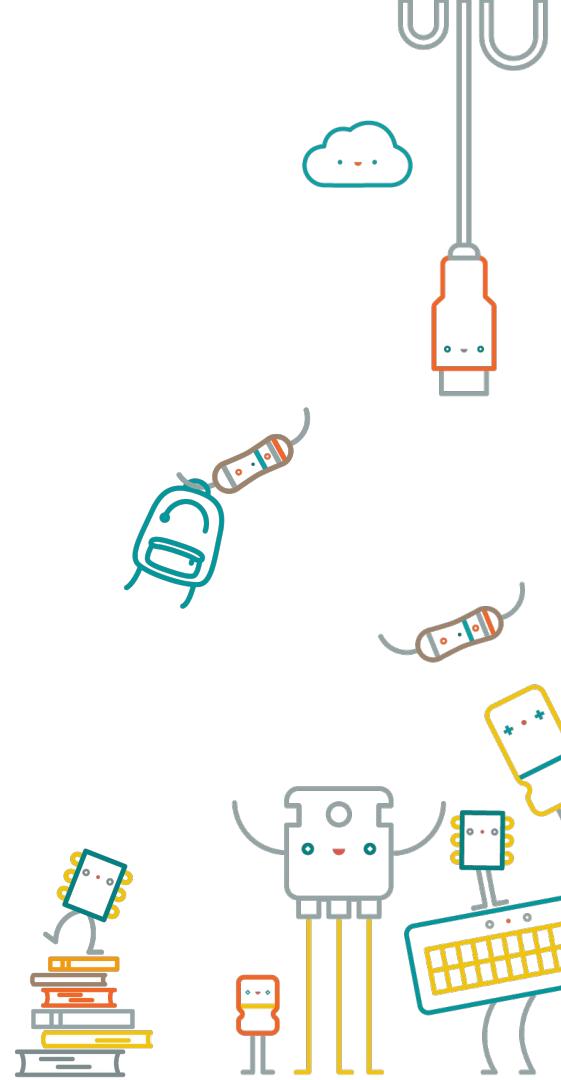




Welcome Arduino Education

June 2023



Why do we exist?

- **Gap between education and the job market**, where technology, methodology and mindset for educating future talents are generally missing.
- Arduino Education strives to bring **cutting-edge, affordable and skill-oriented solutions** to bridge this gap and to become the game changer of STEM education.





Who are we serving?

- We serve teachers.
- Teachers are oriented to the benefits of students.
- Serving teachers will ultimately help students.
- Teachers are the key decision makers.



From top left: Massimo Banzi, David Cuartielles, Tom Igoe and David Mellis

Pic: www.requiredbrain.com/arduino-history-and-success-of-open-source-electronic-micro-controllers/

Arduino Education

Arduino started at the **Interaction Design Institute in Ivrea, Italy**, to make technology simple to use:

- **For design students**
With non technical background, affordable
- **To make technology accessible & democratic**
Open-source
- **To enable anyone to create & innovate**
Build own projects & share them

Where do we act?

Middle schools
& High schools



Higher
education



Career tech
education



Where do we act?

Classroom

Home

Maker
spaces

Innovation
labs

Summer
camps

STEM
clubs

Core values



Learning by doing

- Hands-on approach
- Touching, building, and using the hands enables students to find out why something works.
- Boosts engagement



Creativity

- We encourage the creative use of technology as a way of coming up with new ideas, solutions, and ways of doing things.
- Students aren't just learning how to use technology, they're using it as a tool to build, invent, and experiment.



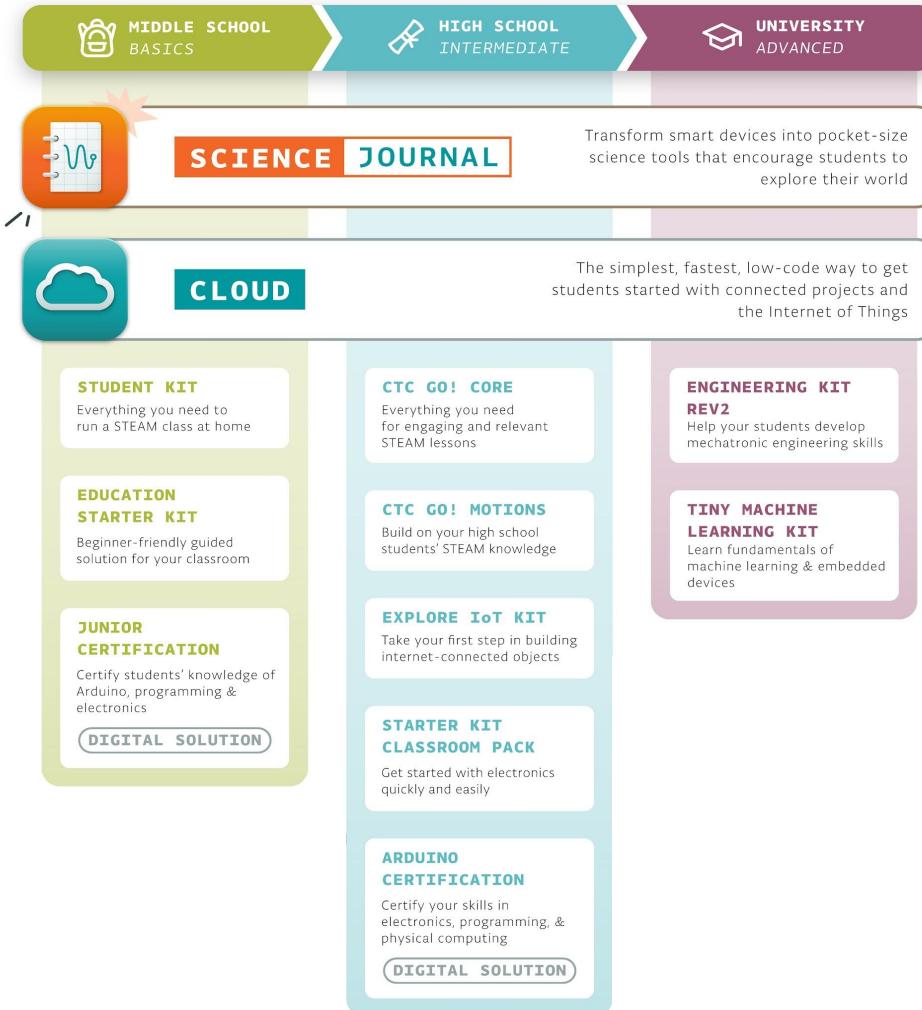
Simplicity

- Teaching complex topics in a simple manner
- We enable children as young as 11 to truly understand the fundamentals of electronics, programming, and coding,
- and champion and support them as they take on more challenging tasks.

Arduino Education

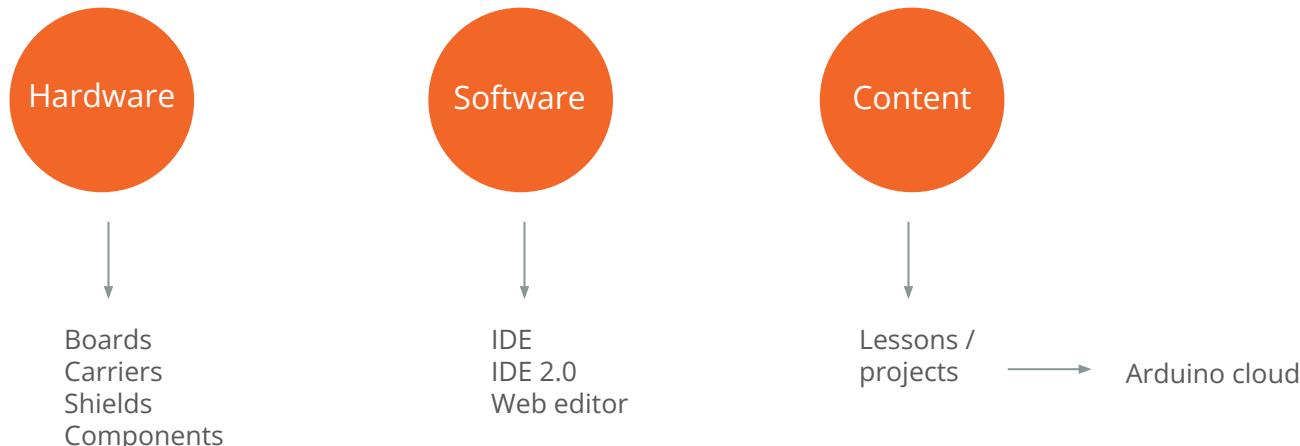
Learning Evolution

A solution for everyone



Arduino Education

- **Low Threshold, High Ceiling** Educational Solutions:
From Beginner-Friendly Coding to industry-level expertise.
- Self-sufficient **hands-on lesson plans** with **open-ended projects**, that teachers can cover science, coding, electronics, and IoT subjects.

