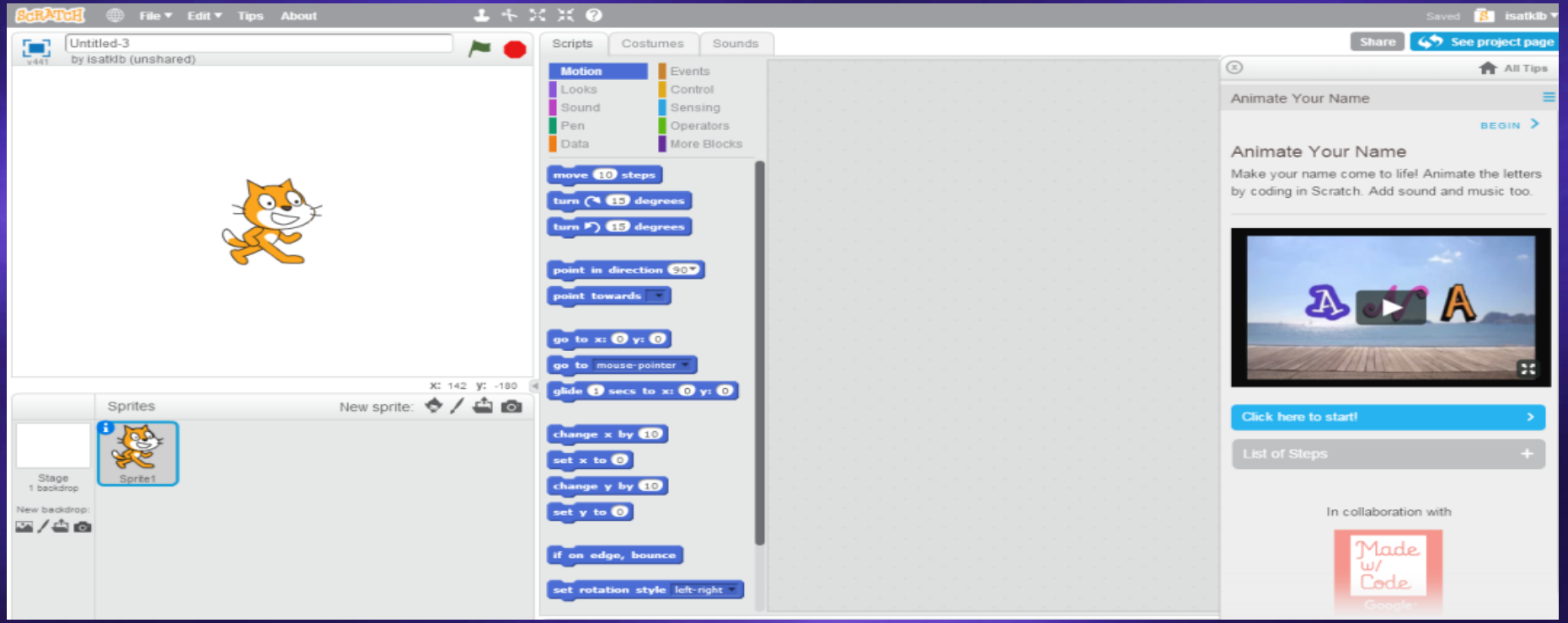


*tablet not included

- Cork the Volcano
- Similar to Mario Brothers game…
- No joystick

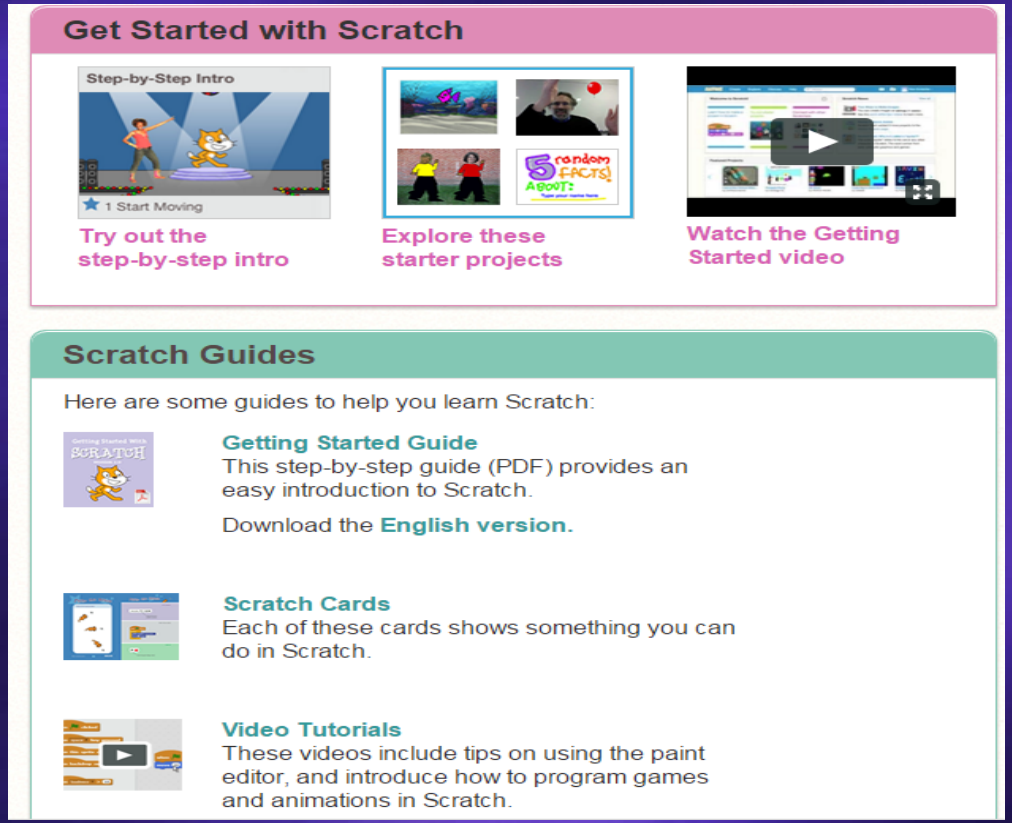
4 – Create Animation and Games

- *Scratch – scratch.mit.edu - a favorite programming tool, mainly because it offers so much control



