

A close-up photograph of a young girl with dark hair, wearing a light blue shirt, focused on working with a microcontroller board. She is using her hands to connect colorful jumper wires to the board. The background is blurred, showing what appears to be a classroom or workshop setting.

# Making in Education

THE OPPORTUNITY TO POWER STEAM EDUCATION WITH INTEL-BASED SOLUTIONS

# Making



# WHAT IS THE MAKER MOVEMENT

The **maker movement** is a growing community of artists, scientists, craftspeople, amateurs, professionals, tinkerers, and engineers **celebrating personal creativity, ingenuity, and empowerment.**

**Learning-by-doing** has long been recognized as a powerful educational context. The **Maker Movement overlaps with the natural inclinations of children and the power of learning by doing.**



The collaborative, project-based nature of maker activities build and support many of the skills identified as critical to the 2020 workforce.

### Skills Needed in 2020

Required Skills



COMPUTATIONAL  
THINKING



DESIGN  
MINDSET



COGNITIVE LOAD  
MANAGEMENT



NEW-MEDIA  
LITERACY



CROSS-CULTURAL  
COMPETENCY



SENSE MAKING



VIRTUAL  
COLLABORATION



TRANSDISCIPLINARY



SOCIAL  
INTELLIGENCE

# WHY BRING 'MAKER' TO FORMAL EDUCATION



Neurological research shows that when students are emotionally engaged with their subject they learn more and retain longer



Exposing students to creating technology from an early age helps to demystify technology and gives them deeper insight into everyday tools



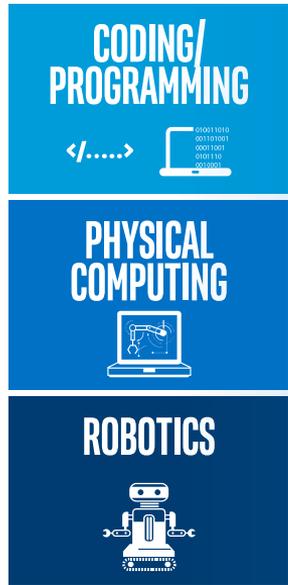
A creative, project based, approach can be applied to a wide range of subjects and helps hit technology standards



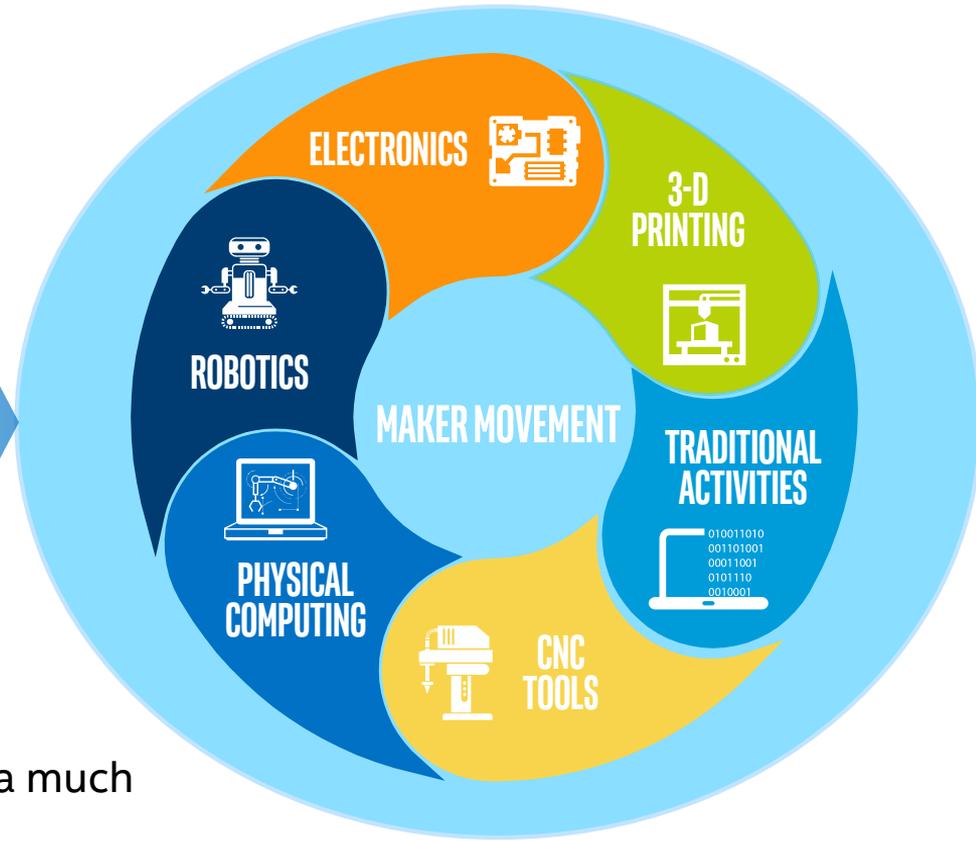
Early introduction to the inner workings of technology can overcome gender biases before they start