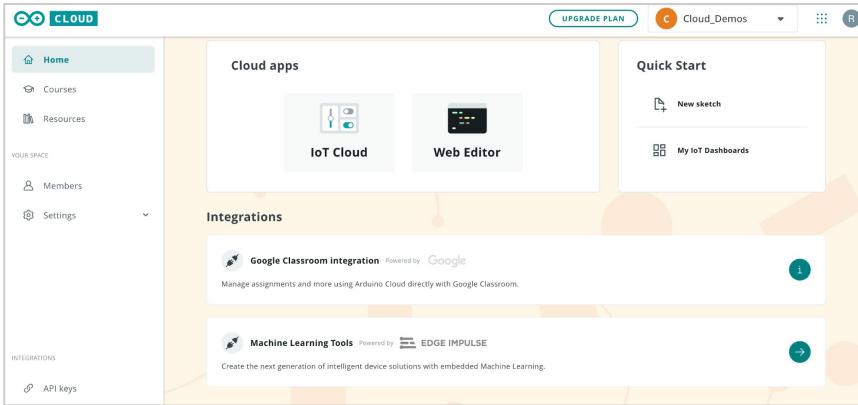




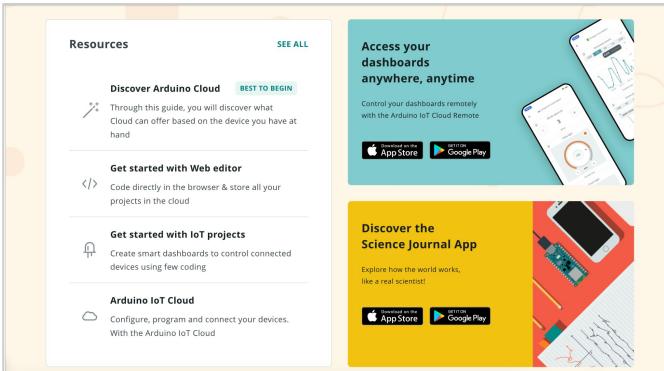
Arduino Cloud for Schools

Enrich learning with Cloud connectivity

An all in **one easy-to-use, secured** online platform that helps teachers to **implement coding, IoT, AI and STEM learning.**



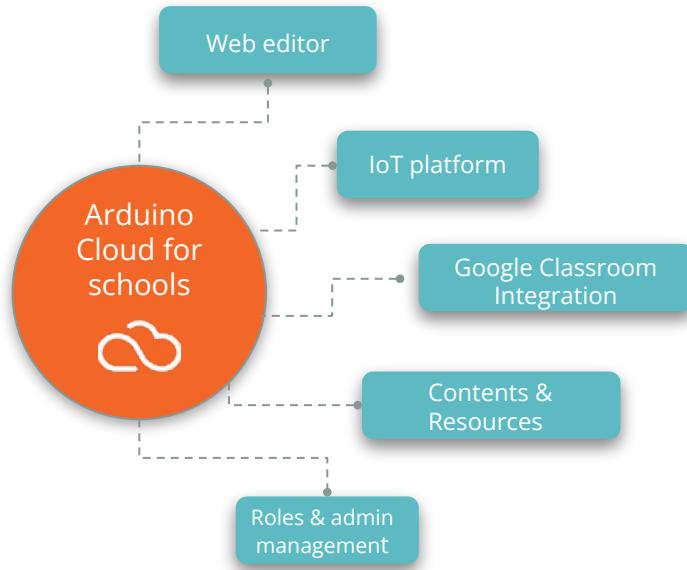
The screenshot shows the Arduino Cloud interface. On the left, a sidebar includes links for Home, Courses, Resources, Members, Settings, and API keys. The main area features a "Cloud apps" section with "IoT Cloud" and "Web Editor" icons. Below this is an "Integrations" section with "Google Classroom integration" and "Machine Learning Tools" options. A "Quick Start" sidebar on the right offers "New sketch" and "My IoT Dashboards" options.



The screenshot shows the "Resources" page of the Arduino Cloud. It features a "Discover Arduino Cloud" guide, a "Get started with Web editor" guide, a "Get started with IoT projects" guide, and an "Arduino IoT Cloud" guide. To the right, there are sections for "Access your dashboards remotely" (with links to the App Store and Google Play) and "Discover the Science Journal App" (with links to the App Store and Google Play).

Arduino Cloud for schools

- Coding with hardware
- Creating IoT projects with hardware
- Connecting with Google classroom
- Compatible with Chromebooks
- Access to lessons and activities
- Students, teachers, and admins role assignment & management



How does the cloud help educators?



Cloud based
Any device



Up-to date



Create folders



Built-in
Examples /
templates



Attach media



Share sketches
Google classroom ™ integration





Education Starter kit



Education Starter kit



Age

- 11+

For

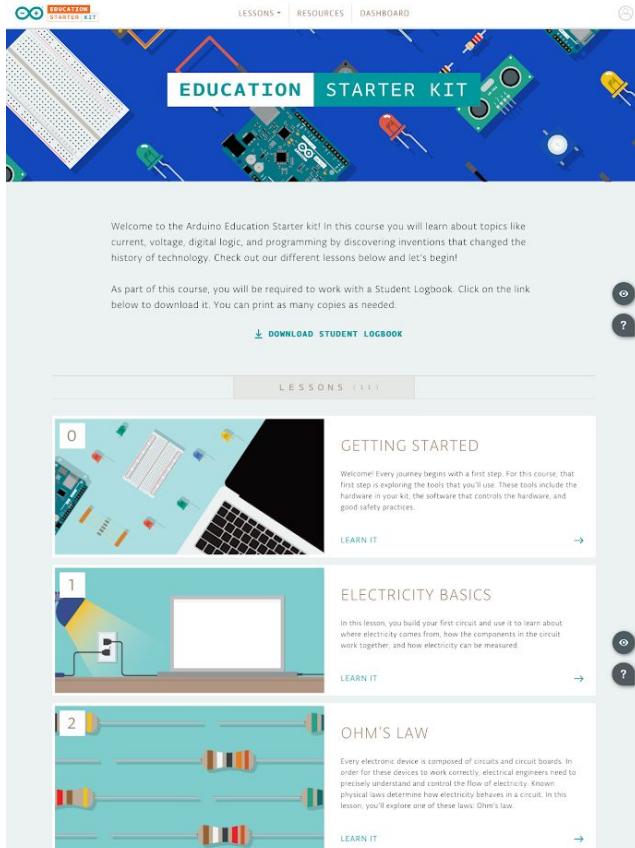
-The classroom

-8 students per kit (4 groups of 2)

Learning outcomes

- Learn electronics and programming step by step in a hands-on way

- No prior coding / electronics experience required.



The screenshot shows the Arduino Education Starter Kit platform. At the top, there are navigation links for 'LESSONS', 'RESOURCES', and 'DASHBOARD'. The main header features the text 'EDUCATION' and 'STARTER KIT' with a background image of various electronic components like breadboards, Arduino boards, and sensors. Below the header, a welcome message reads: 'Welcome to the Arduino Education Starter kit! In this course you will learn about topics like current, voltage, digital logic, and programming by discovering inventions that changed the history of technology. Check out our different lessons below and let's begin!'. A link to 'DOWNLOAD STUDENT LOGBOOK' is provided. The 'LESSONS' section lists three lessons: '0 GETTING STARTED', '1 ELECTRICITY BASICS', and '2 OHM'S LAW', each with a 'LEARN IT' button and a small preview image. The bottom left corner features the 'ARDUINO® EDUCATION' logo.

Platform

Content

- Online platform: 9 lessons and 2 open projects
- Code
- Student logbook and Teacher guide
- Vocabulary
- Training
- Support

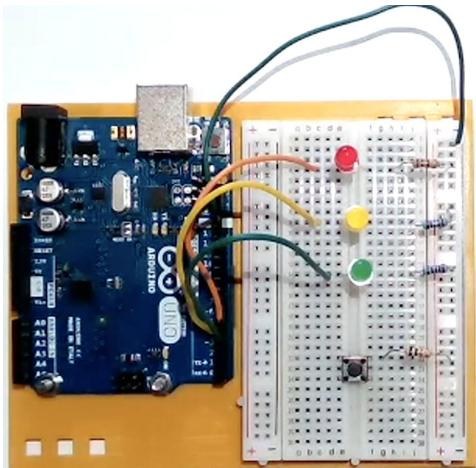
Hardware

- UNO REV 3 Board
- Collection of sensors and actuators: Servo motor, piezo, temperature sensor, LED, buttons, potentiometers, light sensors
- Multimeter

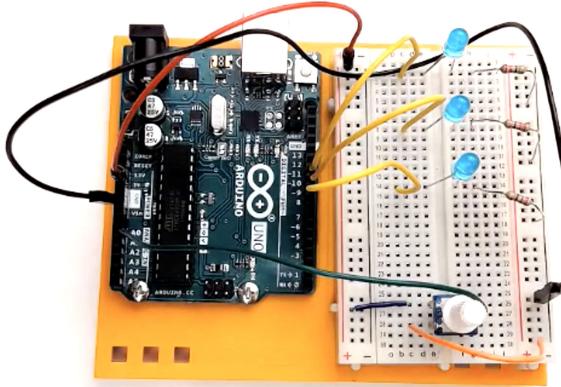
Software

- IDE Offline
- Online editor

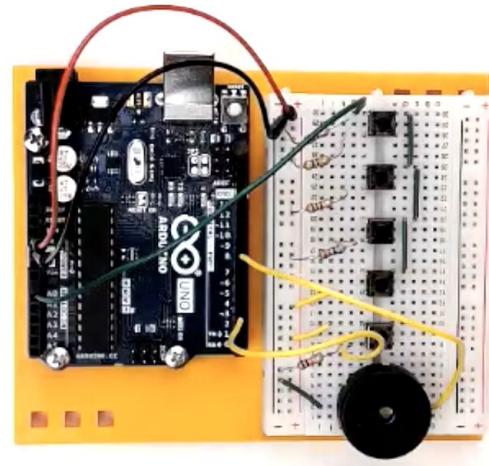
Projects



Lesson 3 -Traffic light



Lesson 4 - Dimmer switch



Lesson 8 - Keyboard

Student Kit



Age

- 11+

For

- Individual use

- Blended / hybrid learning & teaching

Learning outcomes

- Learn electronics and programming step by step in a hands-on way

- No prior coding / electronics experience required

- XXI century skills

Languages available:

- English, Spanish, Italian, German, Croatian

Arduino Student kit

11+ (individual usage)
MOQ 34

Individual access to the platform



- Educational approach
- Physical materials for 1 student / teacher
- Work individually and safely
- The student or teacher register themselves on the platform

4x
Same content

Arduino Education Starter kit

11+ (classroom)
MOQ 5

Access to the platform: classroom management



- Educational approach
- Physical materials for 8 students (4 groups of 2)
- They share materials
- The teacher registers the students on the platform

Arduino Junior Certification



Junior Certification is an **online multiple-choice exam**

Provides official certification on knowledge of Arduino-related electronics and programming

Based on the **Student kit** content

Recommend age 14+

Junior Certification

Assess students' individual aptitude, skills, and what they've learned about programming, electronics, robotics, and Arduino concepts.

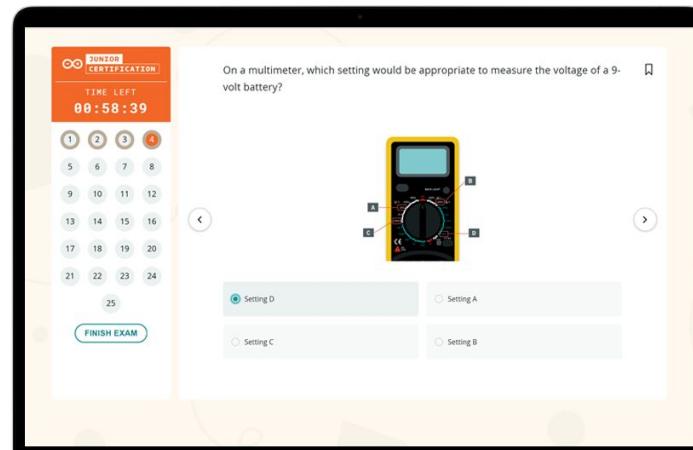
Benefits:

- A clear insight into each **student's own level**.
- Enables to **spot knowledge gaps** and **areas for improvement**.
- Helps students with **self-evaluation**



Junior Certification exam

- The online exam consists of **25 questions**
- **60-minute** time limit
- Available in English
- **Get results immediately** after submission, indicating whether students passed or failed
- Passing the exam will grant students the **downloadable Arduino Junior Certification certificate**



Exam only

- Recommended for users who **have completed the projects** in the Arduino Student Kit or Education Starter Kit.
- Each exam code allows **one person** to take the Arduino Junior Certification exam.
- **One** attempt
- Purchase **multiple codes and share them with your class.**
- After purchasing, exam code will be send by email. **Free to decide when to take it.**



Bundle: Kit & Exam

- **Arduino Student Kit** and an **activation code**, which can be used to unlock **one attempt** at the Arduino Junior Certification exam.
- **Includes hardware and learning content** with lessons and hands-on projects, covering the basics of programming, coding and electronics.
- It requires **no prior knowledge or experience** as the kit guides you through step by step.



Exam platform

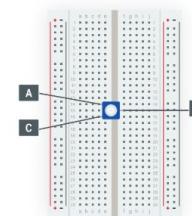
 JUNIOR
CERTIFICATION

TIME LEFT
00:57:54

| | | | |
|----|----|----|----|
| 1 | 2 | 3 | 4 |
| 5 | 6 | 7 | 8 |
| 9 | 10 | 11 | 12 |
| 13 | 14 | 15 | 16 |
| 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 |
| 25 | | | |

FINISH EXAM

Which setup would correctly wire the potentiometer to an Arduino board to be used as a variable input?



Pin A to 5V; Pin B to Ground; Pin C to Pin A1

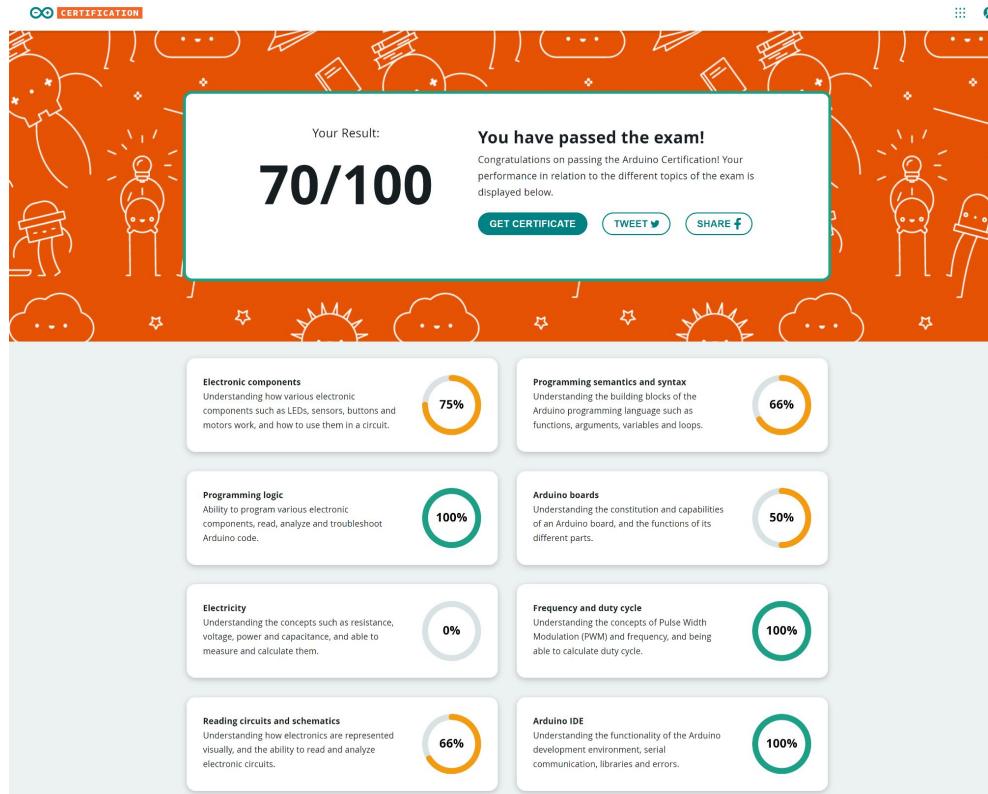
Pin A to Ground; Pin B to 5V; Pin C to Pin 9

Pin A to Pin 2; Pin B to Ground; Pin C to 5V

Pin A to 5V; Pin B to Pin A0; Pin C to Ground

5 question demo

Results & feedback



∞ CERTIFICATION

Your Result:
70/100

You have passed the exam!

Congratulations on passing the Arduino Certification! Your performance in relation to the different topics of the exam is displayed below.

[GET CERTIFICATE](#) [TWEET](#) [SHARE](#)

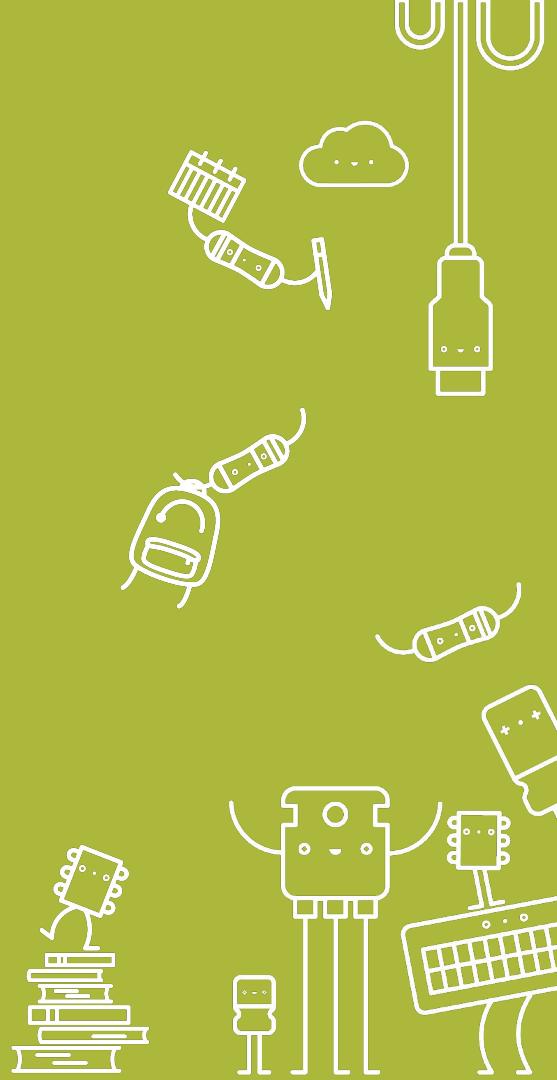
| Topic | Score (%) |
|----------------------------------|-----------|
| Electronic components | 75% |
| Programming semantics and syntax | 66% |
| Programming logic | 100% |
| Arduino boards | 50% |
| Electricity | 0% |
| Frequency and duty cycle | 100% |
| Reading circuits and schematics | 66% |
| Arduino IDE | 100% |



