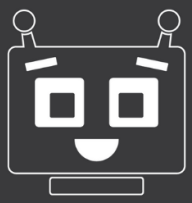
INTRO TO ARDUINO AND PHYSICAL COMPUTING



BUILD A ROBOT

COURSE OUTLINE

Intro To Arduino And Physical Computing
Big Idea: Students will design, build, and program electronic circuits.

Students will:

- Learn how things work and gain the skills to create their own solutions
- Develop problem-solving and critical thinking skills
- Develop social awareness, social intelligence, and collaboration and will learn to solve problems existing in their community
- Build and design their own projects
- Get foundations for other physical computing classes

Course Overview: Intro to Arduino and Physical Computing

This course will inspire excitement for learning about programming and physical computing.

Physical computing involves interactive systems that can sense and respond to the world around them. Many products we use every day have embedded computing technology - phones, household appliances, automobiles, and toys to name a few. Kids will learn how to put together simple electronic circuits and write programs (Arduino "sketches") to create projects that light up, move, and make sounds.

Your child will learn to work through coding and building activities that encourage them to develop solutions for the problems in the world around them. With the support of the course teacher, they will focus on social awareness, social intelligence, and collaboration.

Your kids will learn basic techniques used in computers found in everyday life. In this hands-on virtual class, kids will get an introduction to physical computing using the popular Arduino microcontroller platform. This platform is a great way to learn physical computing for kids with no programming experience.

The course requires a Grove Beginner Kit for Arduino (Purchase Here)

The Grove Beginner Kit for Arduino® is powered by one Arduino UNO compatible Board (ATmega320p based Seeeduino Lotus) together with 10 additional Grove Arduino sensors all in one piece of the board.

- All modules are pre-wired with no breadboard and jumper cables required.
- Very easy to use while also being expandable and flexible for future projects.
- A servo motor, breadboard, jumper wires, RGB LED, and resistors are included with the kit for this course.

Standards (K–12 Computer Science Framework)

1A-CS-02 - Use appropriate terminology in identifying and describing the function of common physical components of computing systems (hardware).

1A-CS-03 - Describe basic hardware and software problems using accurate terminology.

1A-AP-08 - Model daily processes by creating and following algorithms (sets of step-by-step instructions) to complete tasks.

1A-AP-10 - Develop programs with sequences and simple loops, to express ideas or address a problem.

1A-AP-11 - Decompose (break down) the steps needed to solve a problem into a precise sequence of instructions.

1A-AP-12 - Develop plans that describe a program's sequence of events, goals, and expected outcomes.

1A-AP-14 - Debug (identify and fix) errors in an algorithm or program that includes sequences and simple loops.

1A-AP-15 - Using correct terminology, describe steps taken and choices made during the iterative process of program development.

1A-IC-16 - Compare how people live and work before and after the implementation or adoption of new computing technology.

k12cs.org

Curriculum Outline

Social-Emotional Learning

- **Social Awareness** lessons
- **Social Intelligence** lessons
- **Collaboration** lessons

Computer Science Lessons

Lesson 1: Introduction

Students will receive an overview of Arduino and check out kit materials. Students will explore blinking LEDs and using a button as a sensor.

Lesson 2: Making Sounds and Music

Students will discuss and demonstrate sound waves and frequency.

Lesson 3: *Fun with Arduino Projects*

Students will take a look at some fun Arduino projects. Students will explore sound level and light level sensors.

Lesson 4: Data and Information

Students will display data and information on the OLED display and explore temperature and humidity sensors.

Lesson 5: Breadboard

Students will learn how to use a breadboard and RGB (red-green-blue) LED.