# HOW IS MAKER IMPLEMENTED?



Making with  
technology:  
Centered around  
three sub-  
disciplines



Opening up opportunities in technology to a much broader set of learners

# INTEL BASED OFFERINGS FOR MAKERS

At Intel we know that the best way to learn is by doing. That's why we have joined forces with the founders of Arduino\* to transform the way technology is taught in schools around the world

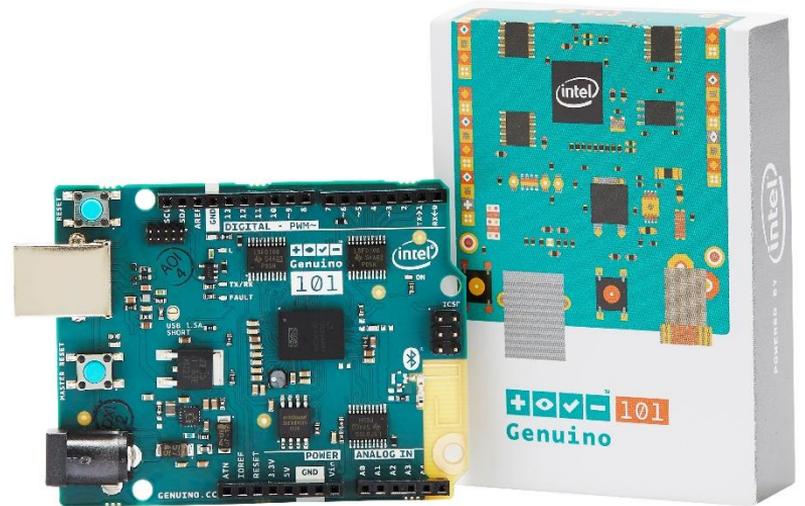
Arduino/Genuino 101\* Board Powered by the Intel® Curie™ Module is designed to give students the power to make what they imagine.

\*The board is named Arduino 101 in the United States, Genuino 101 in the rest of the world



# ARDUINO/GENUINO\* 101 LEARNING BOARD, POWERED BY INTEL

- Simple circuit board, making it easy to learn about electronics.
- Start programming with the open source development environment from the founders of Arduino using a Windows\*, Mac OS\* or Linux computer
- Powered by the Intel® Curie™ Module
- Hardware features for today's more advanced connected use cases



\*The board is named Arduino 101 in the United States, Genuino 101 in the rest of the world