Science Kit R3

Coming soon

September 2023



Science Kit R3



Students 13 +

Hardware

- Arduino RP2040
- Science Carrier REV 3
 - Silicon Stands
 - External temperature probe sensor
 - Ultrasonic Distance Sensor
 - USB-C© Cable
 - Crocodile Clips one end, banana plug the other
 - Speakers (x 2)

Software

- Science Journal app

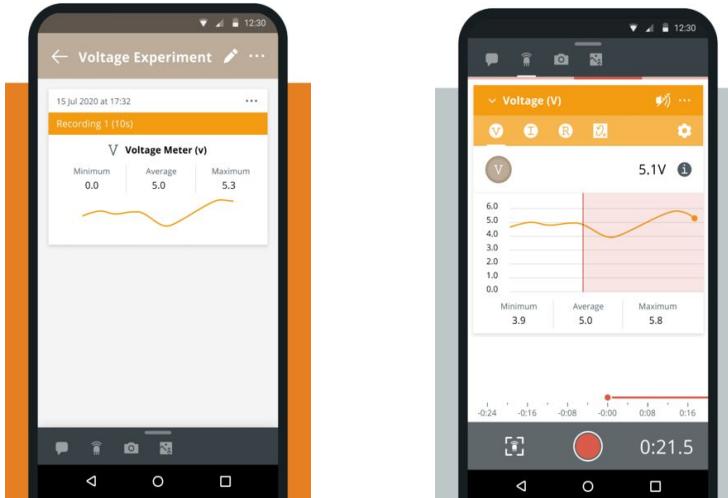
Transforms the smartphone or tablet into a cutting-edge multi sensor data logger.

Software - Science Journal app

A free app that allows students to gather data by harnessing the sensors on the Arduino Science Kit R3 carrier.

The **app is needed to run the experiments** so students will need a tablet, smartphone or Chromebook to complete the investigations in each lesson.

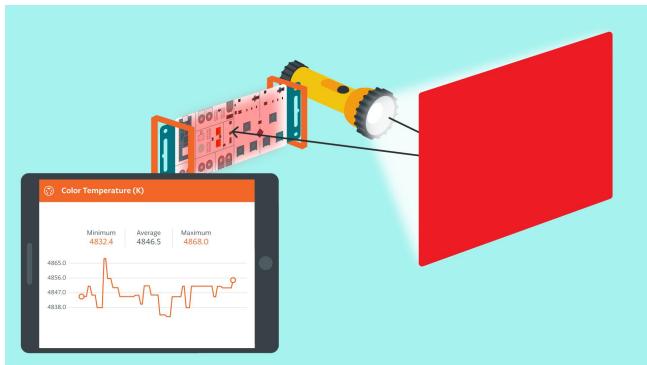
The Arduino Science Journal app available for download from the main app stores: Play Store ([Android](#)) and [iOS app store](#)



Science Kit REV 3

Lessons: 10 (60 mins)

- Linked to the real world
- Guide teachers on curriculum integration (Teachers professional development)



Investigate and explore:

- Speed
- Magnetic fields
- Mass-period
- Pendulum
- Motion & sound
- Kinetic energy
- Temperature / pressure
- Color & temperature
- Voltage
- Frequency

Science Kit R3

Product Benefits

- Out of the box, easy to use
- No coding experience required
- Self-paced investigations
- Personalized hands-on learning
- Applications in the real world with guided and open ended experiments
- Designed to match the science & physics curriculum from around the world.
- Developed in collaboration with physics teachers

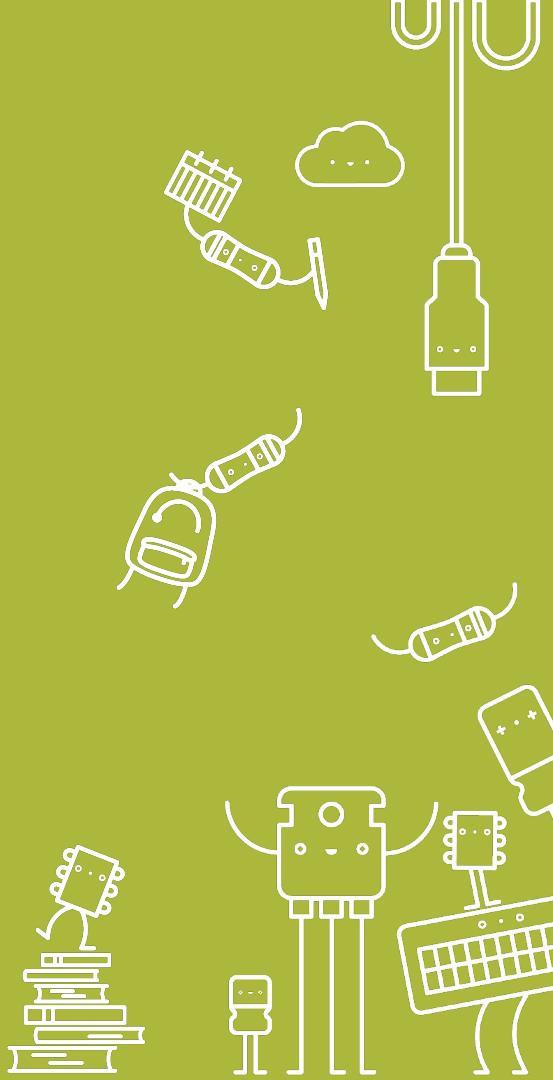
Key Learning Values

- Boost future skills, such as problem-solving and collaboration
- Conduct and document science experiments, log real time data on the Arduino Science Journal app.
- Create assignments from students' experiments within their Google Classroom.



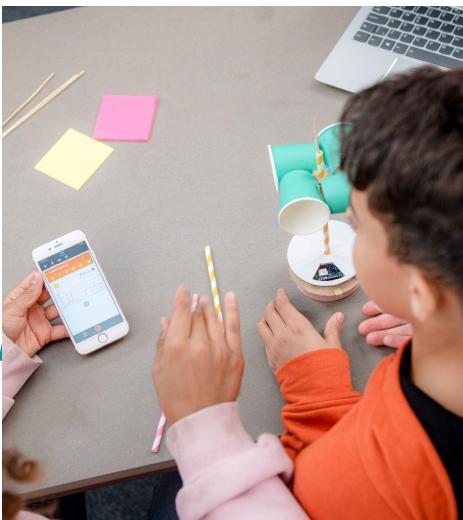


Science Journal app



Arduino Science Journal

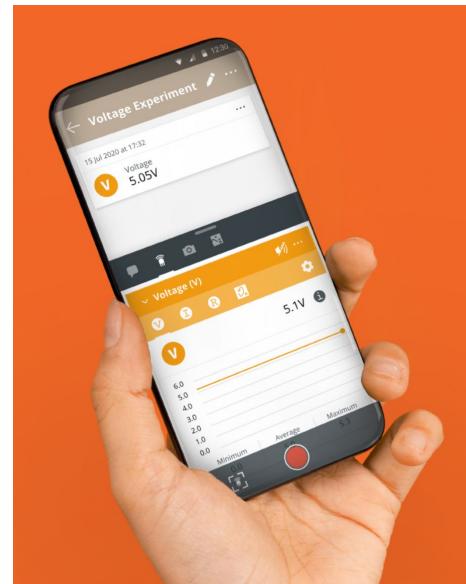
- **Free and simple** to use
- Classroom & home-school friendly
- Safe for children to use ([COPPA](#))
- **Easy recording of observations** in real-time
- **Teachers can create and receive assignments** and **collect experiments**
- Learn about topics like **physics, math, chemistry, biology, arts, music** and more



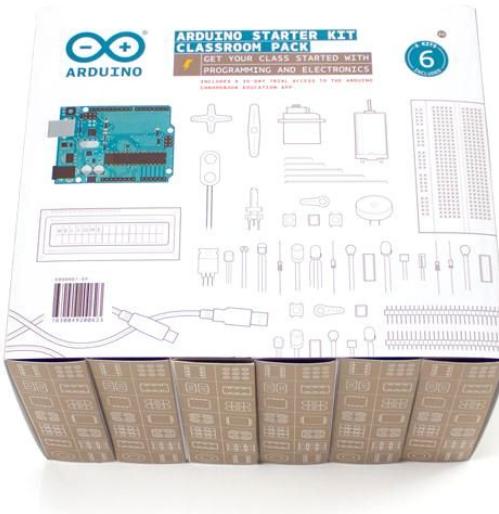
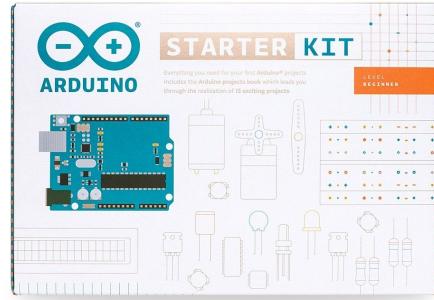


Science Journal app

- The Arduino Science Journal app is recommended for students from 10 to 18 years of age, and is available in 45 languages.
- It's compatible with Android, iOS, and Chromebook.
- Want to measure even more? Connect external sensors and hardware using bluetooth to unlock endless possibilities! The Science Journal is fully compatible with [Science Kit](#), [Nano 33 BLE Sense board](#).
- However, the app can just as easily be used on its own without any other technology.



