Bringing CODING & Creativity to the Classroom

Content provided by littleBits education
CODING + CREATIVITY

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BUILD GAMES. LEARN TO CODE.

Bringing coding + creativity to the classroom

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sr. manager, education
@littleBits
AGENDA

- CURRENT SITUATION
- INTRODUCTION TO LITTLEBITS
- CREATIVITY + CODING IN THE CLASSROOM
- BUILD GAMES. LEARN TO CODE. AN INTRODUCTION TO THE CODE KIT
- TIPS FOR BRINGING CODING TO YOUR CLASSROOM OR SCHOOL
CURRENT SITUATION

- High tech use, low tech understanding among youth
- Coding has a high perceived barrier to entry
- Coding languages and platforms are constantly changing
- Girls, students of color and low-income students have persistent achievement gaps in STEM
- The jobs of tomorrow will require creativity and innovation - in addition to coding skills
OUR MISSION

TO EMPOWER EVERYONE TO CREATE INVENTIONS, LARGE AND SMALL, WITH OUR PLATFORM OF EASY-TO-USE ELECTRONIC BUILDING BLOCKS.
AN EVER-GROWING LIBRARY
COLOR-CODED

BLUE = POWER
Power Bits, plus a power supply, run power through your circuit.

PINK = INPUT
Input Bits accept input from you or the environment and send signals that affect the Bits that follow.

ORANGE = WIRE/LOGIC
Wire Bits connect to other systems and let you build circuits in new directions.

GREEN = OUTPUTS
Output Bits do something—light up, buzz, move...
A GROWING ECOSYSTEM

littleBits

IFTTT

ARDUINO

Google for Education

LEGOfor Education

Makey Makey
LITTLEBITS GROWS WITH YOU

- Lights, Sounds + Switches
- Motion
- Environment Sensors
- Basic Logic + Programming
- Coding
- Cloud
- Hardware Development

HIGH CEILING
LOW FLOOR
In a lesson on the electromagnetic spectrum, students use littleBits to learn about the visible light spectrum and understand how our eyes and brains interpret light.

In a Social Studies unit on Inventors and Inventions, students use littleBits to create an invention to improve the standard of living for people living today.

In this project, students collaborate to create an autonomous drawing machine while also learning about energy and engineering.

In this advanced level lesson, students use the Bits to learn about the binary number system and the process of counting in binary.
CREATING + CODING IN SCHOOLS:

The Opportunity
“EVERY MAKER OF VIDEO GAMES KNOWS SOMETHING THAT THE MAKERS OF CURRICULUM DON'T SEEM TO UNDERSTAND. YOU'LL NEVER SEE A VIDEO GAME BEING ADVERTISED AS BEING EASY. KIDS WHO DO NOT LIKE SCHOOL WILL TELL YOU IT'S NOT BECAUSE IT'S TOO HARD. IT'S BECAUSE IT'S – BORING”

- Seymour Papert (1928–2016)
CREATING & CODING IN SCHOOLS: THE OPPORTUNITY

- The careers of tomorrow will require creative problem-solvers.
- At its core, coding is another tool for creating.
- Combining the project-based and hands-on learning with coding can help boost student engagement while teaching foundational skills.
THE LITTLEBITS CODE KIT
BUILD GAMES. LEARN TO CODE.

The littleBits Code Kit is an intro to coding that engages students through an activity they love: making and playing games. As a bonus, it’s easy to teach - even with no prior STEM/STEAM experience.

It combines electronic building blocks with approachable drag-and-drop Block based programming, providing a foundation of coding as a creative tool that can power real-world inventions.
NEW BITS!

- littleBits codeBit
- LED Matrix
- Rechargeable Battery
THE INVENTIONS

- TUG OF WAR
- VARIABLES
- HOT POTATO... OF DOOM!
- ROCKSTAR GUITAR
- FUNCTIONS
- ULTIMATE SHOOTOUT
- LOGIC
- LOOPS
THE APP

CONTROL YOUR ANIMATION WITH A BUTTON

START

SET score TO 1

DO FOREVER

IF SIGNAL FROM in 1 is on

DO

ADD 1 TO score

SEND SCROLLING TEXT score TO out 1

GET READY TO TACKLE SOME LOOPS BY WATCHING THE VIDEO BELOW!