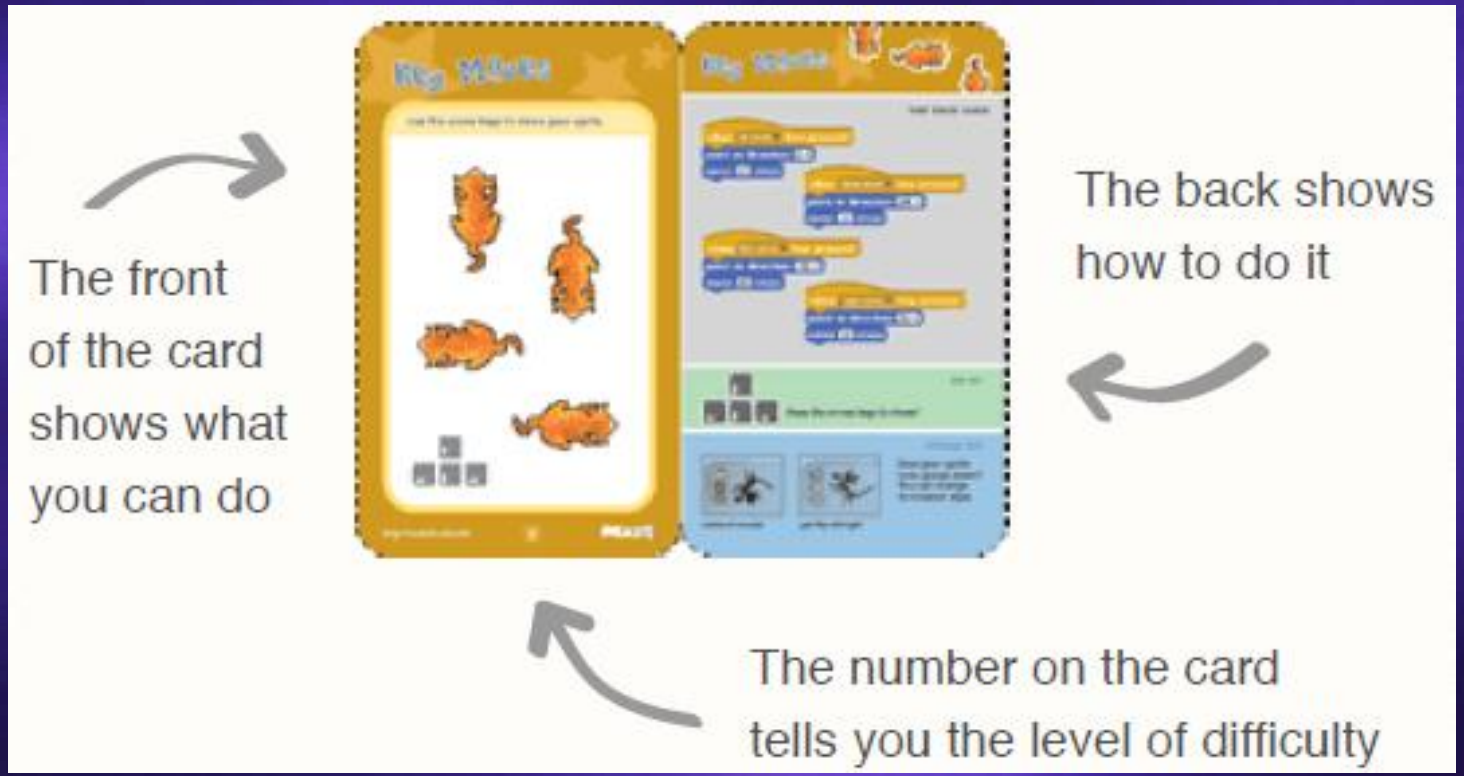
4 –Create Animation and Games

- Scratch – scratch.mit.edu/help/



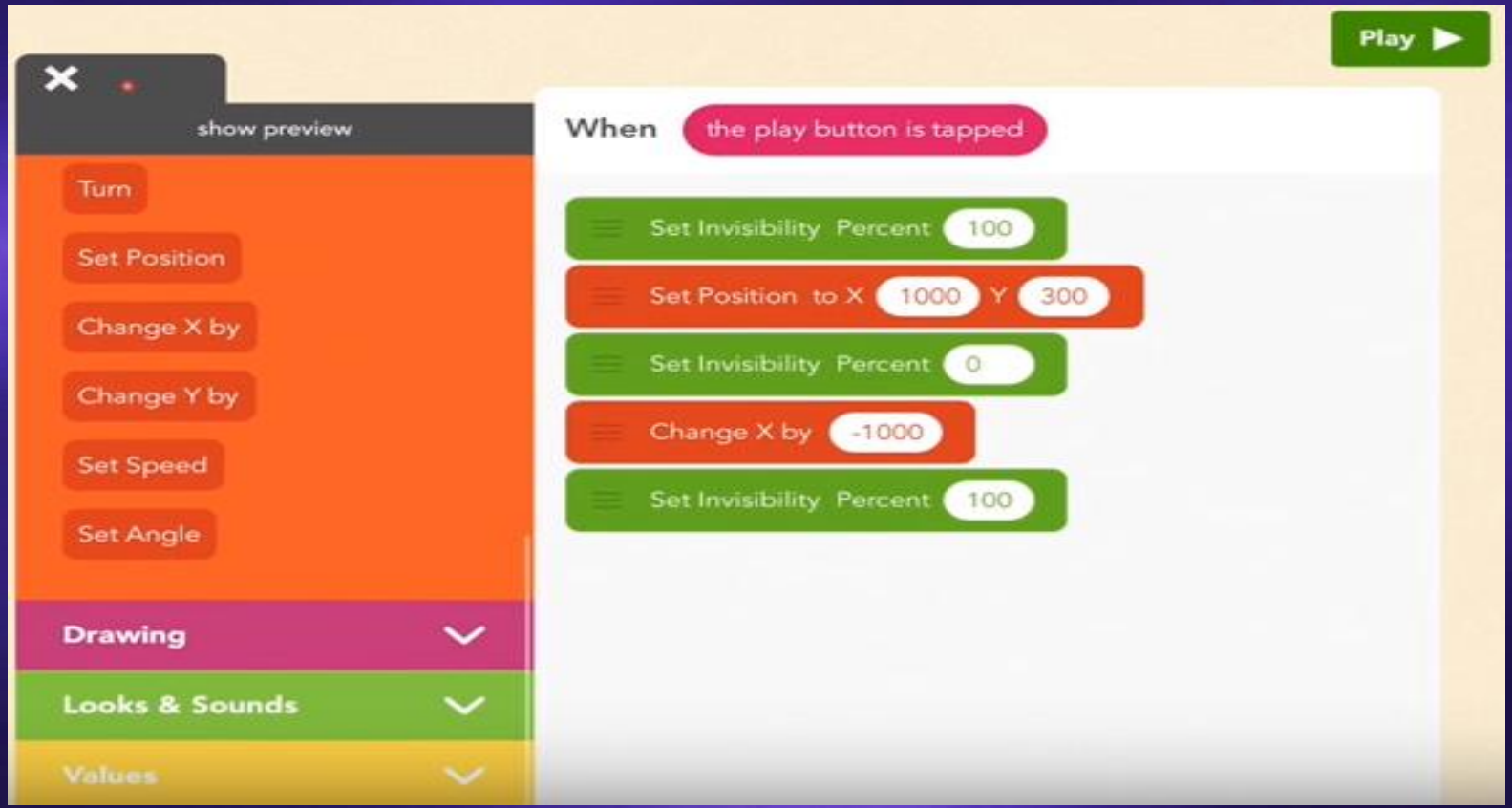
4 – Create Animation and Games

- Scratch – Cards, scratch.mit.edu/help/



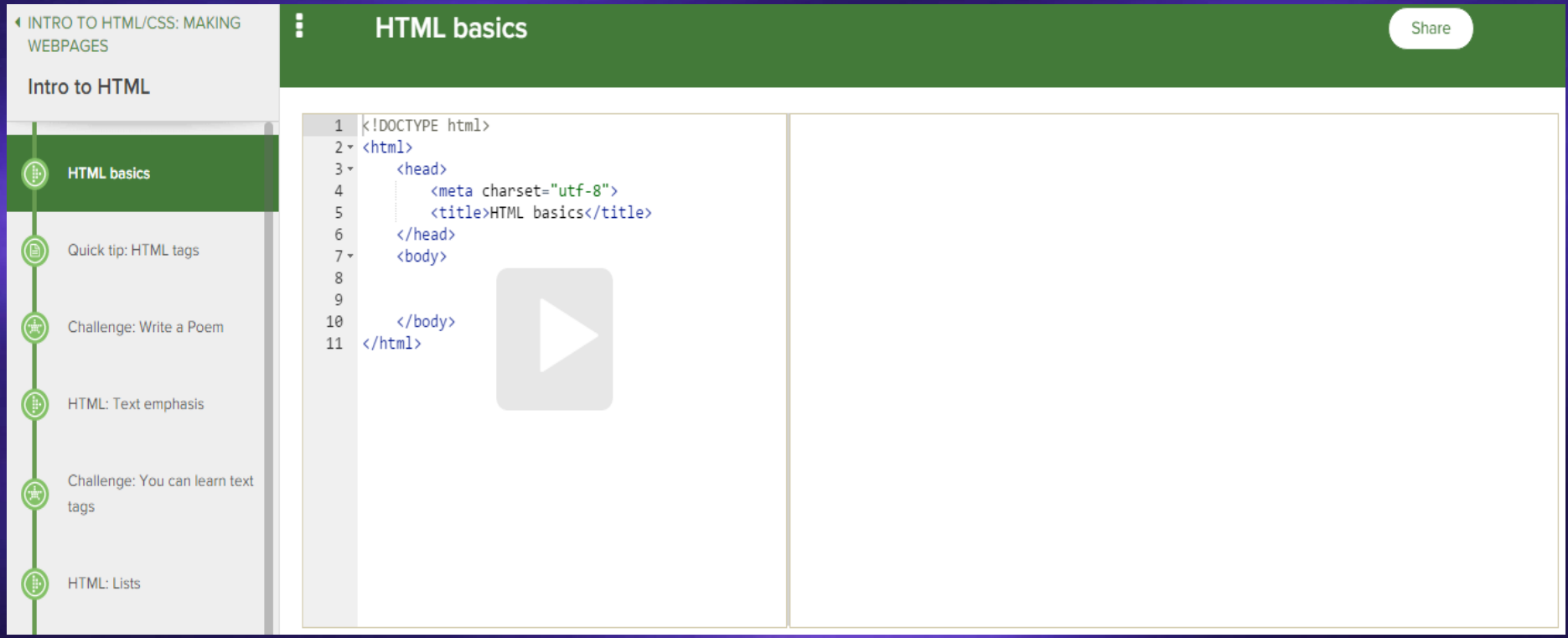
4- Create Animation and Games

- Hopscotch – block coding to create games on an ipad.

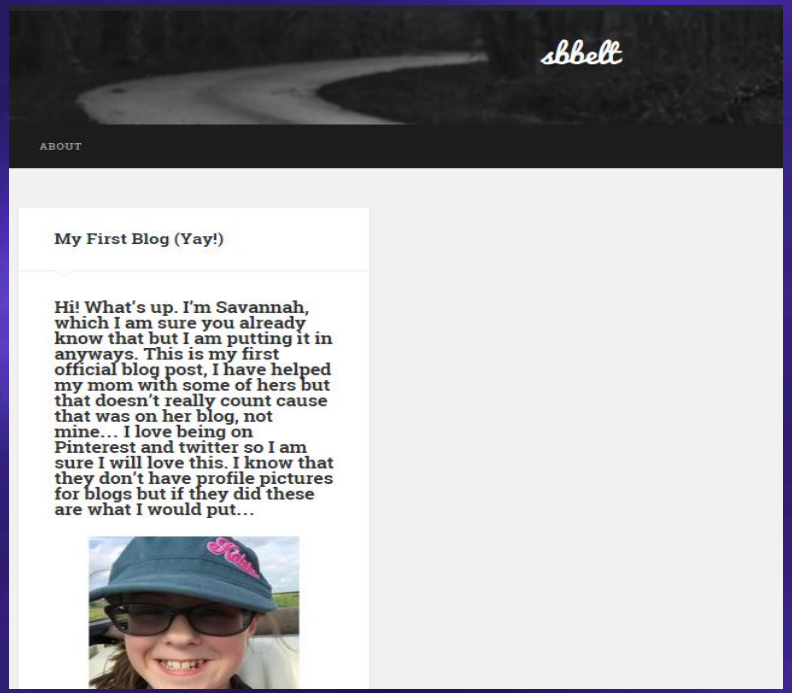


5 – Write a Web Page – Start a Blog

- HTML & CSS – Khan Academy



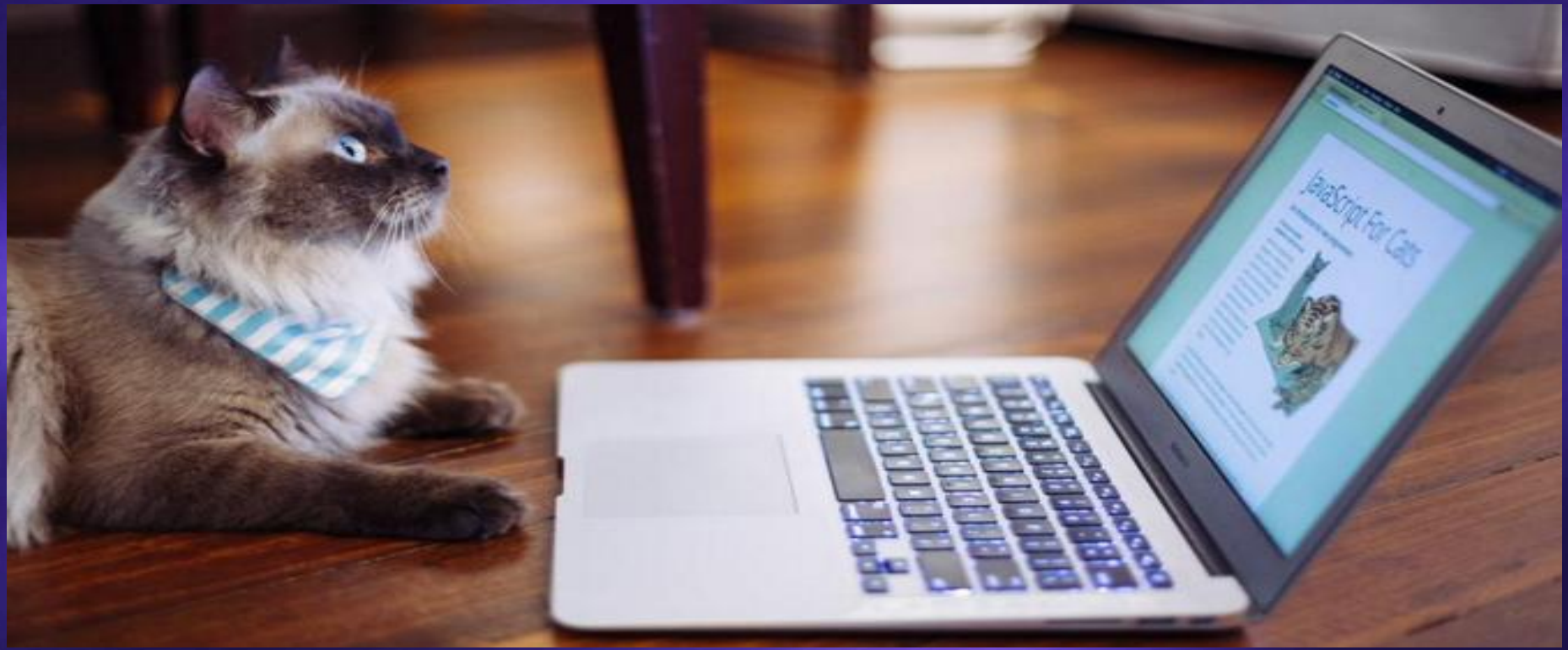
5 – Write a Web Page – Start a Blog



Visual HTML

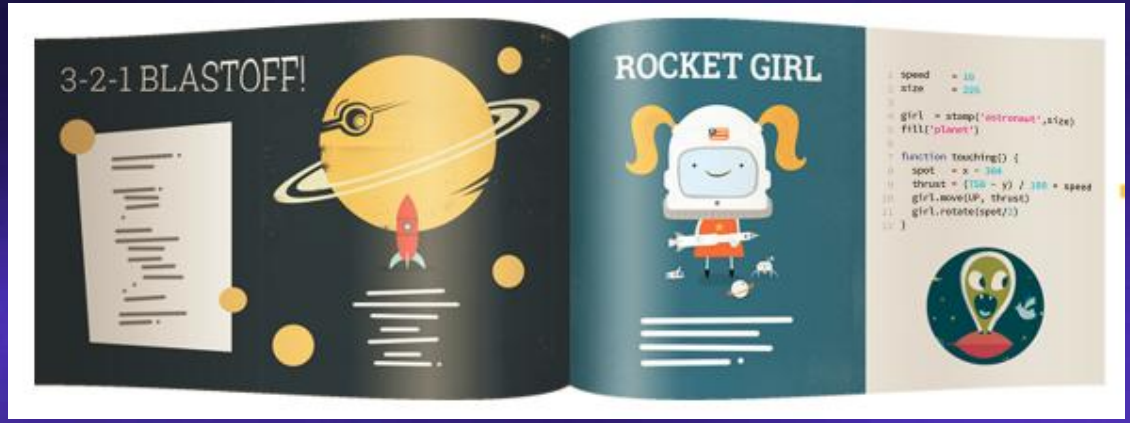
```
[gallery ids="250,256,259" type="rectangular"]

Our <a href="https://bitsbox.com/">BitsBox </a>came in the mail and we
were excited to open it. The contents looked exciting and we dug right
in.

[gallery type="rectangular" ids="253,252,255"]

It came with a trading cards, a code book, a Cubebot, and some
stickers and tattoos. There were 8 trading cards with apps and 22 apps
to code in the book. We really liked the trading cards because they
are fun, you can take them along on the go, and we can trade them. The
book included everything we needed to know to write the apps. The
graphics were wonderful and that was one of my favorite parts of the
product. It was also simple to follow, and included tips to enhance
your apps.

[gallery ids="258,254,263" type="square"]
```

6- Learn a Language



JavaScript for Cats – jsforcats.com

Bitsbox


3-2-1 BLASTOFF!
ROCKET GIRL


ROCKET GIRL
Rocket Girl
speed = 10
size = 225
girl = stamp('astronaut', size)
fill('planet')
function touching() {
spot = x - 384
thrust = (750 - y) / 100 * speed
girl.move(UP, thrust)
girl.rotate(spot/2)
}
bitsbox