Starter Kit - Classroom pack



Age

- 14+

For

- Individual use and for the classroom (12 student)
- 2 students per kit (6 groups of 2)

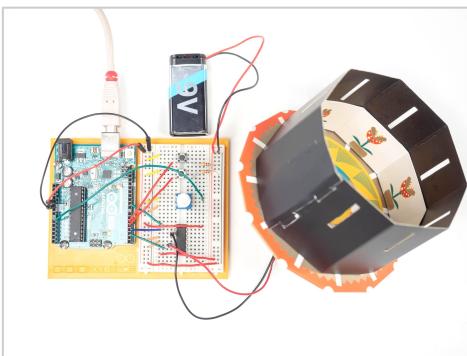
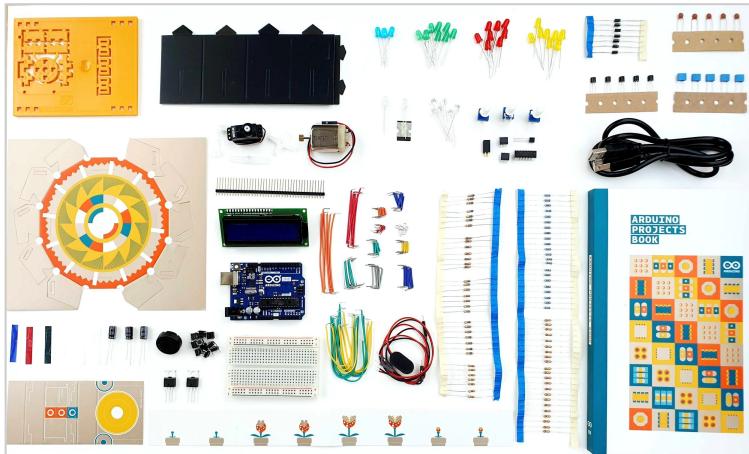
Learning outcomes

- Learn electronics and programming step by step in a hands-on way

- No prior coding / electronics experience required.

13 Starter Kit: Touchy-Feely Lamp

Starter kit



Content

- Projects Book
- 15 projects

Hardware

- UNO board
- Collection of sensors and actuators

Software

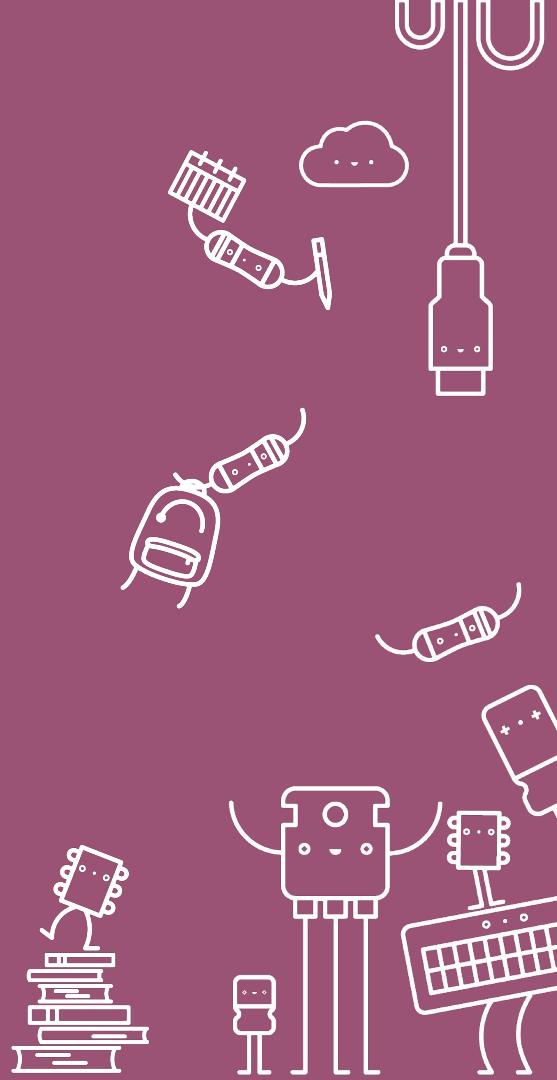
- IDE offline
- Web editor

Languages available

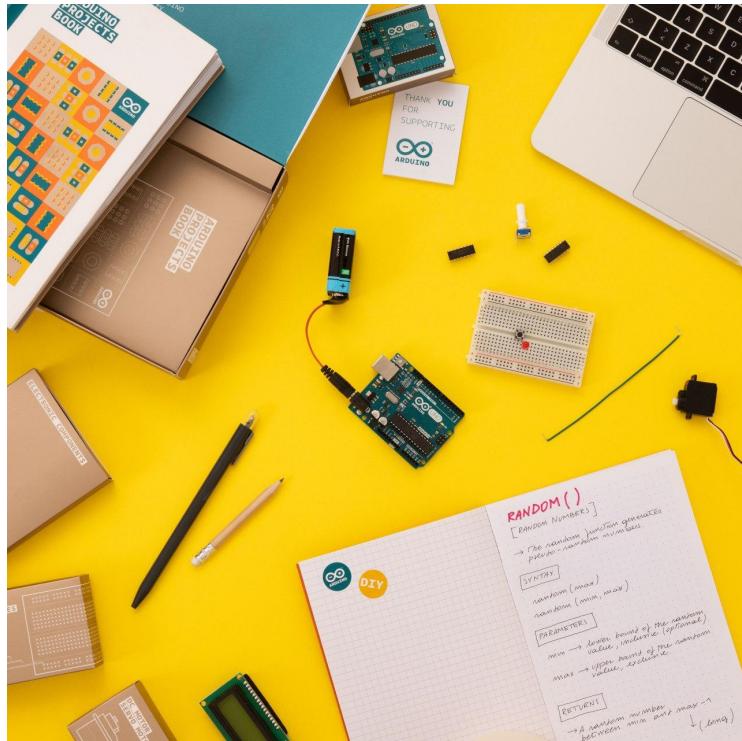
-English, Chinese, Spanish, German, French, Italian, Korean, Portuguese, Arabic



Arduino Certification



Fundamentals certification



Age

- 16+

For

-Individual use

-Learning & teaching remotely

Benefits

- Official Arduino Certification in programming, electronics and physical computing.

Languages

-English, Spanish , Italian, Greek, German, Chinese, Bangla

Demo

Fundamentals certification

Content

- Based on the Starter Kit projects book concepts
- Online exam: 36 questions / 75 minutes
- Score: 70 / 100 points
- 3 main areas: **Theory** and **introduction to, electronics, code and programming with Arduino**

-8 categories: Electricity, Reading schematics and circuits, Arduino IDE , Arduino boards, Frequency and duty cycle, Electronic components, programming logic, programming language and syntax

Modalities

- Exam alone
- Fundamentals Bundle



Fundamentals Bundle & Fundamentals exam



Training
Student kit + 1(one) attempt at the exam

A screenshot of the online exam interface. The top bar shows 'CERTIFICATION' and a timer '1:13:32'. The left sidebar is an 'EXAM OVERVIEW' grid from 1 to 36. The main area shows a circuit diagram with a 9V battery, a push button, three resistors (10kΩ, 220Ω, 220Ω), and three current measurement points (I1, I2, I3). Below the diagram is a question: 'What is the approximate total value of current (sum of I1, I2 and I3) in the circuit below?'. Four answer options are listed: I1 + I2 + I3 = 4.18mA, I1 + I2 + I3 = 9.2mA, I1 + I2 + I3 = 92mA, and I1 + I2 + I3 = 41.8mA.

Exam alone
1(one) attempt

Exam results

... ...

YOU'VE PASSED THE EXAM!