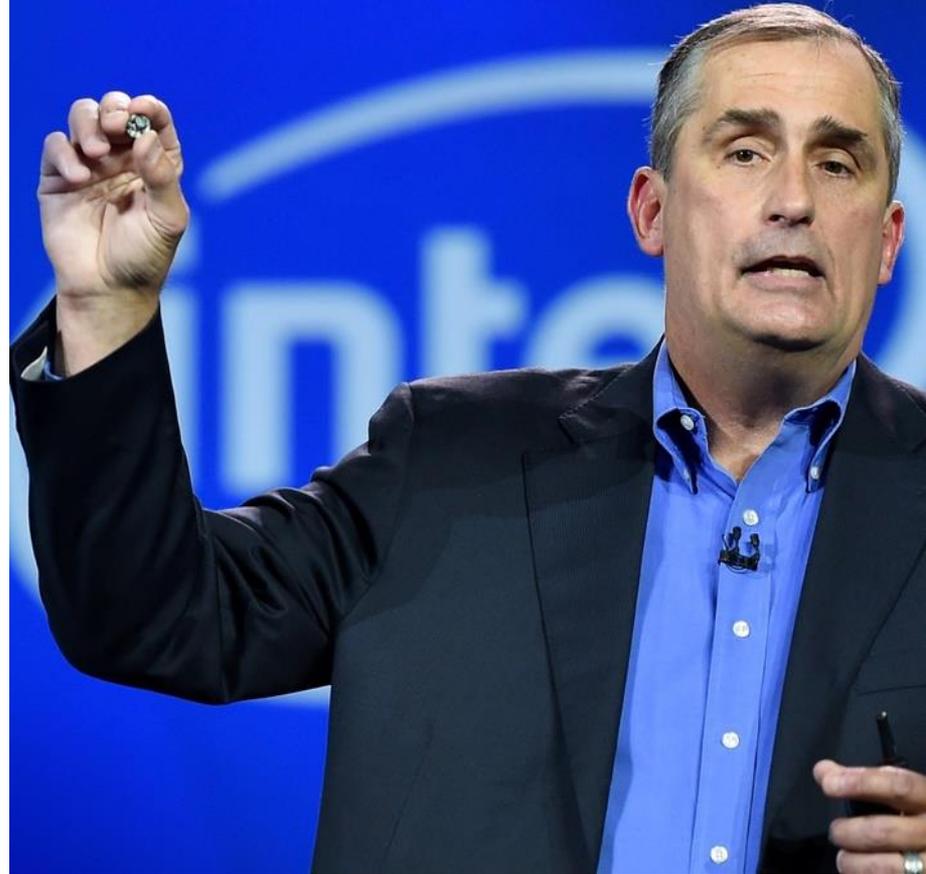
# THE INTEL® CURIE™ MODULE

At the heart of the Arduino/Genuino 101\* Learning Board is a feature rich Intel processor, which offers the performance needed for most demanding projects with minimum power consumption.

The Intel® Curie™ Module provides functions that would normally require add-on boards like built in wireless communication and an acceleration sensor. With this affordable maker board, students can begin to understand some of the fundamental technologies in the devices they use everyday.

## ★ ★ ★ Features

- Low-power, 32-bit Intel® Quark™ microcontroller
- 384kB flash memory, 80kB SRAM
- Bluetooth low energy
- Low-power, integrated DSP sensor hub
- 6-axis combo sensor with accelerometer and gyroscope



# Enabling Adoption

The recent maker renaissance in Education has pushed the use of Maker in Education from Innovators to Early Adopters.

In order to effectively implement, you should consider:

- Maker boards such as Arduino/Genuino 101
- Maker kits with parts to do multiple projects
- Localized lessons, projects and how-to guides to support maker kits
- Kits that are part of, or easily integrated into, local curriculum and standards
- Professional development
- Support

# EXAMPLES OF MAKER KITS & PROGRAM OFFERINGS

## SparkFun Inventor's Kit (SIK) for Arduino\*/Genuino\* 101



- Includes everything necessary to complete 20 circuits
- No previous programming or electronics experience necessary to use the kit.
- Teaches the know-how to start creating personal projects and experiments

## SIK for Google Science Journal App (for Arduino\*101 – US only)



- Contains a collection of parts from SparkFun that support activities developed by Google and the Exploratorium in San Francisco
- Preprogrammed with firmware that will enable Google Science Journal to remotely read data from a connected sensor

## Seed Studio Grove Kit (for Arduino\*/Genuino\* 101)



- Various sensors, actuators, motor, LEDs
- Easy-to-use base shield for Arduino/Genuino 101.