ROCKET GIRL
ROCKET GIRL

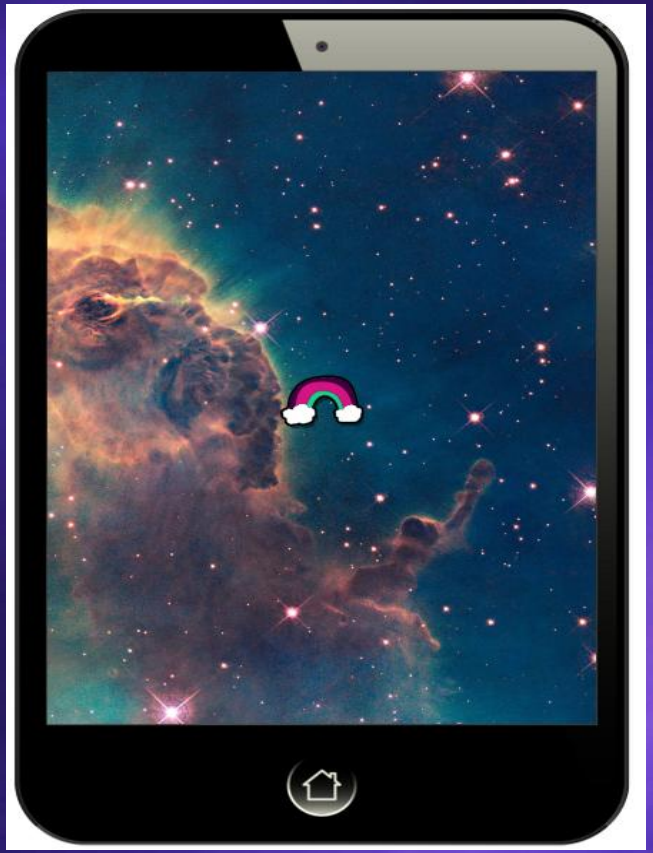
Bitsbox

Moon Blaster
By Isatklb

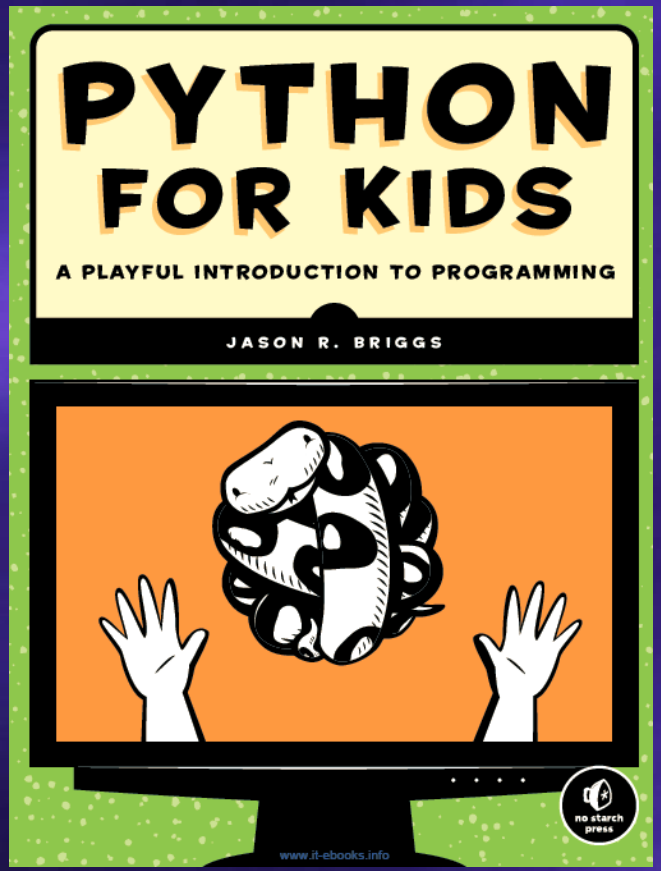
```
1  target=stamp('moon')
2  target.tap = explode
3  fill('stars')
4
5
```

Bitsbox


Moon Blaster
By Isatklb
target=stamp('rainbow')
target.tap = explode
fill('stars')



6 – Learn a Language



Hello world

Python

```
1 print('Hello World!')
2 print(2+2)
3 tax=12.5/100
4 price=100.5
5 totalprice=price + tax * price
6 print(totalprice)
```

Run code

```
Hello World!
4
113.0625
```

Powered by HackerRank.com

6 – Elm

```
-- SYNTAX PROBLEM ------------------------------------------------

I ran into something unexpected when parsing your code!

5|    text Hello, World!"
                         ^

I am looking for one of the following things:

    "\""
    "\\"
    "\n"
    "\r"
```

7- Find Something that Interests Them

- Contests

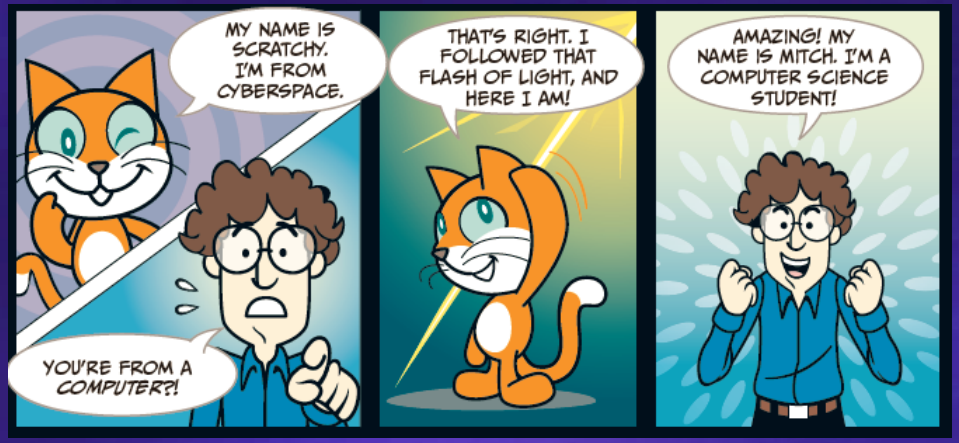
KIDS Coding Contest

ImagineCup

http://www.kidscodingcontest.com/
https://www.imaginecup.com/
http://www.us.lego.com/en-us/mindstorms/community/r
https://twitter.com/Hopscotch

7- Find Something that Interests Them…

- Books and Magazines-

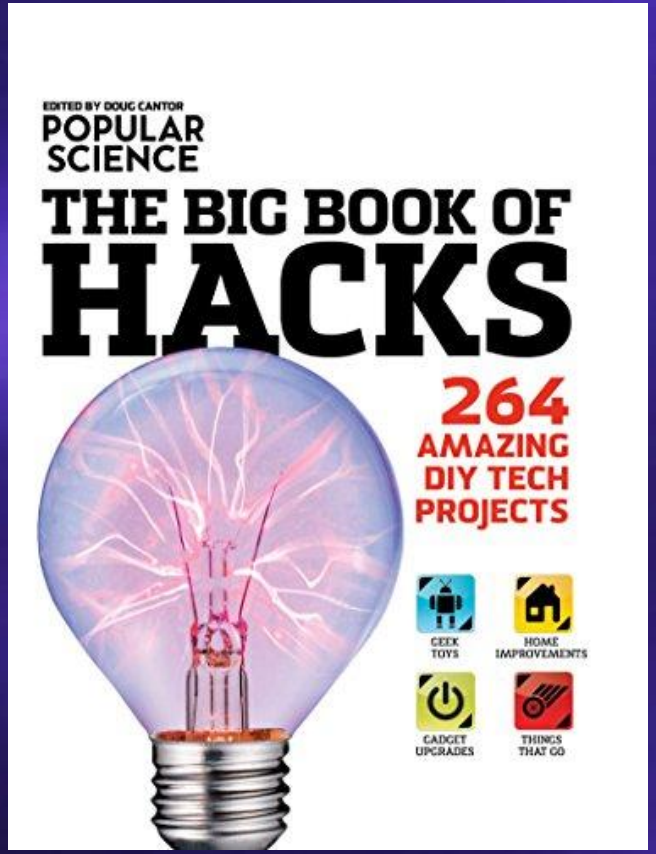


Program 1 makes the sprite show up at the start of the game and disappear when the player presses space, the spacebar on their keyboard.

Program 2 makes the Instructions sprite broadcast start when it receives the space broadcast from program 1. This will start the game!

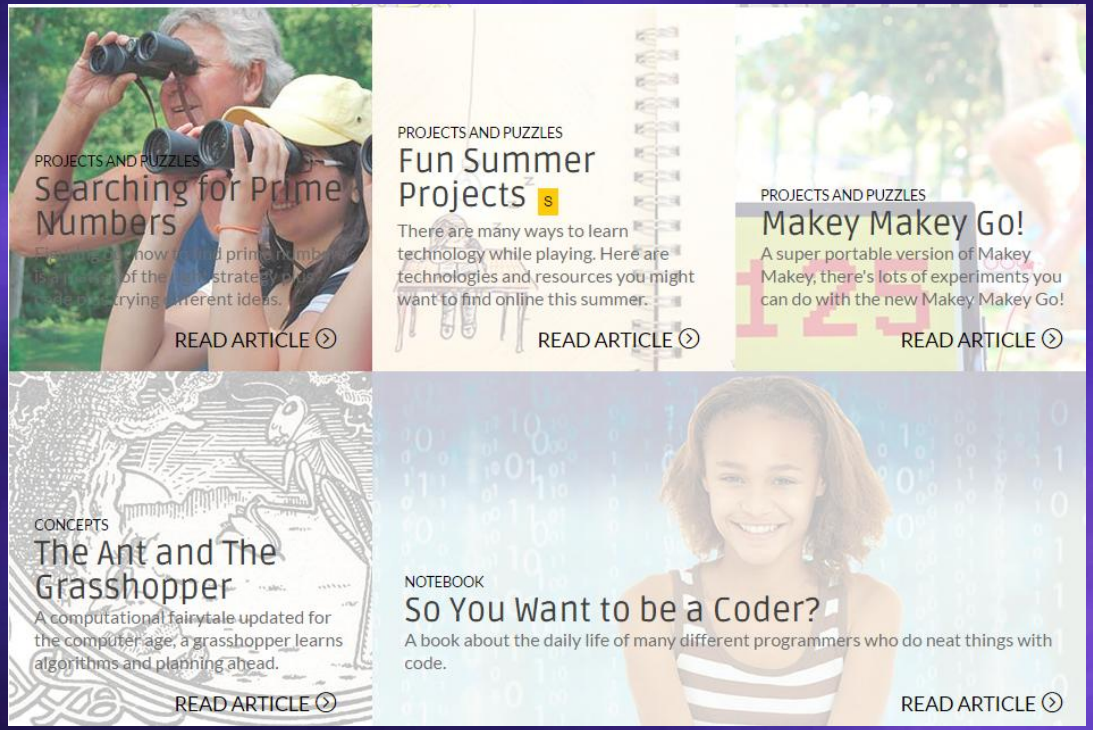
7- Find Something that Interests Them…

- Books and Magazines-



7- Find Something that Interests Them…

- Books and Magazines-
  - Discount KRIS3499



7- Find Something that Interests Them…

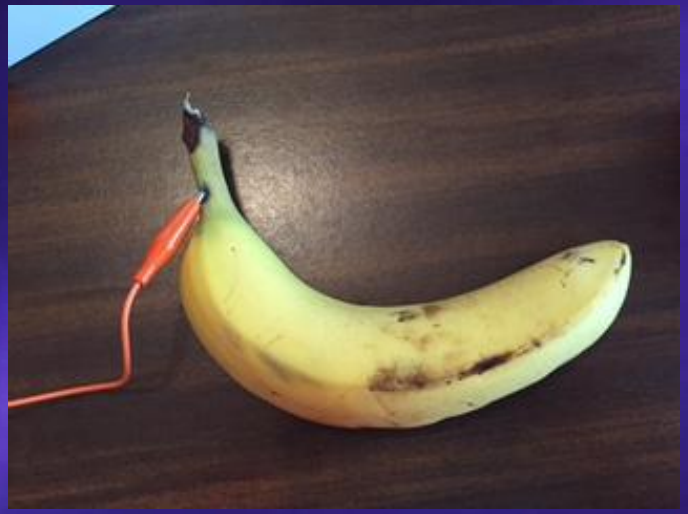
- Course –
  - Codecademy.com
  - Pluralsight.com
- Academic Class(online /textbook)-
  - EdX - UC Berkley, Columbia University, MIT
  - Homeschool Programming
- Minecraft – Code Minecraft Mods
- Hardware – DIY Electronics, Arduino, and Raspberry Pi