Congratulations on passing the Arduino Fundamentals Certification! Your performance in relation to the different topics of the exam is displayed below. You can download your certificate from this page, or from the certification

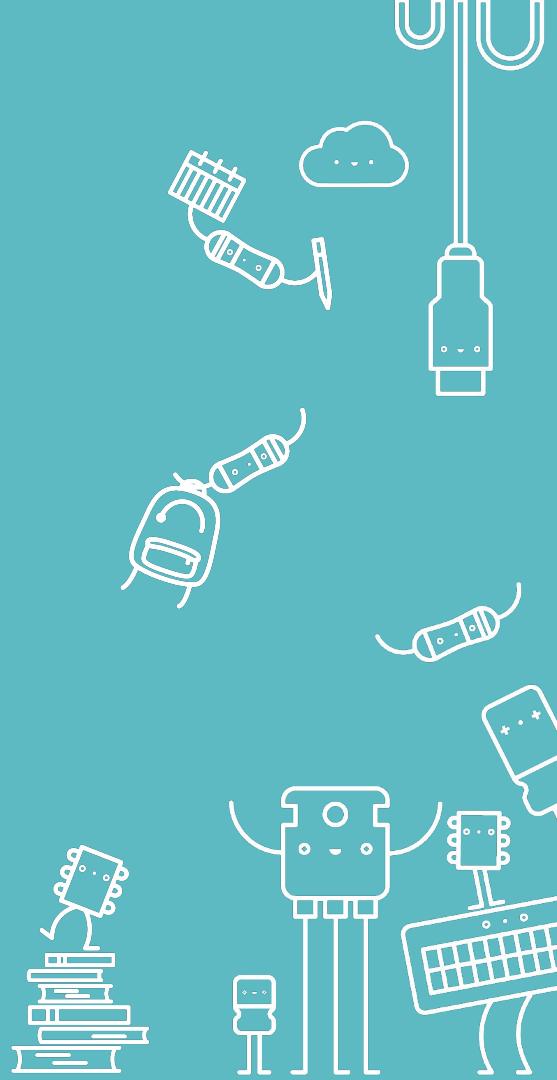
| | |
|--|--|
|  100% Electricity Understanding the concepts such as resistance, voltage, power and capacitance, and able to measure and calculate them. |  50% Frequency and Duty cycle Understanding the concepts of Pulse Width Modulation (PWM) and frequency, and being able to calculate duty cycle. |
|  100% Programming syntax and semantics Understanding the building blocks of the Arduino programming language such as functions, arguments, variables and loops. |  75% Reading circuits and schematics Understanding how electronics are represented visually, and the ability to read and analyze electronic circuits. |
|  37% Electronic components Understanding how various electronic components such as LEDs, sensors, buttons and motors work, and how to use them in a circuit. |  72% Programming logic Ability to program various electronic components, read, analyze and troubleshoot Arduino code. |
|  100% Arduino IDE Understanding the functionality of the Arduino development environment, serial communication, libraries and errors. |  100% Arduino boards Understanding the constitution and capabilities of an Arduino board, and the functions of its different parts. |

[HOME](#) [DOWNLOAD CERTIFICATE](#)



CTC Go! Family

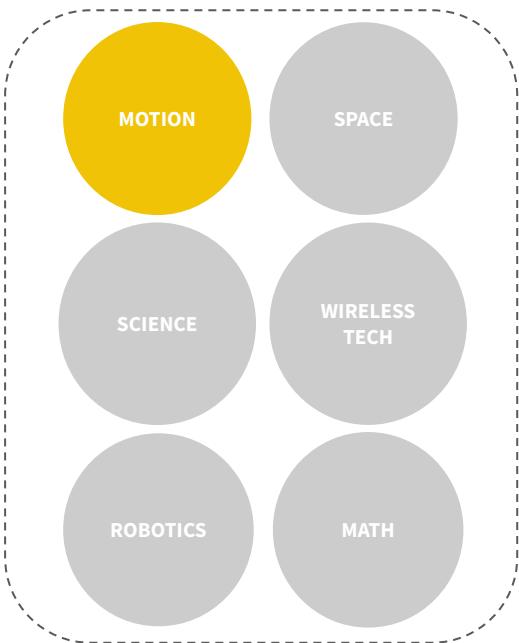
Core module &
motions expansion



CTC GO! (Creative Technologies in the classroom)



+



Core Module

Expansion packs



CTC GO! Core Module



Age

-14-17

For

- The classroom
- 24 students and 3 educators per kit
- 8 groups of 3

Learning outcomes

- Customizable STEAM program
- Learn foundations of electronics and programming
- XX1 skills

Languages available

English, Spanish, French

The screenshot shows the Arduino Education platform interface. At the top, there are navigation links: 'CTC GO!', 'COURSES', 'GLOSSARY', and 'DASHBOARD'. Below this is a banner for 'CORE MODULE 1' titled 'DIGITAL I/O'. The main content area features a photograph of hands working on a breadboard with electronic components. A text box below the photo reads: 'Welcome to the world of technology! We are surrounded by computers, smartphones, and electronic components. In this first course, we will get an understanding of how all this cool stuff works around us.' Below the photograph, there is a 'LESSONS (4)' section with four items: 1. 'GET INSPIRED' (with a 'LEARN IT' button), 2. 'ELECTRONICS' (with a 'LEARN IT' button), 3. 'PROGRAMMING' (with a 'LEARN IT' button), and 4. 'DIGITAL I/O' (with a 'LEARN IT' button). At the bottom of the page, there is a 'PROJECTS (4)' section. The overall theme is orange and yellow.

Platform

Content

- Online platform: 8 lessons and 8 projects
- Code
- Teacher's tips
- Training
- Support

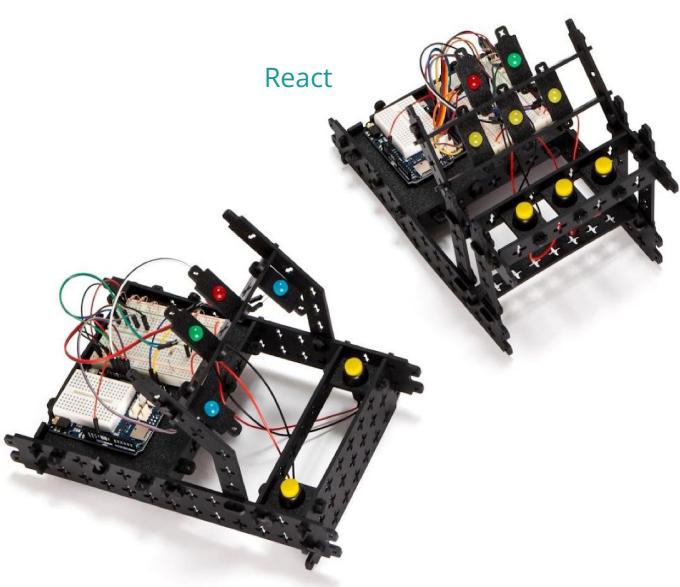
Hardware

- Powered by UNO WiFi REV 2
- Education shield
- Electronic components
- Modular pieces

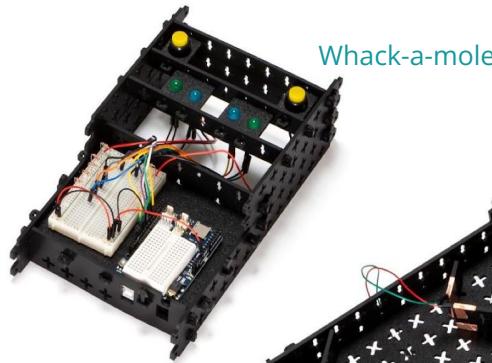
Software

- IDE offline
- IDE online

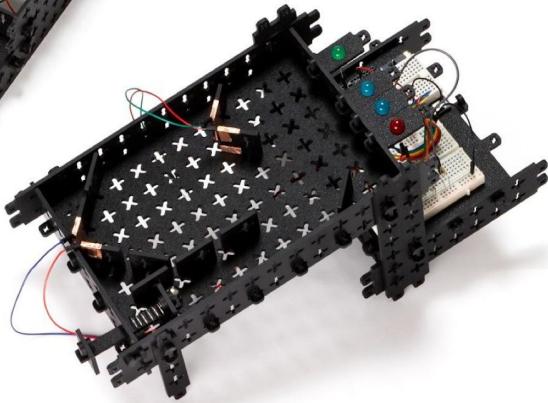
Projects



Finger race



Whack-a-mole



Pinball

CTC GO! Motions Expansion



Age

-14-17

For

- The classroom
- 24 students and 3 educators per kit
- 8 groups of 3

Learning outcomes

-Add mobility to the projects

-Learn about motors

-XXI skills

Languages available

English, Spanish, French

CTC GO!

COURSES GLOSSARY DASHBOARD

MOTIONS EXPANSION PACK

Welcome to this new CTC GO! course. Once we know the basics of programming and electronics from the Core Module, this course will address motion thematic.

LESSONS (4)

1 MAKING THINGS MOVE

Once we know the basics of programming and electronics from the Core Module, in this lesson, we will learn how to start adding mobility to the projects we are going to build.

LEARN IT

2 CIRCULAR TO LINEAR MOVEMENT

Now that we understand how standard servos motors work, the next stage is to practise real-life scenarios that will show us how to produce different types of movements with standard servo motors.

LEARN IT

3 CONTINUOUS ROTATION

In this lesson, we are going to learn to use a new type of servo motor – continuous rotation servo motors – and the differences between it and a standard servo motor.

LEARN IT

4 GEARS AND PULLEYS

Now that we know about standard and continuous servo motors and their similarities and differences, we are going to use the knowledge we obtained in the previous lesson to translate the movement that a continuous servo gives, by using gears and pulleys.

