

Welcome and Overview

This Dot and Dash kit will introduce your students to coding and computational thinking. These unique robots learn with the students and have a variety of functions and uses.



Curricular Big Ideas and Tie Ins

Kindergarten to grade 3:

- Technologies are tools that extend human capabilities.

Grade 4 and 5:

- The choice of technology and tools depends on the task.

Grade 6 and 7:

- Complex tasks may require multiple tools and technologies.

What's Inside?

- 5 Dashes
- 5 Dots
- Accessories
- 10 chargers
- 3 unplugged lessons with handouts
- 10 challenges
- 9 task cards
- How to make a key handout
- How to use a key handout
- Tips and Tricks Handout
- K-2 Planning Worksheet for Dash
- K-2 Planning Worksheet for Dot
- 3-5 Planning Worksheet
- Challenge Card Checklists
- Blockly Puzzle Tracker
- Reflections Worksheet
- Advanced Reflections Worksheet
- Challenge Card Template
- Troubleshooting Handout
- Problem Solving & Debugging Handout
- Evaluation Rubric
- Vocabulary
- Resources

Device Management: (how to care for Dot and Dash)

- Unboxing: <https://www.youtube.com/watch?v=vDA2sT2qVZ0>
- App Overview: <https://www.youtube.com/watch?v=vxXIMqX2F78>
- Care and Maintenance: https://www.youtube.com/watch?v=zXlp_mzMxL0&t=21s
- Robot Guts: <https://www.youtube.com/watch?v=g8idCcNeIQg>
- Classroom Setup: <https://www.youtube.com/watch?v=eR4yVQ0VPhs>

Getting Started:

- Each Dash and Dot need their own Ipad to run.
- The Ipad will need 5 Wonder Workshop apps: Wonder, Go, Blockly, Path, and Xylo.
<https://www.makewonder.com/apps>
- Make sure Dash and Dot are charged (takes 1 hour).
- On back of the robots is a white power button.
- Turn robots on one at a time with their Ipad.
- Start with the Wonder App: Open the app, Hit the play button, then the orange plus sign in the right hand corner, this will sync your robot to the Ipad.
- On the App go to "Controller" and let the students explore the robots functions.
- On the App start going through the "Scroll Quest" challenges. After completing a few of the challenges the App will unlock the "Free Play" feature.
- Now you have full access to your Dot and Dash!

Intro to Coding:

(Lessons adapted from <https://curriculum.code.org/> as accessed on June 1, 2018):

Unplugged Lessons (without technology)

Introducing computational thinking

Reflective Learning Journal to use throughout the unit for student notes, questions, and reflections of their learning.

<https://drive.google.com/file/d/0B-uvt08wYSQqcU5RRHVtOE1tTlk/edit>

Lesson 1 –Happy Maps:

Help your students understand the difference between planning a sequence and encoding into appropriate language. This lesson teaches students how to read and write in shorthand code.

<https://curriculum.code.org/csf-1718/coursea/5/>

Worksheet/Materials: <https://drive.google.com/file/d/0B-uvt08wYSQqRTVWQ1ZldVR4S1U/edit>
<https://drive.google.com/file/d/0B-uvt08wYSQqQUstcmp2UVJoRU0/edit>

Lesson 2 – Programming in Maze:

Give students Unplugged Blockly Blocks (Grades K-1) - Manipulatives with directional commands like E → (East) and W ← (West).

Show an empty Flurb map from the Happy Map Cards - Worksheet

Starting at the location of the Flurb, use your finger to show students what each block does. Show them how the E → corresponds to the right arrow and moves the Flurb one step to the right.

Ask: "How would you get the Flurb to the fruit using Blockly blocks?"

The students then program the Flurb using the paper Blockly blocks. **Make sure that they understand that the blocks need to go from top to bottom and they all need to be connected!**

Compass Rose Printable for Direction Support: https://drive.google.com/file/d/1m-cX-B7KWxZO58okvOctJ8mN_zV_MsV/view

Programming blocks to create a sequence <https://drive.google.com/file/d/0B-uvt08wYSQqTW9WdU9sb1JpX28/view>

Lesson 3 – Events Unplugged:

Distinguish events from actions!