## Creative Technologies in the Classroom (CTC) 101\* kit from Arduino



- Classroom kit supporting 18-30 students.
- All electronics components and pre-cut mechanical parts needed for five introductory electronics projects
- Access to online curriculum with kit purchase



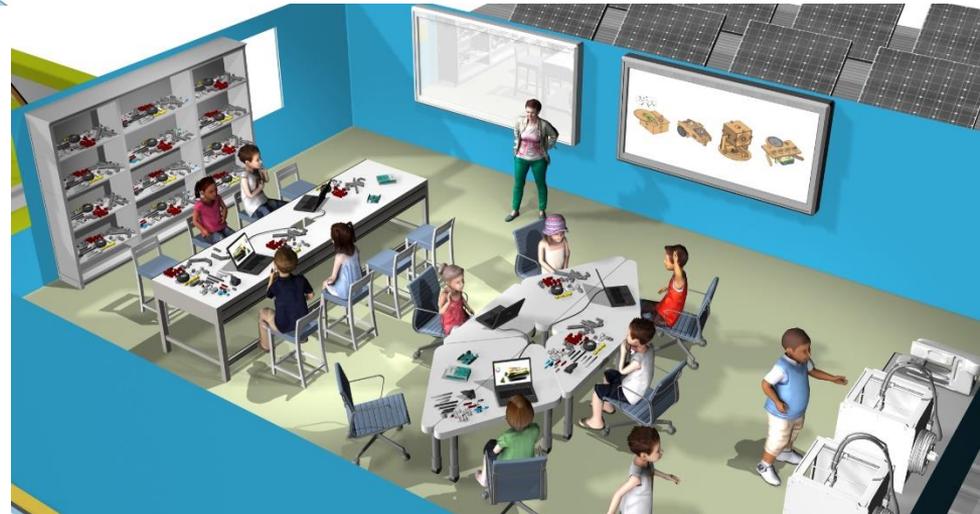
## CLASSROOM

- Engaging experiences
- Integrated
- Agency

## MAKER SPACE

- Consolidated
- Focused
- Shared

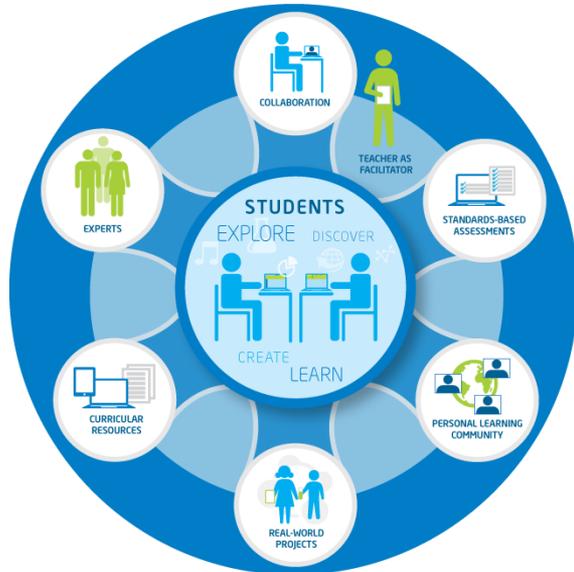
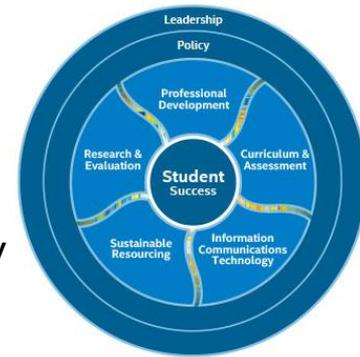
Learn more:  
<http://www.intel.com/content/www/us/en/education/solutions/infographics/maker-global-infographic.html>



# SHIFTING THE LEARNING PARADIGM

## Student-Centered Classroom

Technology-rich environment enables learning any time, anywhere, any way



**Technology** has changed the way we **LIVE AND LEARN**

It is time to **get more students excited about STEAM**

**Making** is a **great place to start**. Start somewhere – big or small

Intel has resources and solutions to help you get started

Get educators and students excited about STEAM, making is a great place to start.

Explore the available resources including the affordable Arduino/Genuino 101 maker board and maker kits.

Lesson plans, projects for Arduino/Genuino\* 101 from educators are available at:

<http://www.intel.com/content/www/us/en/education/maker-resources-for-educators.html>



