Bring Hands-On Coding and STEAM Into Your District or Classroom

Content provided by littleBits™ education
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AGENDA

- Learn about you
- State of Education, Today!
- littleBits design and education philosophy
- Invention-based learning
- Review case studies and best practices in integrating STEM into your curriculum
- Questions? We’re here to answer
Education is no longer about teaching a particular skill – it’s about helping students to be future-ready.

**DID YOU KNOW?**

65% of today’s students will have careers that don’t exist yet.

littleBits is at the forefront of invention-based learning

**Learning Mission:**
- Critical Thinkers and Problem Solvers
- Collaborators
- Creators
- Communicators

**Attitudes:**
- Identify as innovators and change makers
- Embrace failure
LOW FLOORS, HIGH CEILING, WIDE WALLS

SEYMOUR PAPERT (1928, 2016)
BUILD YOUR FIRST CIRCUIT

GRAB SOMETHING BLUE, AND SOMETHING GREEN.

SNAP THEM TOGETHER TO BUILD YOUR FIRST CIRCUIT
BUILD YOUR FIRST CIRCUIT

GRAB SOMETHING BLUE, AND SOMETHING GREEN.

SNAP THEM TOGETHER TO BUILD YOUR FIRST CIRCUIT
BUILD YOUR FIRST CIRCUIT

GRAB SOMETHING PINK.

SNAP THE PINK IN BETWEEN BLUE AND GREEN BITS
BUILD YOUR FIRST CIRCUIT

GRAB SOMETHING PINK.

SNAP THE PINK IN BETWEEN BLUE AND GREEN BITS
HOW IT WORKS
FOR EVERY LITTLEBITS INVENTOR THERE IS A MOMENT.
WORLD’S BUILDING BLOCKS
WORLD’S BUILDING BLOCKS
**littleBits EDUCATION OFFERINGS**

**STEAM STUDENT SET**

Complete Engineering & Design Solution

- Build with inputs, outputs, sensors, and motors
- Learn engineering design cycle – build, refine, remix
- Gain creative confidence and 21st century skills through inventions, robots, toys, machines, and much more
- Aligned with NGSS standards

**CODE KIT**

Complete Computer Science Solution

- Build hardware – “inside the machine”
- Learn software/coding – “talk to machine’s brain”
- Bring your codes to life through storytelling, live animation, music, inventions, game design, and much more
- Aligned with NGSS and CS standards
IMAGINE WHAT YOUR STUDENTS CAN INVENT WITH LITTLEBITS.
MAKING + STEM

Emphasis on learning about STEM through making

Being told procedures and concepts before problem solving can inadvertently undermine the learning of deep structures in STEM. (Schwartz, Chase, Oppezzo, & Chin, 2011)

Students who invented formulas through problem solving gained a deeper understanding of physical structures and transferred their knowledge more frequently than students who were told and then practiced through problem solving.
SPACE

Bringing STEM in the school library’s maker space or have a dedicated “STEM lab”

STEM in a cart and sharing among different classrooms
MATERIALS

Tip #1: Invest in cross-compatible materials that can be mixed with other tools in your space.

Combining static building blocks like Lego with electronic building blocks.
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A HOW CAN YOU LEVEL-UP YOUR CAR? LET'S EXPERIMENT!

CHANGE HOW YOU CONTROL THE CAR.

- Use inputs other than the slide dimmer. Try a light sensor you control with a flashlight, or string two wires together with a button to have a “remote” control.

B SUPE IT UP!

- Add a siren using lights or the buzzer, or a speedometer using the number Bit.
- Give your vehicle a body or form. Give it some character!
- Use LEGO® to build a bigger car or even a train.

C BUILD A TRAILER FOR YOUR VEHICLE USING MATERIALS AROUND YOU.

- How much stuff can your vehicle haul?

HOST A CAR SHOW! Present the best features of the car you made. Let others test drive it.

ASK YOUR FRIENDS WHAT THEY WOULD USE YOUR VEHICLE FOR – sending messages, passing snacks, borrowing pencils – and show them how it could accomplish that function.
MATERIALS

Tip #2: Invest in tools that are reusable and can be configured and remixed in many different combinations

Ex: Modular systems like Lego, littleBits, and Strawbees; programmable robots like Wonder Workshops
MATERIALS

Tip #3: Invest in tools that are gender neutral. Students are the ones who should bring “personalities” to their creations and not the other way around.

Gender gap in technical fields is not about girl’s lack of interest in STEM subjects – it’s about losing that interest due to lack of opportunities to engage in meaningful STEM activities. Early STEM experiences matter.

74% of girls in middle school are interested in STEM

Only 18% of computer science graduates are female
Implementation challenge: Finding the time to dedicate to STEM and Coding
NOVEL ENGINEERING

An integrated approach to teach engineering and literacy

1. Read a book and identify problems
2. Scope problems and brainstorm solutions
3. Design a solution
4. Get feedback
5. Improve designs
6. Share
“In science the fourth graders learn about circuitry and transformation of power from battery power to movement, and lighting up,” said Landgraf. “The littleBits curriculum reinforces and makes that connection stronger and more real for them.”

Using littleBits, students were tasked with creating a sculpture that moves, lights up and is interactive. Additionally it needed to incorporate a piece of artwork from a well known artist that Landgraf assigned. The two main goals for students during the lesson were working together as a group and learning how to solve problems creatively.
MAKING EXPERIENCES

New Jersey educators Laura Fleming and Billy Krakower, one from elementary and the other from high school teamed up!

• Pair up older and younger students
• Throw away the directions
• Encourage student voice
• Focus on experiences, not projects
• Ask, "What else?"
• Give a guiding question
SCHOOL BUS TURNED INTO A MAKERSPACE
“Once students have mastered a few simple tasks, give them a task while withholding the most obvious Bits. Limiting the materials forces them to be more creative.” – Diana Rendina

“Give the kids 10–15 minutes of playing when introducing littleBits. Then ask them, ‘What have you noticed? What observations have you made about it? What works? What doesn’t?’” – David Saunders

“Give students open-ended prompts, like “Build something that draws something.” Instill creative confidence by telling them, ‘Trust yourself; there is no right answer. Instead, focus on what the questions are that we need to ask to find a solution,’” – Saunders

“Set up kits during the summer months and allow summer reading program participants to earn a badge for tinkering with littleBits.” – Holly Arnason
ASSESSMENT

Focus on the process and not the final project

Share the failures and obstacles

Share how you overcame the barriers and the lesson learned through the process

Discuss ideas for further research and development
TRUST IN CONSTRUCTIVISM

Constructivism: let students construct their own knowledge.


Trust your students and they will amaze you!

And remember, it’s ok if you do not know something BUT help them to learn how to find answers when you don’t know them.
OUR HEARTS BITS FOR EDUCATORS!
THANK YOU.

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