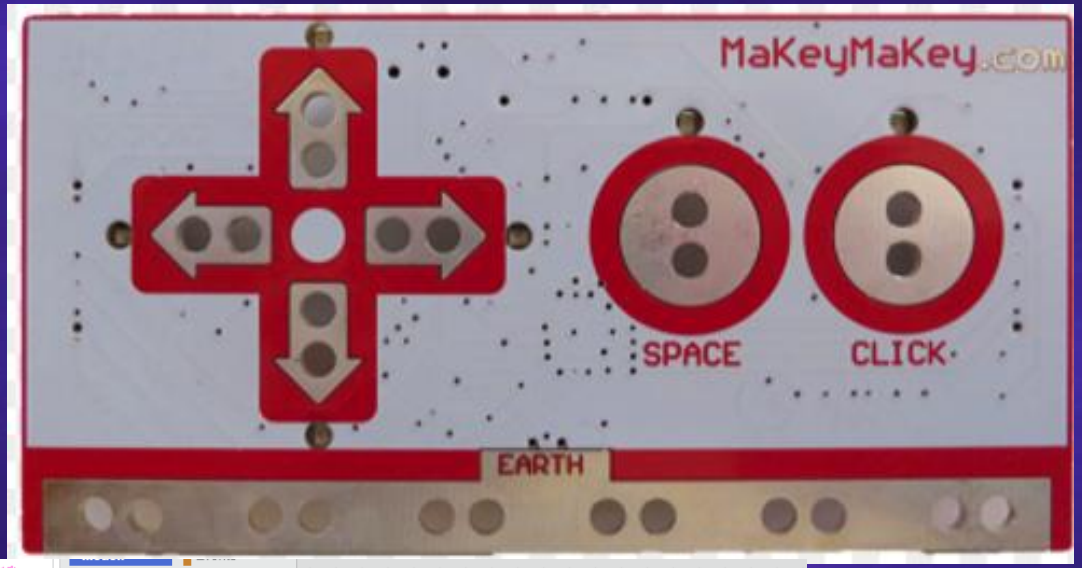
8- Hardware – DIY Electronics, Arduino, and Raspberry Pi, Oh My!

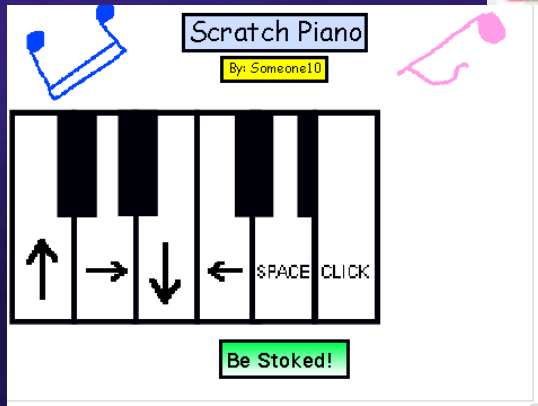
- Allows kids to engage in more active learning.
- Students improve test scores by 25%-38% using interactive learning techniques
- DIY Electronics–Codebug, Makey Makey, Arduino, Raspberry Pi, Kano Computer
- Robots – EV3, Sphero, Dash and Dot

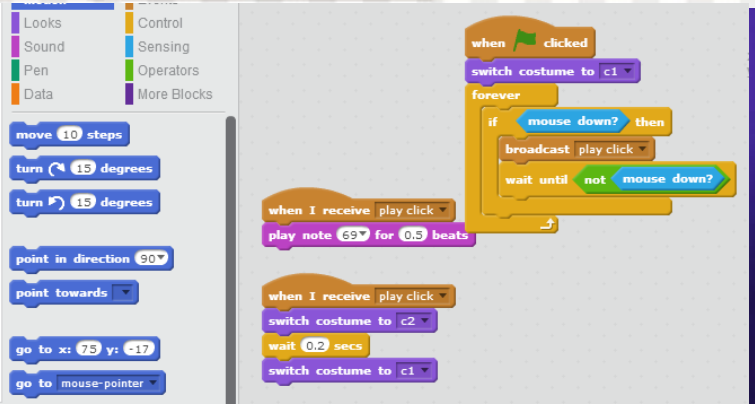
- DIY – Makey Makey

DIY – Makey Makey

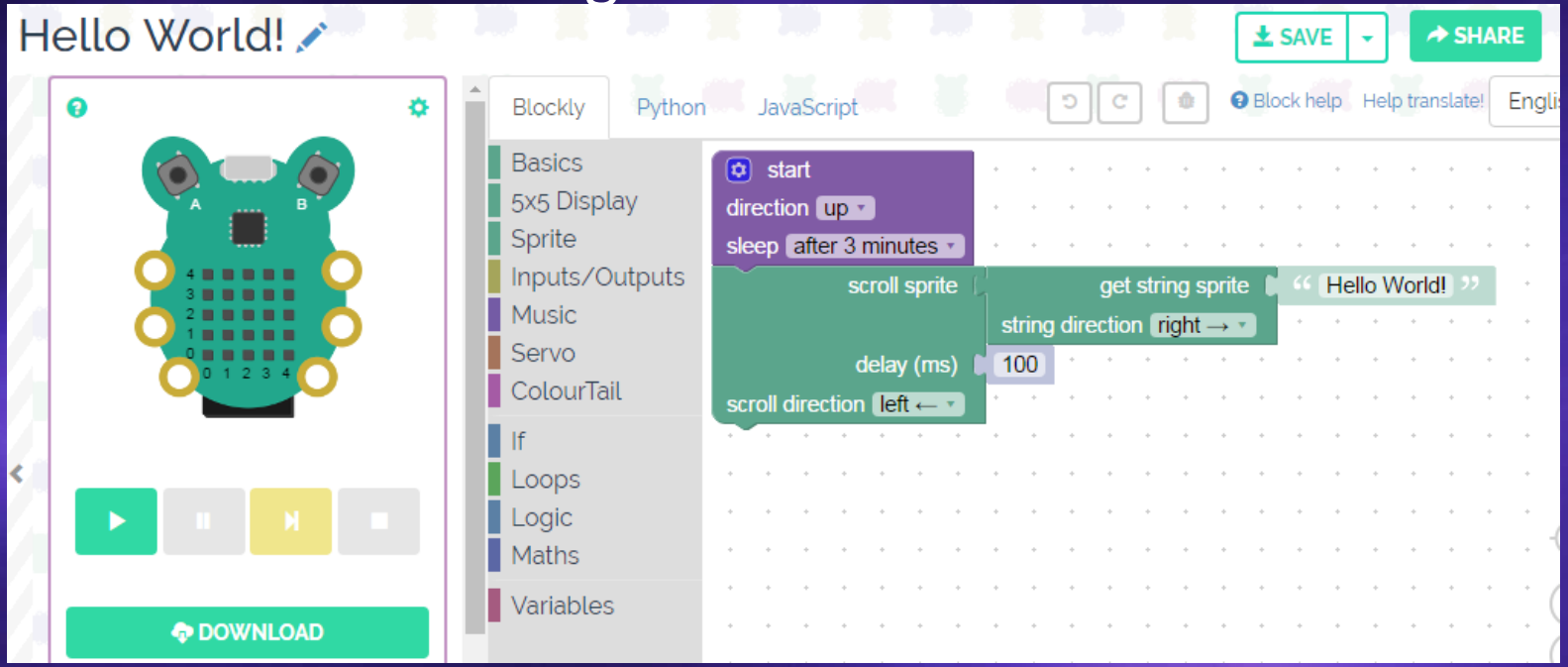








- DIY - Codebug



- Super cheap and fun way to get kids coding.
- Can code on site and use emulator, then download code to bug and play on the bug.
- www.codebug.co.uk

- Codebug

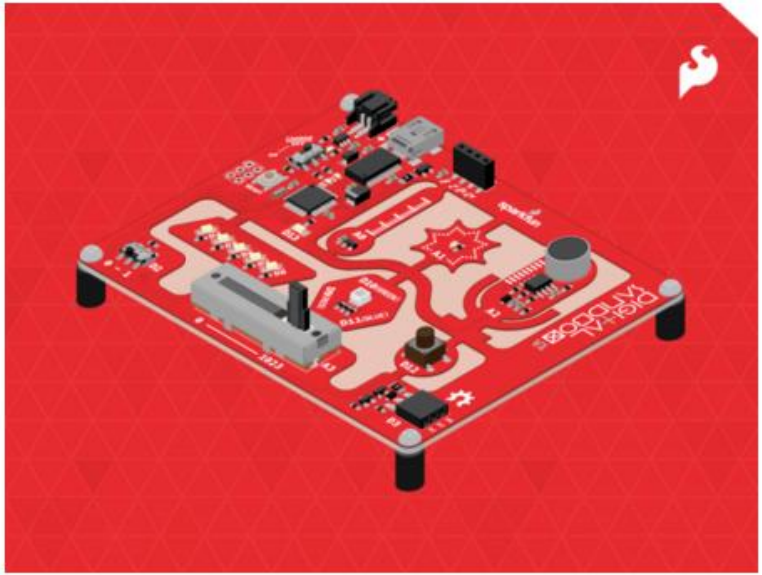
8- Hardware – Arduino

- Arduino – Arduino.cc
  - An open-source prototyping platform based on easy-to-use hardware and software.
  - Inexpensive microcontroller
- Sparkfun.com – Arduino Sandbox

Arduino – Sparkfun.com- Digital Sandbox Tutorial

Welcome to the Digital Sandbox!

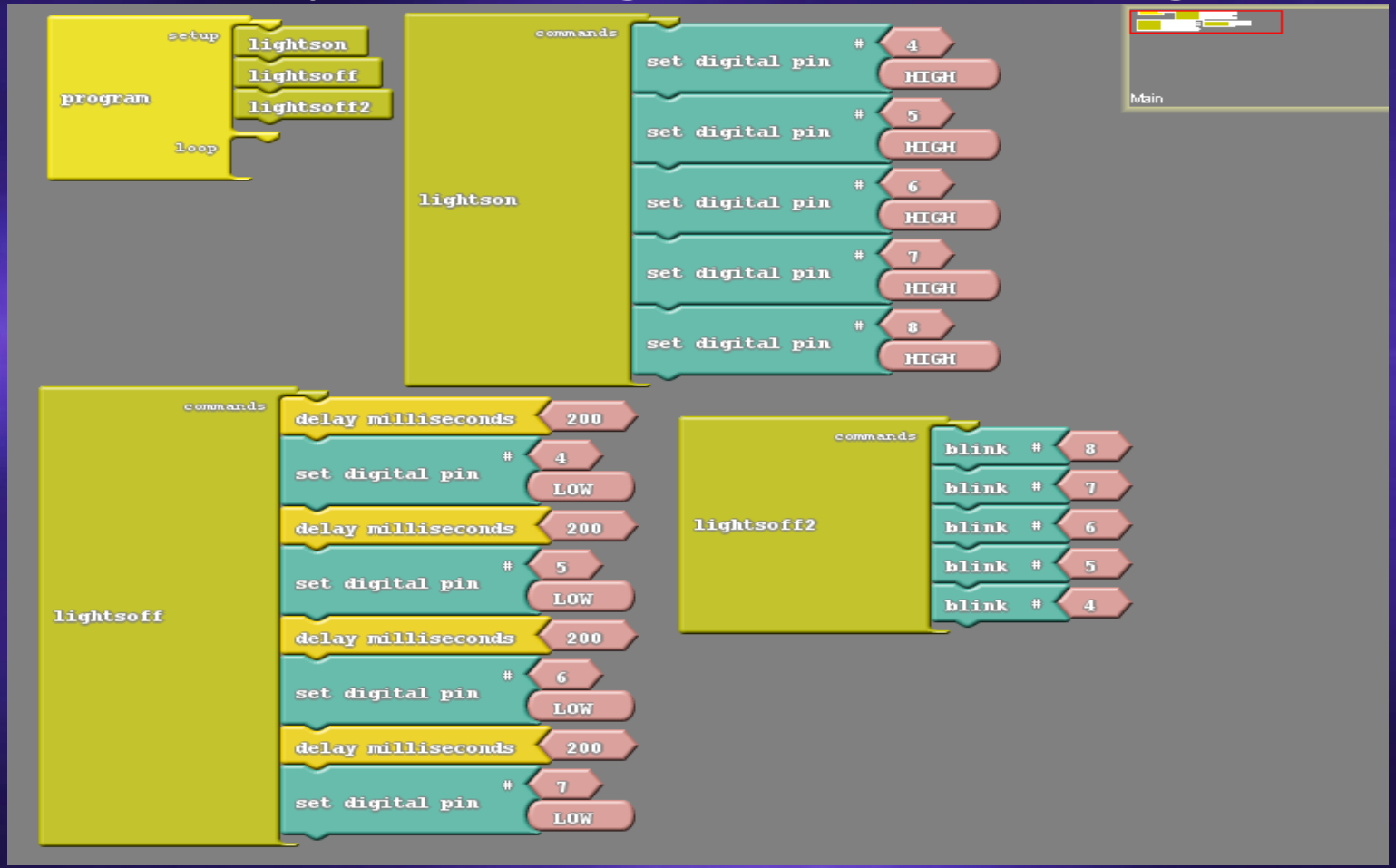
The Digital Sandbox is a learning platform that engages both the software and hardware worlds. It's powered by a microcontroller that can interact with real-world inputs – like light or temperature sensors – while at the same time controlling LEDs, motors, and other outputs. The Digital Sandbox is equipped with everything, on board, that you will need to complete 13 experiments including controlling an LED, measuring how loud things are, detecting the temperature is, and more. Think of this as a SparkFun Inventor's Kit all in one board!