Event = An action that causes something to happen.

A Series of Events

- Tell your class you are going to ask them questions. They are to put their hand up if they would like to answer.
 - e.g How many thumbs do I have? What is bigger, a bird or a horse?
- Ask students with hands up for the answers
- Ask the class how you knew that the students wanted you to call on them.(students raised hands) Explain to the class that raising their hands is an "event" that causes you to know that they want to be called on.
- Ask the class if they can think of any other events that give signals.

(You may need to remind them that you're not talking about an event like a birthday party or a field trip.)

- If they have trouble thinking of examples, you can remind them that an event is an action that causes something to happen.
 - An alarm clock going off? What does that make happen?
 - Pressing "Start" on the microwave? What does that do?
 - Pressing the power button on your tv remote?

Do you remember helping the Flurbs find fruit?

- You knew where you wanted your Flurb to end up, so you could make a program that took them from start to finish without any interruptions.
- In most real programs, we can't do that because we want to have options, depending on what the user needs.
 - Say that I only want my character to move when my finger is on the screen of my phone. I would need to program the character to only move when I put my finger on the screen of my phone.
 - Putting my finger on the screen would then become an "event" that tells my character to move.

In earlier lessons, we created algorithms that allowed us to control a friend or Flurb for several steps at a time. It was fun and useful, but what happens when you don't know everything that you want your friend to do in advance? This is where events come in!

Directions:

- Show the controller printable (or project to whiteboard)
<https://code.org/curriculum/course1/15/Activity15-TheBigEvent.pdf>
- Decide with your class what each button does. We suggest:
 - Pink Button -> Say "Wooooo!"
 - Teal Button -> "Yeah!"
 - Purple Dial -> "Boom!"
- Practice tapping the buttons on the overhead and having your class react.
- Add some button sequences into the mix and have the students try to keep up with their sounds.
- Let your class know that every time you push a button, it is an "event" that lets them know what they are expected to do next.
- Get the class started on a planned task before interrupting them again with the buttons.
We suggest:
 - Counting to 10
 - Singing "Old MacDonald"
- Once their plan is underway, interject button presses sporadically.
- Continue the blend until they understand the difference between actions that are guided by a plan and those that are event driven.

Controller printable: <https://code.org/curriculum/course1/15/Activity15-TheBigEvent.pdf>

Controlling Events Assessment: <https://code.org/curriculum/course1/15/Assessment15-TheBigEvent.pdf>

Optional Student Activity: Plant a Seed Algorithm (teacher provides planting materials)

The concept of algorithms are related back to everyday, real-life activities by planting an actual seed. Algorithms can be used to help describe things that people do every day. In this activity, we will create an algorithm to plant a seed.

* Cut out the steps for planting a seed

HYPERLINK "https://code.org/curriculum/course1/6/Activity6-RealLifeAlgorithms.pdf" <https://code.org/curriculum/course1/6/Activity6-RealLifeAlgorithms.pdf>

* Choose the six correct steps from the nine total options.

* Glue the six correct steps, in order, onto a separate piece of paper.

* Trade the finished algorithm with another person or group and let them use it to plant their seed! Full Lesson: <https://curriculum.code.org/csf-1718/coursea/3/> Video

<https://play.makewonder.com/challenges.html>

<https://studio.code.org/s/coursea/stage/3/puzzle/1> Worksheet:

<https://code.org/curriculum/course1/6/Activity6-RealLifeAlgorithms.pdf>

Show and Share (demonstration of learning) - try out your algorithm – test someone else's – does it work or does it need tweaking?