NEED A HINT?

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna.

CONNECTED TO Eggplant Dine

CLEAR CODEBIT  UPLOAD
Online Resources

- 10 Lessons
- 100+ Activities
- Coding Video Tutorials
- Classroom Management Tips
- Challenge Cards & Certificates
- Assessment Tools
- NGSS Curricular Crosswalk
TIPS & TRICKS
TOP TIPS FOR BRINGING CODING TO YOUR SCHOOL

1. **CHOOSE STARTING ACTIVITIES WITH A LOW BARRIER TO ENTRY**
   You want all students to feel comfortable getting started with coding. Code.org has great resources.

2. **IT’S OKAY TO LEARN ALONGSIDE STUDENTS**
   But trying out inventions beforehand can make life easier.

3. **CONNECT WITH OTHER FACULTY**
   And give them a chance to learn with you. Librarians are often a great resource!

4. **UNDERSTAND YOUR SCHOOL’S IT PROCESS**
   Do you want to download apps for 30 students? Best to do ahead.

5. **MAKE IT CREATIVE & RELEVANT**
   Making a project relevant to a student’s life is tuardware or software, students should know how to treat materials.
TOP TIPS FOR BRINGING CREATIVITY & CODING TO YOUR SCHOOL

HAVE FUN!

This is new and exciting and your students are going to take it in all sorts of directions.
Starting a Coding Program

Presented by Chris Kunkel
Math Teacher • STEM Coordinator
Hoboken Charter School
May 4, 2017

Agenda

How I started
Ways to invest students
Project Resources

Slides can be found at: bit.do/webinar-5-4-17
How I started

appinventor.mit.edu
How I started

MIT App Inventor

- Jumped in
- Did tutorials
- Not the easiest starter program, though not so bad either

appinventor.mit.edu
Students need a reason to code.
Students need a reason to code.

Corollary: Tutorials are a good starting point but not enough for sustained interest.
Second Try

- Better for beginners
- Fewer UI issues
- Issued challenges

scratch.mit.edu
## Scratch Challenges

**Name __________________**

**Become a Coding Master!**

### Level 1

<table>
<thead>
<tr>
<th>Challenge</th>
<th>Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glide Around the Screen</td>
<td>Make the Cat glide around the edge of the screen using just the glide block and turn block.</td>
</tr>
<tr>
<td>Move in a Rectangle</td>
<td>Make the cat move in a rectangle using the following blocks: repeat 4, repeat 10, move 10 steps, turn 60 degrees.</td>
</tr>
<tr>
<td>Walking Cat</td>
<td>Make the Cat “Walk” across the screen and say things using the speech bubble. Hint: use next costume.</td>
</tr>
</tbody>
</table>
Some kids will get super into coding and it will be really fun.
Some kids will get super into coding and it will be really fun.
Corollary: Others will be bored.
Third Try

Girls Who Code

- Not a platform
- A community

girlswhocode.com
Lesson Learned

Investment is key.
Lesson Learned

Investment is key.
Corollary: Celebrate success, particularly the small ones.
The Trash Analyzer

By: Alison, Austin, and Sophie

Our Project

Infrared Receiver
Arduino Board
Speaker

Infrared LED
Infrared Receiver

Ways to invest students

ProjectCSGIRLS

competition

projectcsgirls.com
Ways to invest students

competition

clubs.makewonder.com
Ways to invest students

appchallenge.tsaweb.org

Many examples of competitions

VERIZON INNOVATIVE APP CHALLENGE

vexrobotics.com/competition/

Google Code-in
codein.withgoogle.com
Ways to invest students

Schoolwide Events

HOUR OF CODE
Ways to invest students

Schoolwide Events

Share day
Ways to invest students

Schoolwide Events

A hackathon (also known as a hack day, hackfest or codefest) is a design sprint-like event in which computer programmers and others involved in software development, including graphic designers, interface designers, project managers, and others, often including subject-matter experts, collaborate intensively on ...