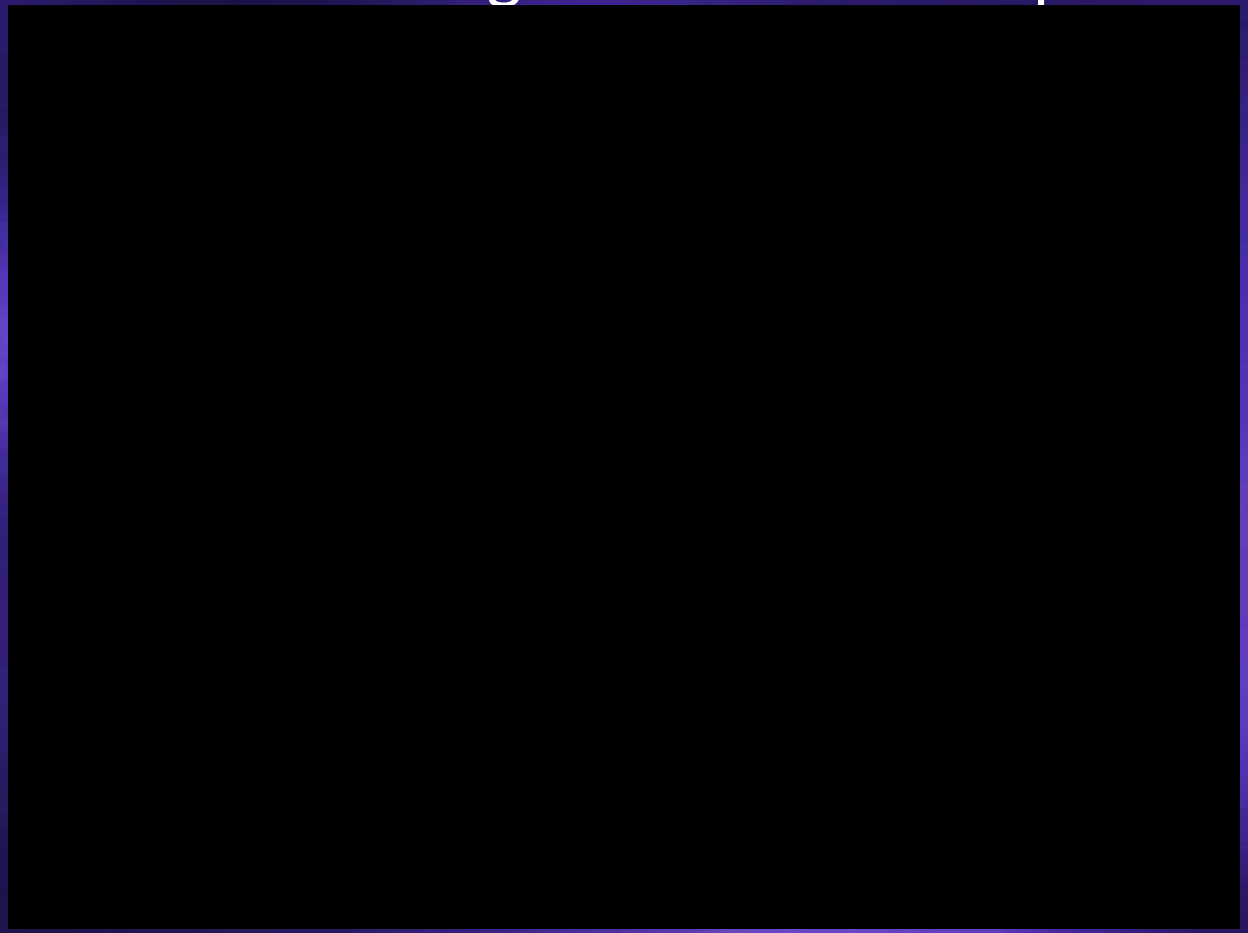
This tutorial walks you through a series of experiments that demonstrate how to program the Digital Sandbox using ArduBlock, a graphical programming language for Arduino.

If you're interested in programming your Sandbox using the regular Arduino programming language, check out our parallel tutorial: the Digital Sandbox Arduino Companion.

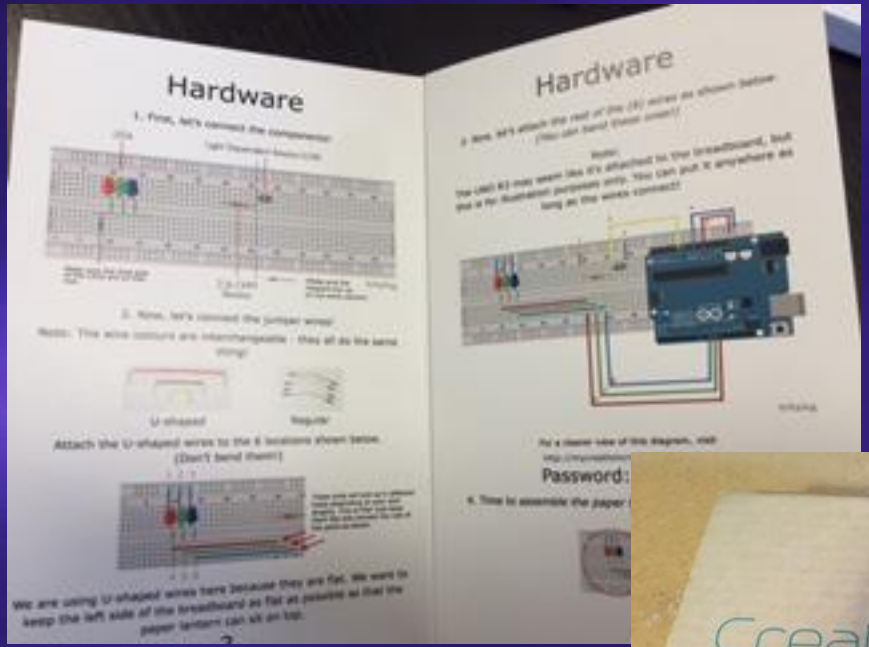
Arduino – Sparkfun Digital Sandbox, using Ardublock.

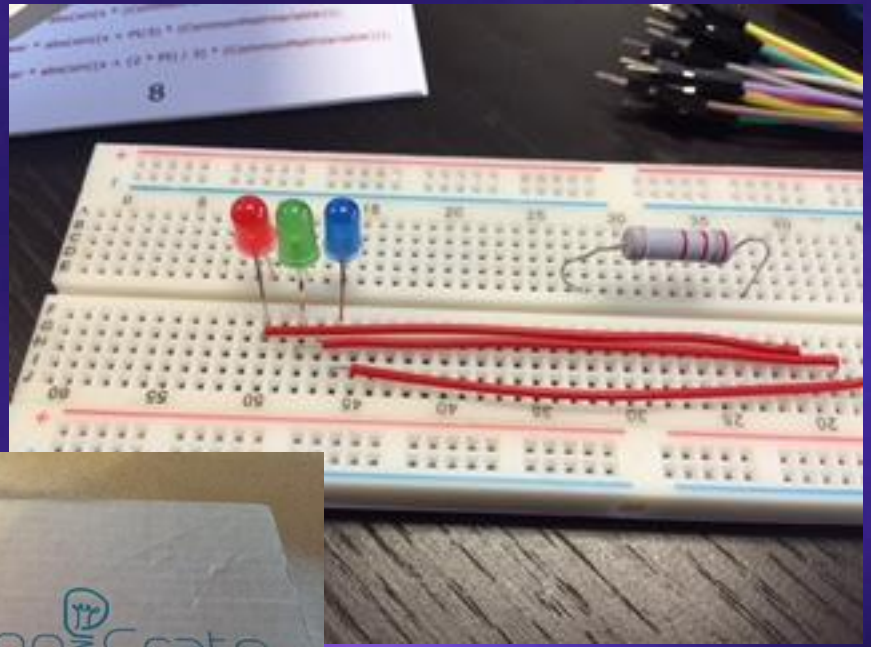


- Arduino Blinking – tutorial from Sparkfun



Arduino - Creation Crate





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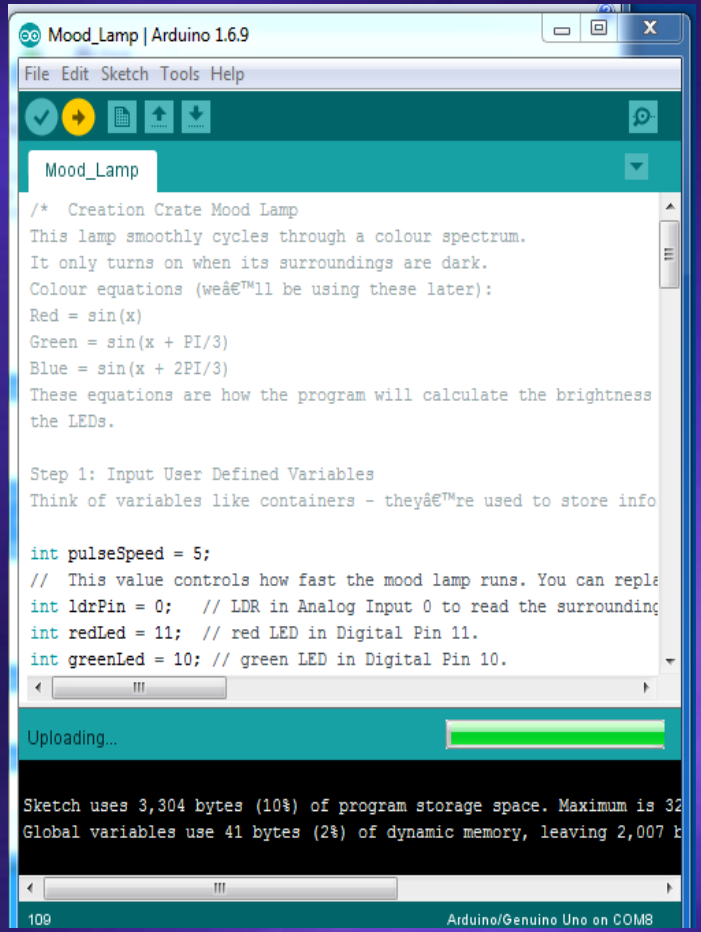
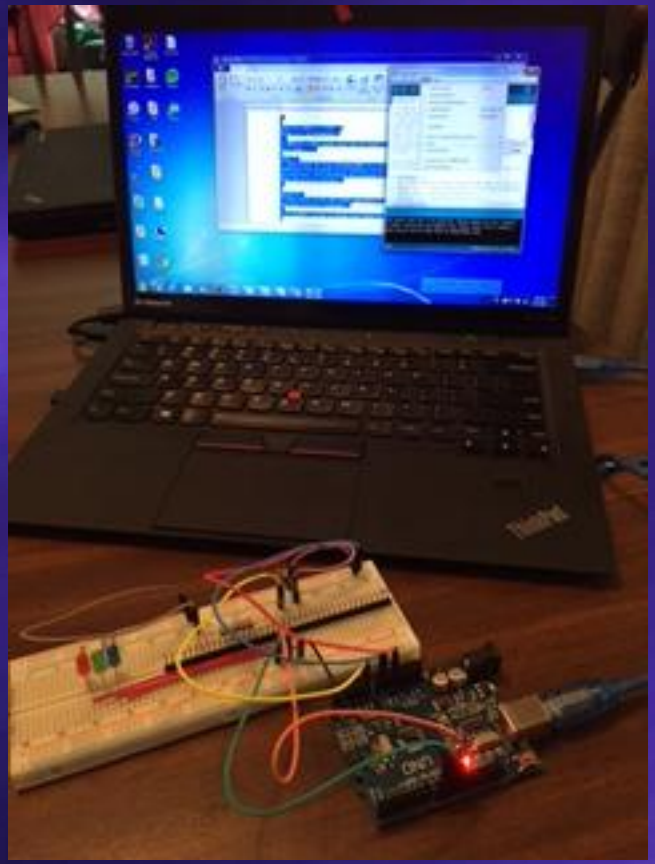


- Arduino - Creation Crate



Arduino - Creation Crate

8- Hardware - Raspberry Pi

- Raspberry Pi- The Raspberry Pi is a complete, functional, mini-computer.
  - Cheap
  - Small
  - Easy to navigate
  - Portable
  - Software - Raspbien, Minecraft Pi, Python, Scratch, Sonic Pi, …

See larger image

Image courtesy Michael Teeuw

Magic mirror

Developer Michael Teeuw came up with a neat idea for a home project: Create a high-tech mirror that shows you the weather, time, and the day's headlines while you're getting ready for the day.