Optional: mount seed cards onto cardstock with magnet backings

Lesson Materials:

Background Knowledge needed: Video <https://play.makewonder.com/challenges.html>
<https://studio.code.org/s/coursea/stage/5/puzzle/1>

Background Knowledge needed:

Lesson 3 What are loops? <https://play.makewonder.com/challenges.html>
<https://www.youtube.com/watch?v=3JiEpTmz4xE&feature=youtu.be>

Curricular Links:

ADST and beyond Lesson Materials: Worksheet/Materials <https://drive.google.com/file/d/0B-uvt08wYSQqb2RldWtMRHBwLWs/edit> Manipulatives <https://drive.google.com/file/d/0B-uvt08wYSQqSmgxTVVTcHY3Nnc/edit>

Challenges:

- Hello World:
 - Learn how to record voices onto Dash.
 - Learn how to make Dash respond to voices.
- Secret Code:
 - Learn how to use Dash's buttons to create an "enter the code" game.
 - Learn about sequencing.
- Zoo Party:
 - Discuss ways to use their robots' sounds, movements, and lights to transform them into animals.
 - Learn to program Dash to respond to cues.
 - Practice using Dot Seen, Obstacle Seen, and Branching.
- Juggernaut:
 - Learn new ways to program Dash to respond to their actions.
 - Learn ways to add conditional statements using Wonder.
 - Use measurement to determine how far Dash has traveled.
- Campfire Story:
 - Brainstorm story elements for the story starters.
 - Practice telling impromptu stories.
 - Learn about the role of "random" in state machines.
 - Practice using Custom Sounds, Random Link, and Branching.
- Space Battle:
 - Discuss ways to use their robots' sounds, movements, and lights to transform them into spaceships.
 - Learn to use the Launcher, including calculating distance and adjusting trajectory.
 - Learn to program Dash to detect obstacles.
 - Practice using Obstacle Seen cue and move to behaviour.
- DJ Dot:
 - Discuss the parts of a song and the concept of sampling.
 - String together a variety of sounds to create a song.
 - Practice creating loops.
 - Learn how to add randomization to a state machine.

- **Officer Dash:**
 - Learn new ways to program Dash to see and react to Dot.
 - Create conditional statements using Wonder.
 - Learn how to program complex searching behaviors for Dash.
- **Follow the Leader:**
 - Learn fun new ways to use Dash's distance sensors.
 - Learn ways to add conditional statements using Wonder.
 - Learn about directionality.
- **Dragon:**
 - Learn new ways to program Dash to see and react to Dot.
 - Learn ways to add conditional statements using Wonder.
 - Learn more about Dot's inputs.

Task Cards:

- Dash There and Back 1-4
- Turn Dash into a Car
- Turn Dash into a Fire Engine
- Turn Dash into a Train
- Turn Dash into an Animal
- Turn Dash into an Alien

Vocabulary (from <https://curriculum.code.org/> as accessed on June 1, 2018):

- **Algorithm** - A list of steps to finish a task.
- **Bug** - Part of a program that does not work correctly.
- **Debugging** - Finding and fixing problems in an algorithm or program.
- **Program** - An algorithm that has been coded into something that can be run by a machine.
- **Programming** - The art of creating a program
- **Event** – An action that causes something to happen.

<p>Kit Components:</p> <p>Consumables:</p> <p>Painter's Tape</p> <p>Felt Pens (washable)</p> <p>Dry Erase markers</p>	<p>Technology:</p> <ul style="list-style-type: none"> • Dashes • Dots • Charging station • Ipads (or devices to use with robots) 	<p>Additional Resources:</p> <ul style="list-style-type: none"> • Notebook • Task cards (give examples and then leave blank) • Mats (e.g. 100 chart, alphabet, hopscotch, agility ladders, maps, etc.) • Trivia Questions (some leading ones along with dry erase blank ones)
<p>Curricular Links/Big Ideas</p>	<p>Learning Outcomes Links</p>	<p>Lesson/Idea</p>
<p>Core Areas:</p>		
<p>Math</p>	<p>Measurement</p> <p>Angles</p> <p>Counting</p>	<ul style="list-style-type: none"> • Measure distance it takes from Dash to get to Dot. • Perimeter/Area/Turns etc. To make it through a maze • 100 Chart puzzles (skip counting) • Number Trail e.g. put out numbers and move robot to/from etc. (skip/pattern counting)
<p>Language Arts</p>		<p>Writing about the adventures of Dash and Dot</p> <p>Retelling familiar stories (designing sets and costumes)</p> <p>"Going on a Bear Hunt" - Illustrate the story as Dash moves through it</p> <ul style="list-style-type: none"> • Sight word cards • Alphabet mats