LEARN IT

ARDUINO® EDUCATION

Platform

Content

- Online platform: 4 lessons and 4 projects
- Code
- Teacher's tips
- Training
- Support

Hardware

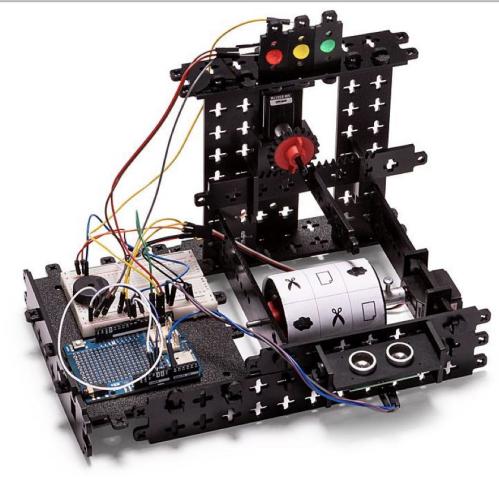
- Powered by UNO WiFi REV 2*
- Education shield*
- Electronic components
- Modular pieces

Software

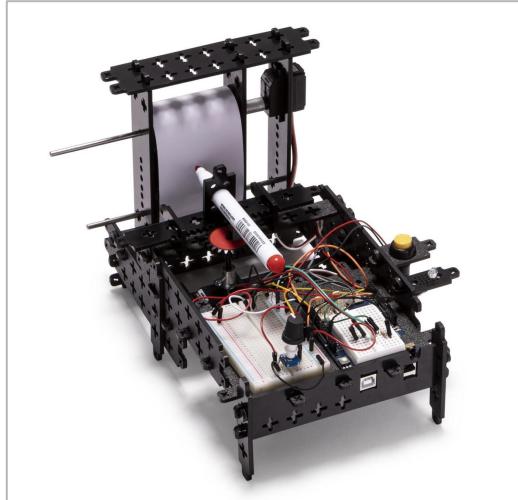
- IDE offline
- IDE online

*(not included. Available in the Core module)

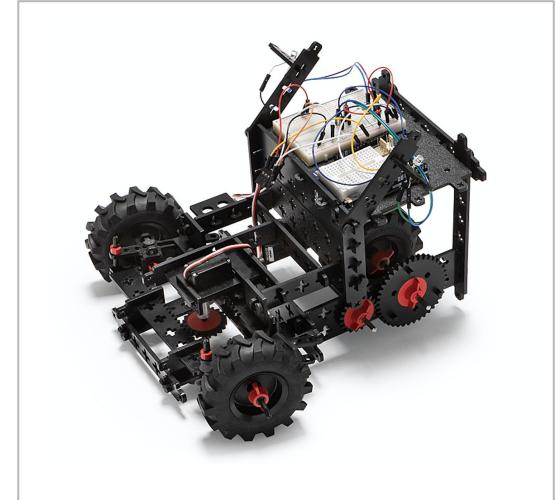
Projects



Rock, paper, scissors



Wave generator



Wiggler



Explore IoT Kit Rev2

IoT technology presents exciting opportunities for students to innovate and create new solutions to real-world problems



Explore IoT kit Rev2



Age

-16+

For

-Classroom / remote

-2 students

Learning outcomes

Get started quickly and easily with the Internet of Things
Enhance students' understanding of real-world, technology and its applications.

Requirements

-Previous experience in programming
-School Plan

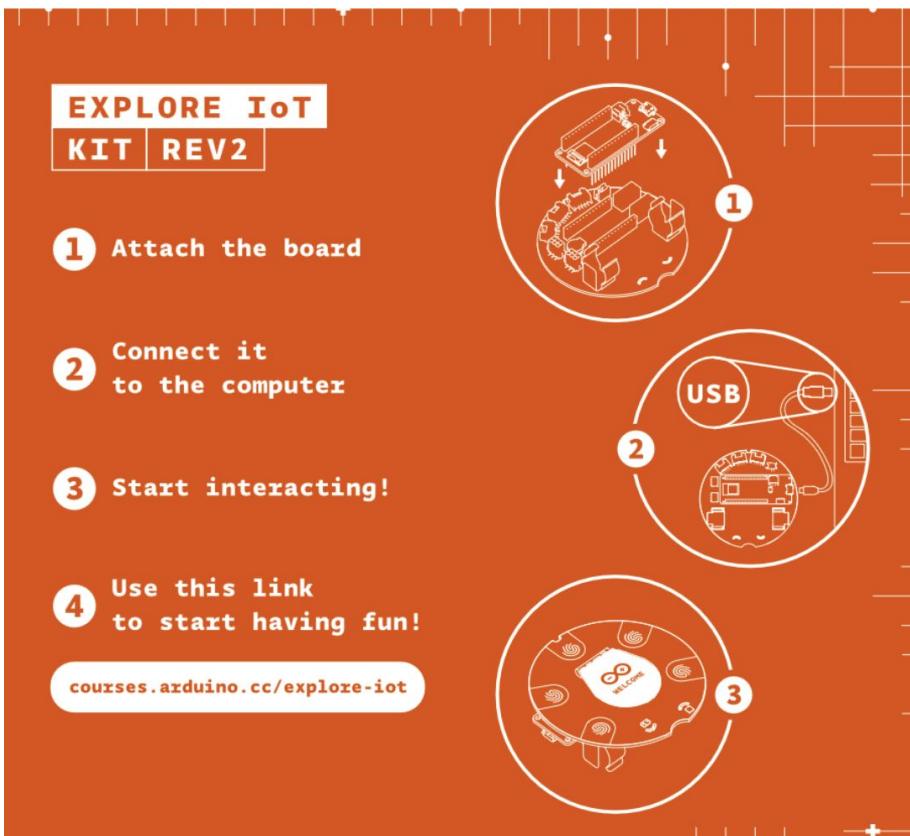
Languages available

English, Italian

Explore IoT REV2

Pre-flashed activity:

- Out of the box experience
- No-code
- Start with confidence
- Interactive first experience



Key Learning Values



Using Arduino IoT Cloud and connected devices



Collecting, processing, and storing data



Graphing and visualizing data and understanding its meaning



Collaboratively developing solutions to tackle sustainability issues using IoT technology



Learning multiple design thinking techniques and using them to create solutions



Network security considerations

Content

- Investigate and solve a real-world challenge linked to one of the UN's Sustainable Development Goals.
- Design methodologies
- In-depth understanding of real-world issues to build a sustainable future.
- Develop their own unique solutions to challenges such as:
 - Urban farming
 - Health monitoring
 - Water and waste conservation

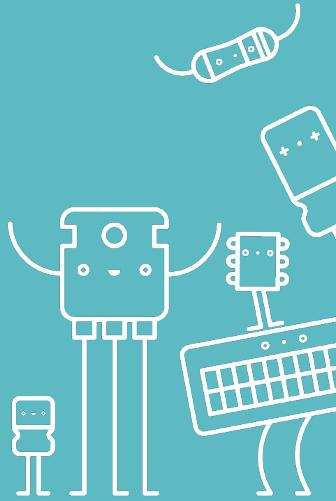
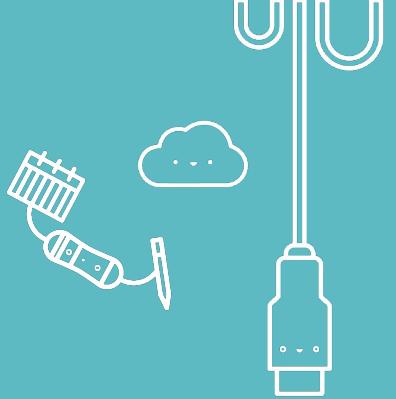


-Foundational knowledge & sensor activities
-10 real world activities



Greenhouse kit

For partners only



Greenhouse kit

Developed in collaboration with Campustore

- Use innovative technology to boost sustainability by creating an automated greenhouse.
- A progressive way to start learning farming concepts with IoT for Middle School and High School students



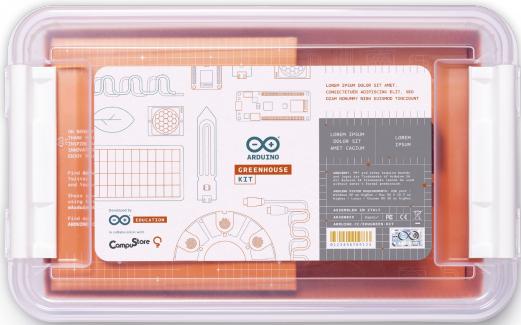
Key selling points

A greenhouse is a controlled environment that allows plants to receive specific climatic conditions that they need for stimulated growth.

- Experiential learning
- IoT for real world application
- Students of all backgrounds can benefit from agricultural knowledge.
- Research purposes
- Easily create connected devices
- Real-world data, students develop better critical thinking and problem-solving skills
- Create connections and allow students to innovate, and enhance their understanding of real-world technology.



What does it include?



Hardware:

- Arduino MKR WiFi 1010
- MRK IoT Carrier REV2
- Growth LED strip
- Fan
- Water pump w/speed controller
- 2 moisture sensors
- VOC sensor
- CO2 sensor
- Temperature & humidity sensors
- Pressure sensor

Content:

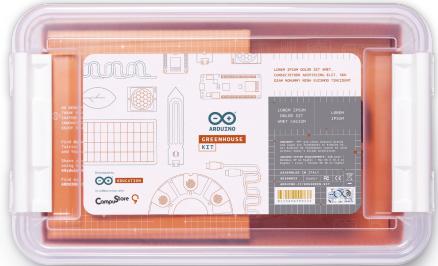
- Middle School and High School
- 5 guided projects
- 1 open project

Covers basic technical and agricultural learning points to the greenhouse effect

Software:

- IoT platform
- Web editor
- Remote IoT app

What is needed?