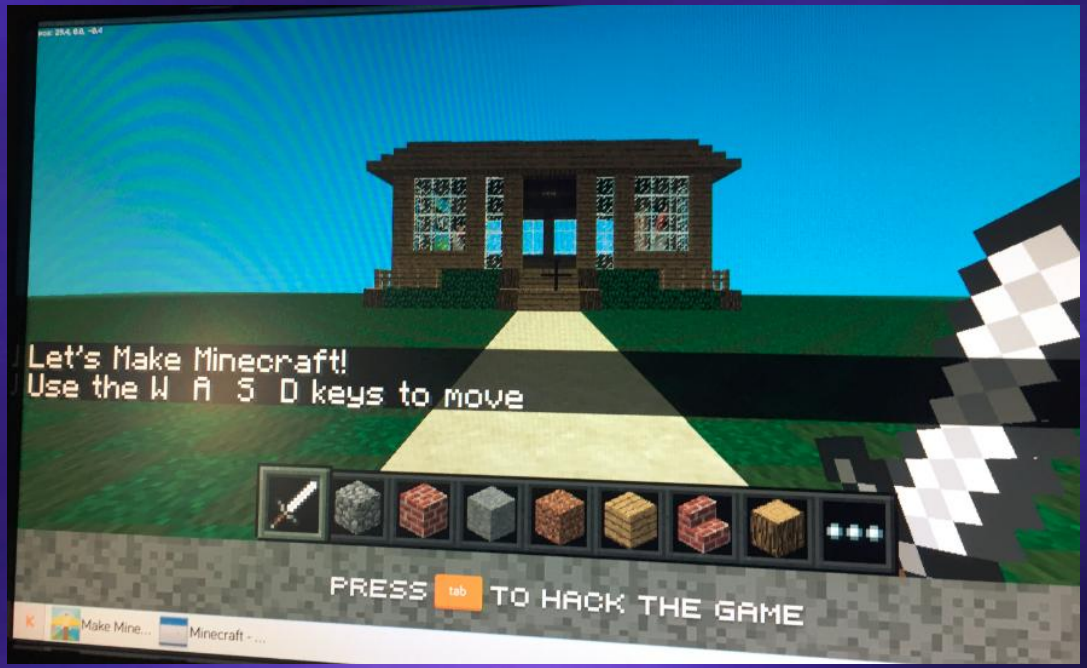
8- Hardware - Kano Computer (Raspberry Pi)

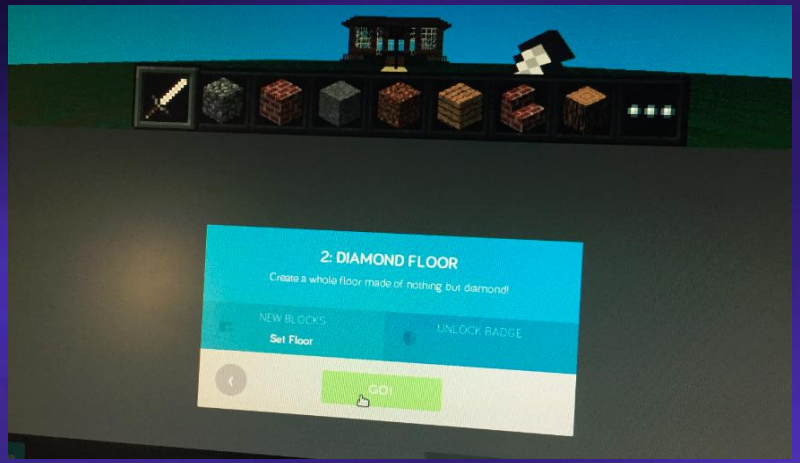
- Raspberry Pi
- Speaker
- Wireless keyboard with trackpad
- Kano OS – pre-loaded with software including Minecraft
- Wi-Fi dongle

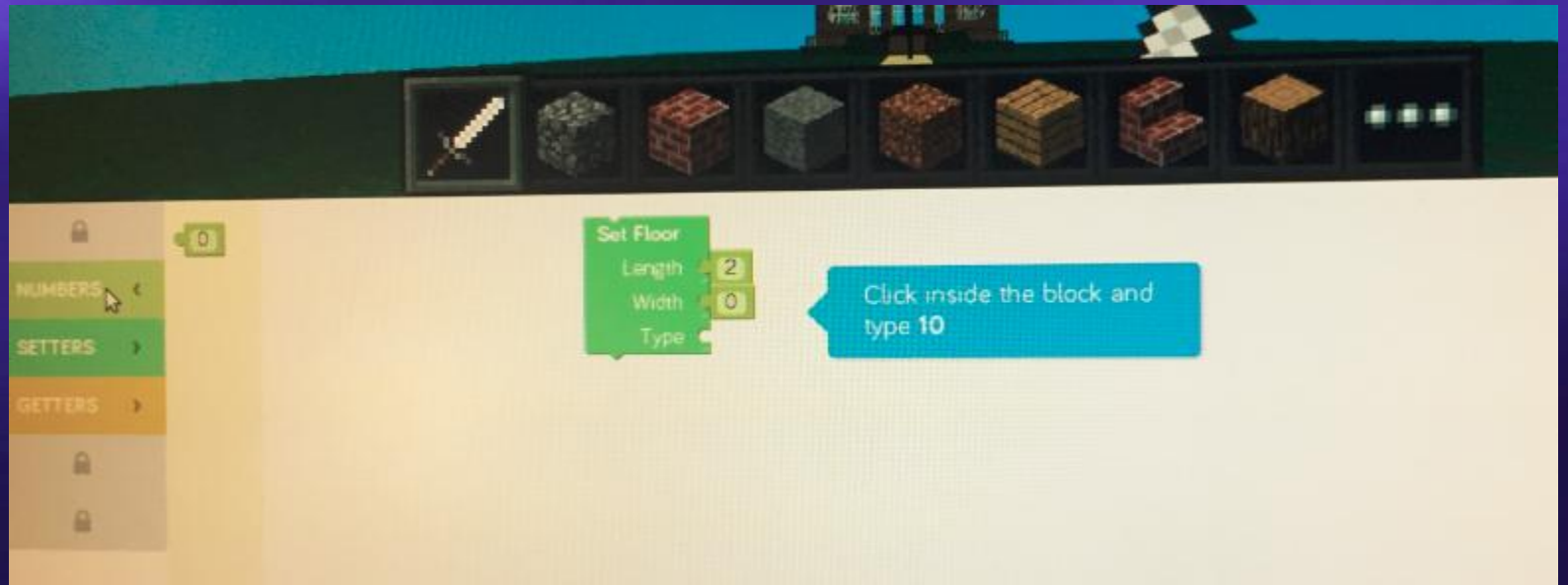
GETTING STARTED WITH MINECRAFT PI

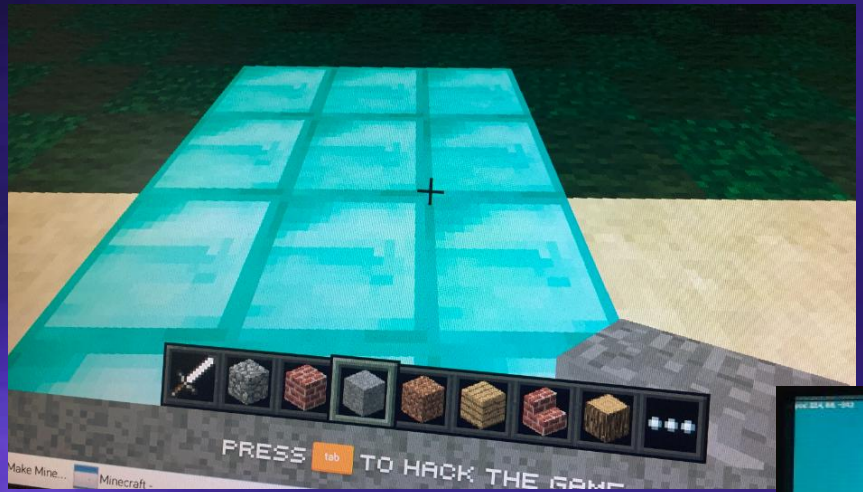
Minecraft is a popular sandbox open-world building game. A free version of Minecraft is available for the Raspberry Pi; it also comes with a programming interface. This means you can write commands and scripts in Python code to build things in the game automatically. It's a great way to learn Python!

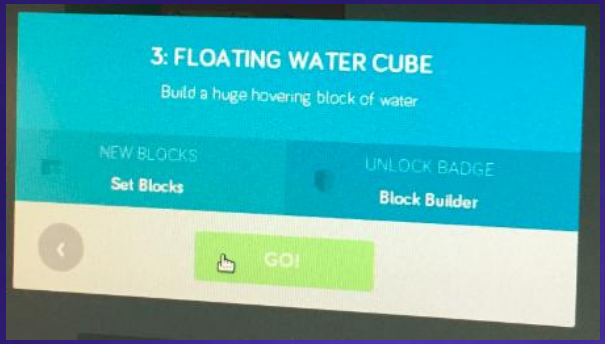
8- Hardware - Kano Computer (Raspberry Pi)

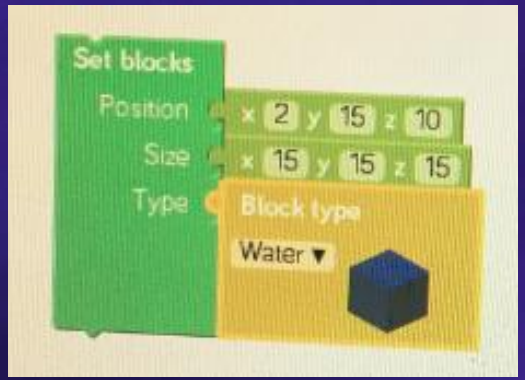


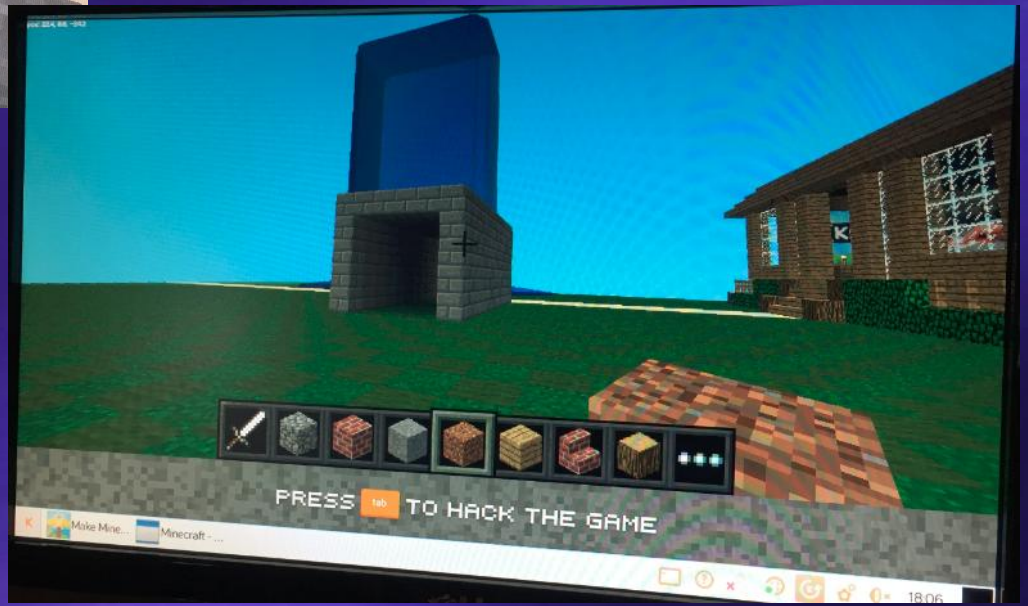

2: DIAMOND FLOOR
Create a whole floor made of nothing but diamond!
NEW BLOCKS
Set Floor
UNLOCK BADGE
GO!