		<ul style="list-style-type: none"> •
Social Studies	mapping	<ul style="list-style-type: none"> • Map Dash's route from one destination to the next on a map – consider adding historical features e.g. STOP – choose a fur to trade. Which one and why? Or STOP choose a means of transportation. Which one and why?
Science	Role of Technology Force and Motion Gravity	<ul style="list-style-type: none"> • Trivia task cards • Friction (what surfaces work best?) • How to make a robot – what's inside?
Project Ideas – ADST		<ul style="list-style-type: none"> • Building with lego and other materials • Design playground/obstacle course • Coding • Build game/sport (e.g. bowling/soccer) • Build an elevator or lift for dot
Arts	<ul style="list-style-type: none"> • Elements and Principles of design • Drama • Speaking/Listening • Dance • Music 	<ul style="list-style-type: none"> • Design sets and costumes for robots • Colour (coding light changes) • Voice Recordings of sound effects and short stories • Code a Dance – choose a song – make a costume- build a stage – perform with a felt

		pen to record a picture of the dance
Core Competencies (great connections to all)	I can persevere with challenging tasks	<ul style="list-style-type: none">• Reflections on their process and progress. Communicating things going well and things bringing challenges and identifying next steps

Resources:

<https://education.makewonder.com/>

<https://play.makewonder.com/challenges.html>

<https://code.org/>

http://www.thedigitalscoop.com/the_digital_scoop/2015/02/changing-dash-challenges.html

http://www.thedigitalscoop.com/the_digital_scoop/2015/01/dash-and-dot-robots-blockly-with-1st-graders.html

<https://play.makewonder.com/uploads/6/2/6/5/62657913/1helloworld.pdf>

<https://play.makewonder.com/uploads/6/2/6/5/62657913/2secretcode.pdf>

<https://play.makewonder.com/uploads/6/2/6/5/62657913/3zooparty.pdf>

<https://play.makewonder.com/uploads/6/2/6/5/62657913/4juggernaut.pdf>

<https://play.makewonder.com/uploads/6/2/6/5/62657913/5campfirestory.pdf>

<https://play.makewonder.com/uploads/6/2/6/5/62657913/6spacebattle.pdf>

<https://play.makewonder.com/uploads/6/2/6/5/62657913/7didot.pdf>

<https://play.makewonder.com/uploads/6/2/6/5/62657913/8officerdash.pdf>

<https://play.makewonder.com/uploads/6/2/6/5/62657913/9followtheleader.pdf>

<https://play.makewonder.com/uploads/6/2/6/5/62657913/10dragon.pdf>

<https://drive.google.com/file/d/0B06DSGXn1rXIOVlINVbZcEQ4RFk/view>

<https://drive.google.com/file/d/0B06DSGXn1rXIX2pDeWFIUnpvcE0/view>

<https://play.makewonder.com/using-a-key.html>

<https://play.makewonder.com/making-a-key.html>

<https://education.makewonder.com/assets/files/resources.pdf>

<https://drive.google.com/file/d/0B-uvt08wYSQqb2RldWtMRHBwLWs/edit>

<https://drive.google.com/file/d/0B-uvt08wYSQqRTVWQ1ZldVR4S1U/edit>

<https://drive.google.com/file/d/0B-uvt08wYSQqQUstcmp2UVJoRU0/edit>

<https://code.org/curriculum/course1/6/Activity6-RealLifeAlgorithms.pdf>

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<https://drive.google.com/file/d/0B-uvt08wYSQgcU5RRHVtOE1tTlk/edit>

Created by: Kara Dawson, Lauren Geneau, and Alissa Pratt