Hackathon - Wikipedia
https://en.wikipedia.org/wiki/Hackathon

codinginmathclass.wordpress.com/2015/12/15/computer-science-education-week-at-preston/
Ways to invest students

LittleBits Challenges

littlebits.cc/projects/littlebit-makeymakey-bobsled
Project Resources

Teacher created

Scratch Club Rules (with sound)
by scratchatmg

Before we do anything, we need to go over the rules for Scratch Club.

leosandssophia.com/scratchatmg

INTRODUCTION TO SCRATCH COMPUTER PROGRAMMING LESSON SERIES

TEACHING KIDS TO CODE
A Collection of Math Modelers
for the Scratch Programming Language
to Accompany a 4th Grade Math Curriculum

Programmed and Written by:
Jeffrey Gordon
Scratch Username: jgordon510

bit.do/scratchmath
Project Resources

Making Math in Scratch

Teacher created

mrhonner.com/?s=scratch

scratched.gse.harvard.edu/stories/making-math-scratch
And stay tuned for more chats on the 2nd and 4th Tuesday of each month! #ScratchEdChat

A2. To help debugging become “hard fun,” in the words Papert, created a bug wall: scratched.gse.harvard.edu/stories/see-in... #ScratchEdChat
Project Example

Computer Science Impact Project - Complete a project to address a community, national or global issue.
Project Example

Design a video game to help fellow students practice math skills.
Project Example
Design a game.
Thank you for watching.
CODING AND CREATIVITY
IN THE ELEMENTARY MAKERSPACE

KELLY KNIGHT
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RIVERSIDE PRESBYTERIAN DAY SCHOOL
JACKSONVILLE, FL

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@MSKELLYKNIGHT
GETTING STARTED...
WHY CODE?

Computational thinking
Problem solving
Modern literacy
Systematic reasoning
Collaboration
Innovation
Creativity
And more!
PASSION, FLEXIBILITY, SUPPORT
BRINGING CODING TO YOUR SCHOOL
TOOLS AND TOYS

littleBits
Sphero
KIBO
MaKey MaKey
LEGO WeDo
Scratch
Scratch Jr.
Kodable
SPHERO
write a program about
Phases of Matter
1. solid
2. liquid
3. gas
for Sphero
MAKEY MAKEY AND SCRATCH
LEGO WEDO
SCRATCH JR
HOUR OF CODE
BUBBLES AND BINARY
Dear Ms. Knight

Thanks for teaching me this year!

My favorite thing about you is

You are fun to be around.

My favorite thing about your class is creating.
<table>
<thead>
<tr>
<th>RESOURCES</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>littleBits</td>
<td>littlebits.cc</td>
</tr>
<tr>
<td>Sphero 2.0</td>
<td><a href="http://www.sphero.com/education">http://www.sphero.com/education</a></td>
</tr>
<tr>
<td>KIBO</td>
<td><a href="http://kinderlabrobotics.com">http://kinderlabrobotics.com</a></td>
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<td>Makey Makey</td>
<td><a href="http://makeymakey.com">http://makeymakey.com</a></td>
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<td>LEGO WeDo 2.0</td>
<td><a href="https://education.lego.com/en-us">https://education.lego.com/en-us</a></td>
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<td>ScratchJr</td>
<td><a href="http://Scratchjr.org">http://Scratchjr.org</a></td>
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<tr>
<td>Scratch</td>
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<td>Kodable</td>
<td><a href="https://www.kodable.com/">https://www.kodable.com/</a></td>
</tr>
</tbody>
</table>
Thank you for joining us!

QUESTIONS?

CONTACT: education@littlebits.cc
OR VISIT: littlebits.cc/education