0
NUMBERS
SETTERS
GETTERS
Set Floor
Length
2
Width
0
Type
Click inside the block and type 10


PRESS tab TO HACK THE GAME


3: FLOATING WATER CUBE
Build a huge hovering block of water
NEW BLOCKS
Set Blocks
UNLOCK BADGE
Block Builder
GO!


Set blocks
Position
x 2 y 15 z 10
Size
x 15 y 15 z 15
Type
Block type
Water


PRESS tab TO HACK THE GAME

9- Robots– EV3 – education.lego.com

- Build robot
- Code with Brick Program App
- Upload with USB
- Run

9- Robots– Sphero

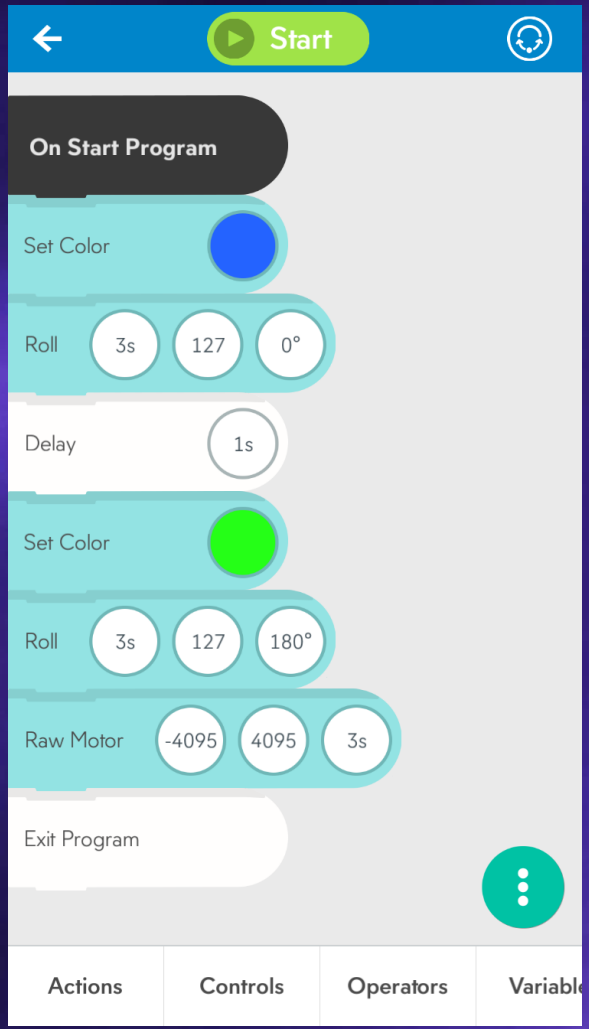
- Sphero – mini robot
  - flip, spin, color change, and roll
  - Uses a C-based language called OVAL
  - Can use blockly app
  - Clear shell – see how it works

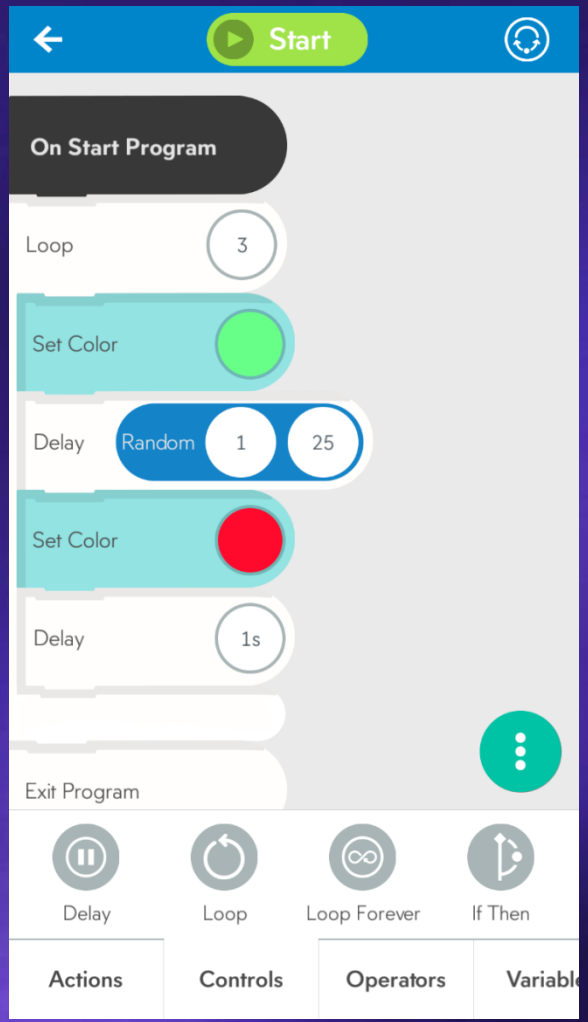
9- Robots– Sphero

TSA paid IBM $47,400 for an app that only pointed right or left

The app is so simple it could have been created by nearly any beginning-level app developer.

MASHABLE.COM | BY KARISSA BELL

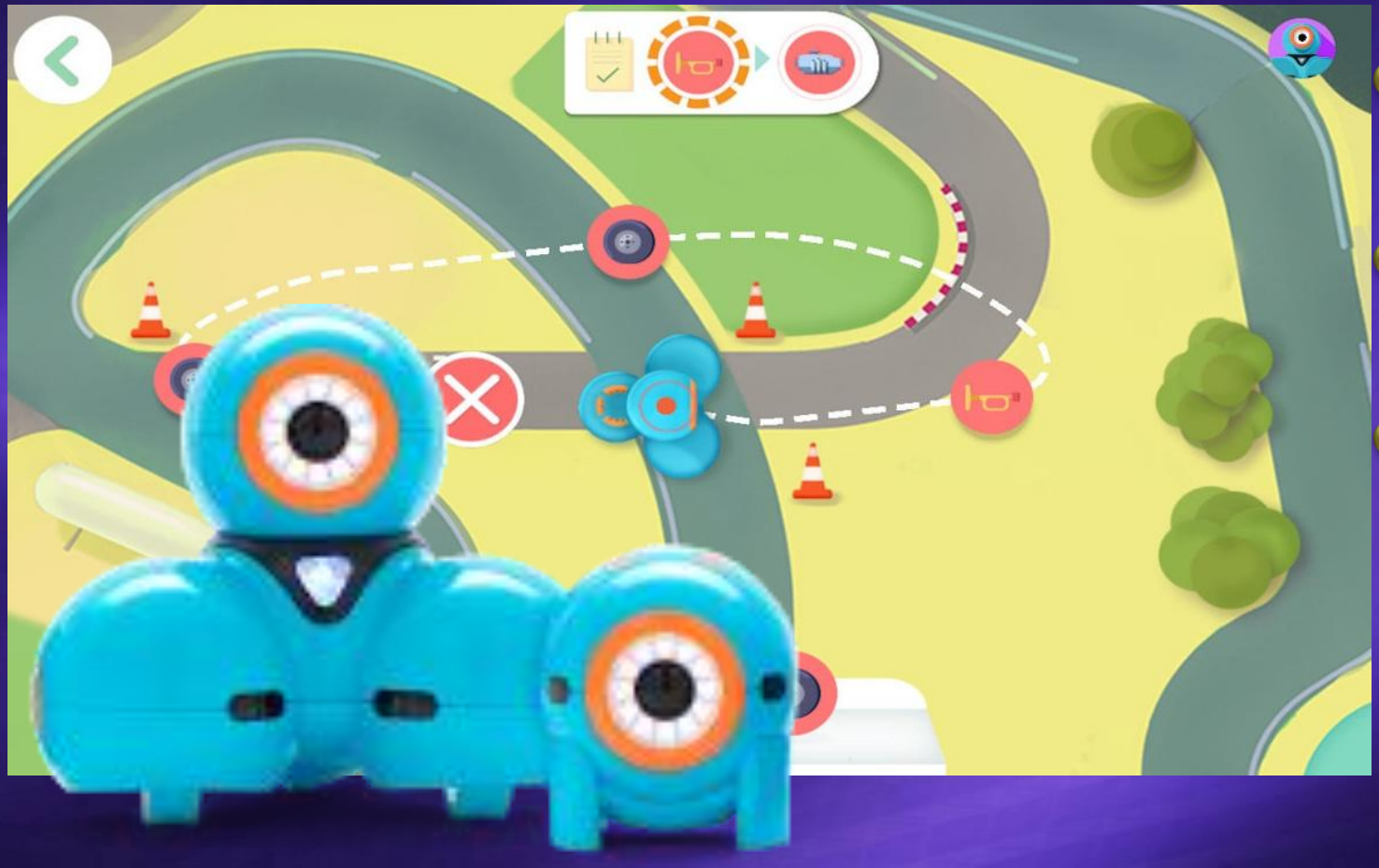

Start
On Start Program
Set Color
Roll
3s
127
0°
Delay
1s
Set Color
Roll
3s
127
180°
Raw Motor
-4095
4095
3s
Exit Program
Actions
Controls
Operators
Variable


Start
On Start Program
Loop
3
Set Color
Delay
Random
1
25
Set Color
Delay
1s
Exit Program
Delay
Loop
Loop Forever
If Then
Actions
Controls
Operators
Variable

9- Robots–Dash and Dot from Wonder Labs

- They are engaging for all ages.
- Interact with movement, sensing and audio automatically
  - Can code different reactions to sensors
- They are compatible with Lego's for building add-ons.
- They are so stinking cute.

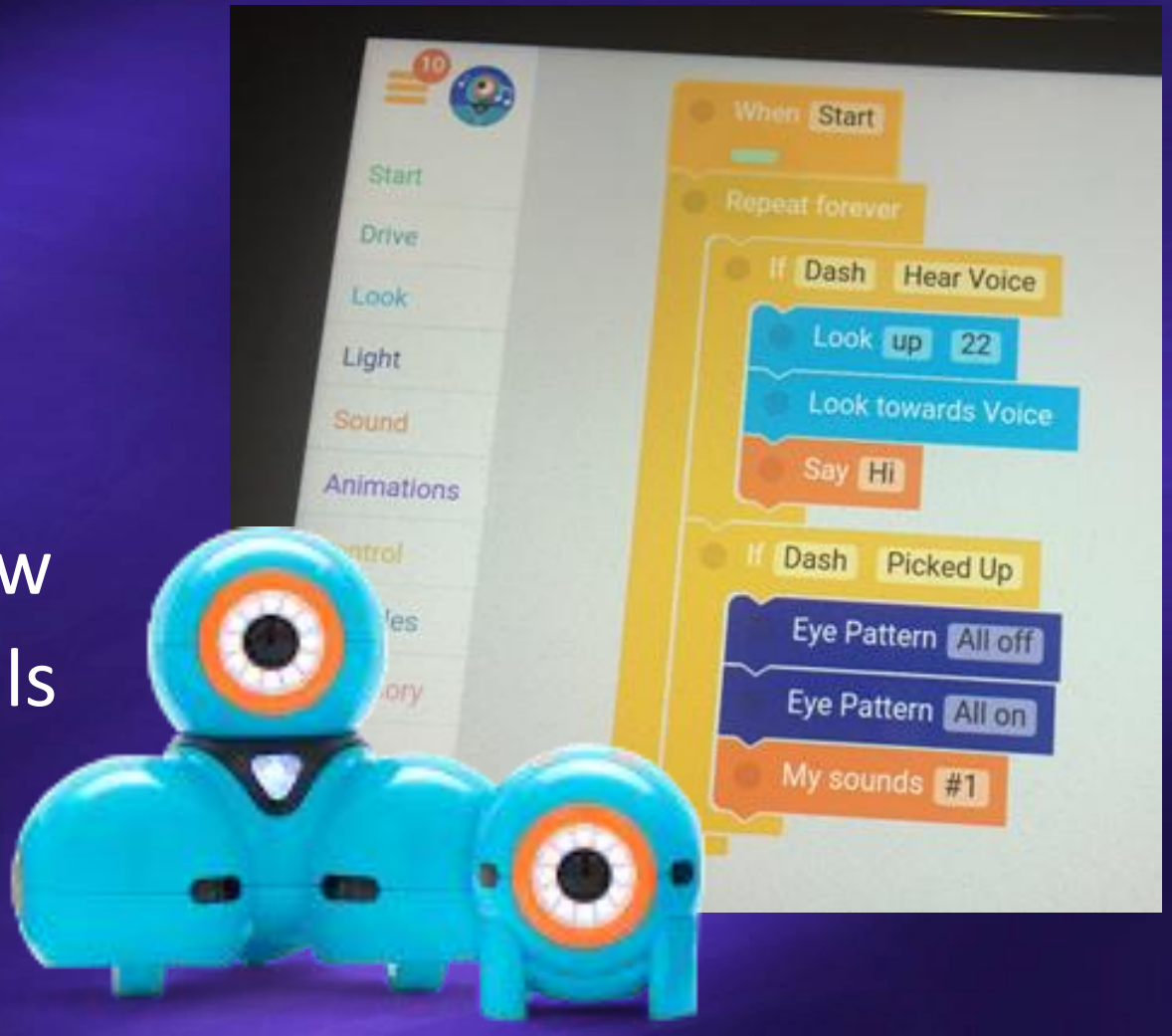
- Dash and Dot



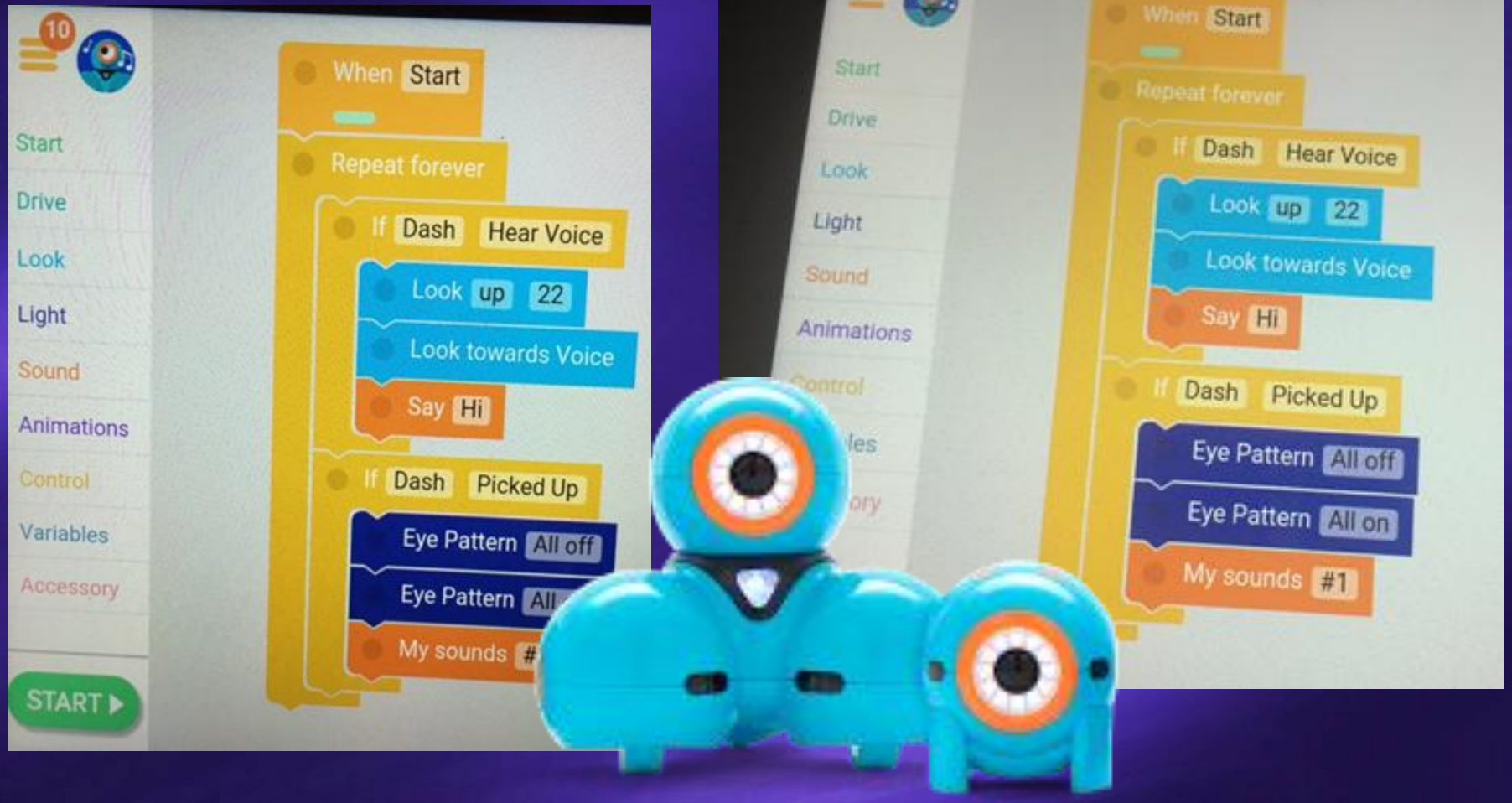
- Algorithm design
- Command sequences
- Sensors and events

- Dash and Dot
  - Building code the way we think

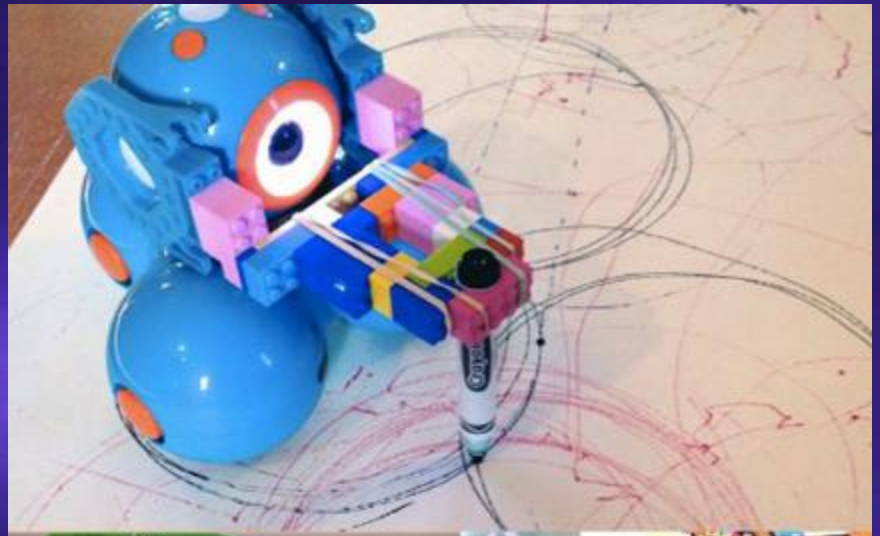
- Dash and Dot
  - Algorithm design
  - Command sequences
  - Control flow
  - Conditionals
  - Loops



Dash and Dot


10
Start
Drive
Look
Light
Sound
Animations
Control
Variables
Accessory
START
When Start
Repeat forever
If Dash Hear Voice
Look up 22
Look towards Voice
Say Hi
If Dash Picked Up
Eye Pattern All off
Eye Pattern All on
My sounds #1

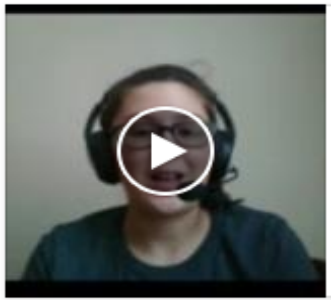
Dash and Dot




When
Top Button
Repeat
10
times
Turn Left
360
Backward
10
very slow

10- Have Them Teach a Class

- Host an Hour of Code
- Speak at a Conference
  - http://tinyurl.com/msch9HOC



Savannah walks you through an Hour of Code - Minecraft style (Channel 9)

This session offers you the chance to participate in the worldwide movement of Hour of Code™ while being guided step by step through the tutorial in your local...

CHANNEL9.MSDN.COM

HOUR OF CODE FOR CAMPERS

Savannah Boedigheimer

That Conference 2015

Day: Wed, Aug 12 **Time:** 1:00 PM **Location:** Cypress *(map)*

Level: 3rd Grade – 5th Grade (and up) **Category:** Family

Tags: beginner, Fun, proramming, easy

This program is designed to demystify code and show that anybody can learn the basics. This is a beginner workshop for campers who have no experience with programming. Every camper should have the opportunity to learn computer science. The Hour of Code is a global movement reaching tens of millions of students in 180+countries, and I am bringing it right here to base camp. No experience necessary! Bring a computer if you want to follow along and give it a try.

HOUR OF CODE

HOUR OF CODE

DECEMBER 14, 2015
3:30-4:30 PM

MARSHALL LYON COUNTY LIBRARY
201 C STREET, MARSHALL, MN

The Hour of Code program is designed to show that anybody can learn the basics. This workshop will complete a new tutorial. Bring a laptop or tablet or use one in the computer lab. (This is recommended for ages 8 and up.)

Top 10 Ways to Teach Your Kids to Code

- Ages 4-8
  - Robot Turtles, LittleCodr
  - Hour of Code/Stratch Jr.
  - Dash and Dot
  - Puzzlets
  - Kano Computer

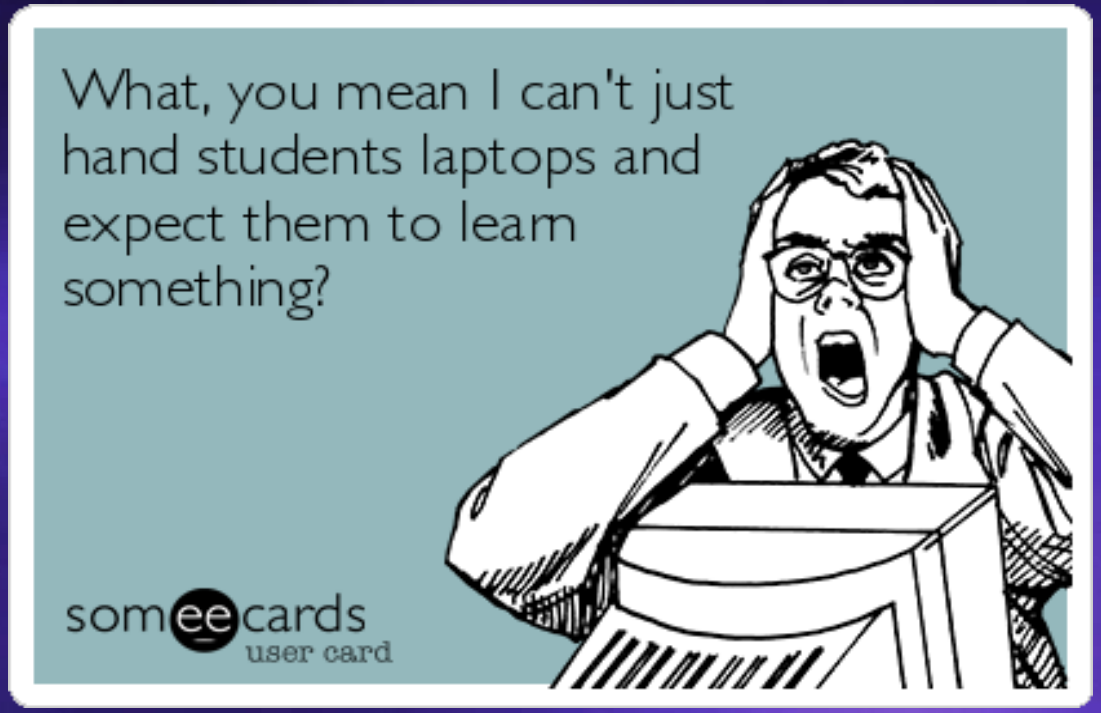
Top 10 Ways to Teach Your Kids to Code

- Ages 7-12
  - CJump
  - Hour of Code/Khan
  - Makey Makey/Codebug
  - Dash and Dot/Sphero
  - Creation Crate/Arduino Kits
  - Kano Computer/ Raspberry Pi

Top 10 Ways to Teach Your Kids to Code

- Ages 11 and up
  - CodeMaster
  - Hour of Code/Made With Code
  - Makey Makey/Codebug
  - Sphero
  - Bits Box / Kids Code and Computer Science Magazine
  - Raspberry Pi, Kano Computer

- List of places to learn to code on Lifehacker- http://tinyurl.com/lifehackerltc
- Infographic of reasons kids should learn to code: http://tinyurl.com/j8pu667
- List of Apps and Websites for Learning to code, reviewed – CommonSenseMedia - http://tinyurl.com/qzkcdqm
- Free books/apps/courses for coding on Github- http://tinyurl.com/gitfree
- List of coding tools by type - http://tinyurl.com/hffv7sz
- Minecraft Pi - **http://tinyurl.com/p76ncen**



Slide Information: isatklb.wordpress.com

Questions:isatklb@gmail.com