1. Hardware



The image shows two screenshots. The top screenshot is from the Arduino Cloud interface, showing a dashboard with two circular gauges: one at 30.2% and another at 22.66. The bottom screenshot is a 'Soil Humidity' lesson from a 'School Plan' on the Arduino website. It includes a diagram of a pipe with a hydraulic gradient and a formula: $Q = \frac{A * k * \Delta h}{L}$. The lesson content discusses the relationship between soil moisture and plant growth.

2. IoT Platform / online content
School Plan



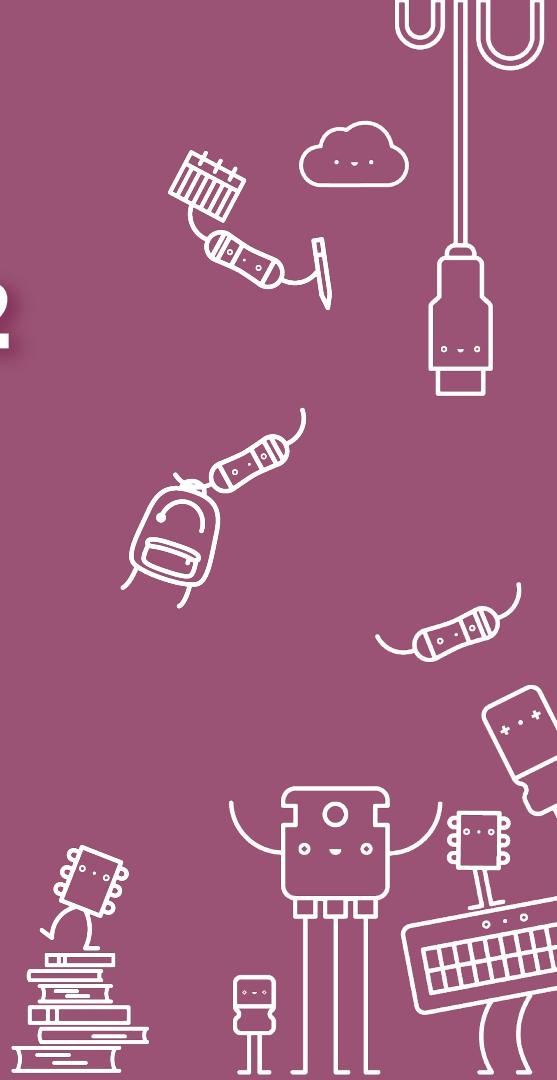
3. Greenhouse structure





Engineering Kit REV 2

AEK REV 2



Engineering Kit REV 2



Age

-17+

FOR:

- The classroom / remote
- 3 students & 1 student per kit

Learning outcomes

- Key engineering and mechatronic concepts.
- Knowledge of robotics, image and video processing

-Matlab & Simulink

-XXI century skills

Languages available

English, Spanish

Engineering Kit

Getting Started ▾ Activities ▾ DASHBOARD

ENGINEERING KIT

Welcome!

The Arduino Engineering Kit is directed towards engineering students that want to learn about Arduino, MATLAB, Simulink, and Stateflow. This kit has been developed as a collaboration between Mathworks and Arduino. The kit contains all the components needed to build three complete projects, as well as educational materials with explanations about the physics and math of mechatronics. You will be introduced to programming in Arduino, Matlab and Simulink, and learn about all of the above while making three challenging engineering projects.

LESSONS (3)

UNBOXING AND INSTALLATIONS

Get started with the Arduino Engineering Kit. Get to know the materials included in the kit, the tools, the content structure, best practices and instructions to install the tools you will use to build the projects.

ARDUINO, MATLAB & SIMULINK

Learn the basics of the Arduino IDE, the MATLAB® IDE, the programming language, and the Simulink® models. You will discover how these three tools can be connected to each other while making practical exercises.

BASICS OF MECHATRONICS

Go through a detailed explanation about the various electronic components such as DC Motors, IMU Sensors, Servo motors, PWM signals, Li-Po batteries and key mechatronic concepts such as motor characterization and designing a control system.

ARDUINO® EDUCATION

Platform

Content

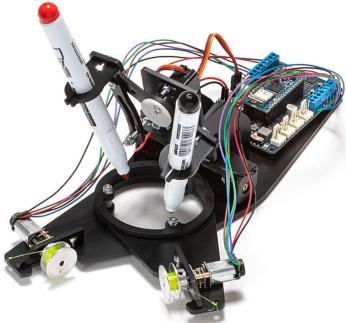
- Online Platform: 3 lessons and 3 projects
- Training
- Support

Hardware

- NANO IoT 33 board
- Nano Motor carrier
- Electric components
- Assembly pieces

Software

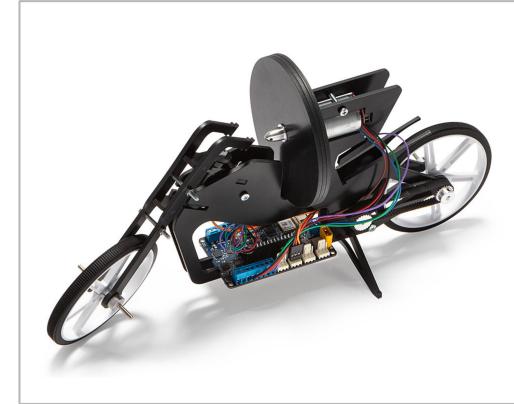
- Mathlabs
- Simulink
- Arduino IDE



Drawing robot



Web camera controlled rover



Self balancing motorcycle

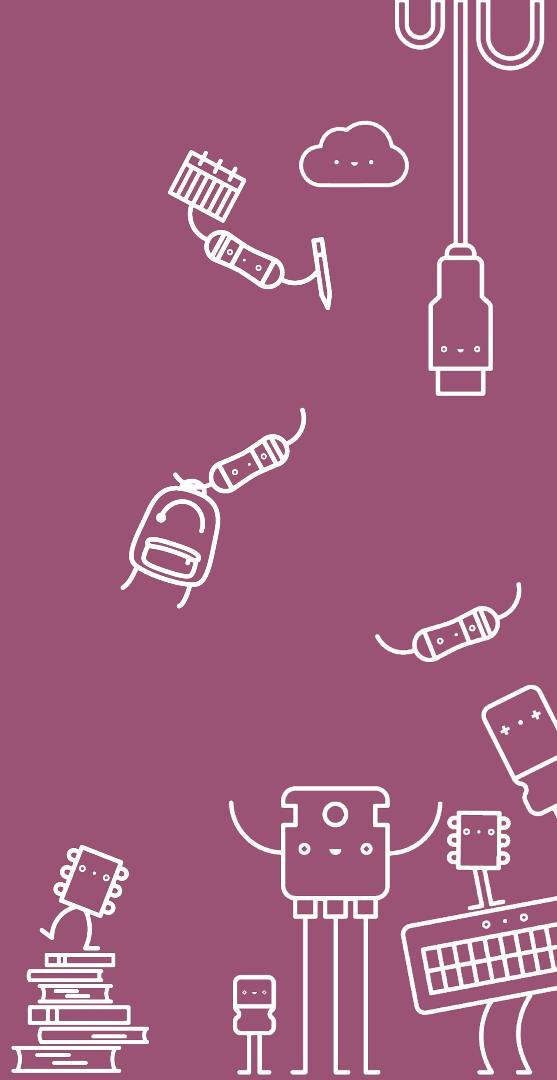
- **Image processing** of pictures to take from them the traces to replicate it in a white board
- **Trigonometric concepts** that allow knowing the position of the robot on the whiteboard
- **Mathematical movement concepts** to transform the pixels that make up the images in meters that the robot has to move

- **PID Control concepts** in diferencial platforms
- **Real time image processing** to locate the robot position on the arena
- Real time image processing to detect obstacles

- Apply the **mathematical theory** in the simulink model
- PID control modeling based on IMU sensor data



Tiny ML Kit



TINY Machine Learning KIT

COURSE 1

- Understand what machine learning (ML) Is
- Deep learning and embedded machine learning
- Understand neural networks
- Background responsibilities and Real Examples

COURSE 2

- Train your device using your own datasets
- Using external training models for your project
- Basics of AI, real user cases and scenarios
- Know and play with some of the most used technics
- Real world industry applications

COURSE 3

- Hardware basics
- Code your own projects with TinyML
- Train your TinyML device
- Deploy, test, and correct your TinyML projects

Arduino Nano 33 BLE Sense

- Senses: movement, acceleration, rotation, temperature, humidity, barometric pressure, sounds, gestures, proximity, color, and light intensity.



Custom Arduino shield to attach your components



Camera module (OV7675)



External content:

- There is **NO Arduino content** for this kit
- Use the freely available content & courses from [Harvard University](#) at [EdX](#)

Arduino IDE
Tensor Flow
Google Colab

edX: Tiny machine learning course

◀ Previous               ▶ Next

TinyML Application Deployment Preview

Bookmark this page

TinyML Application Deployment Preview



And hey, in course 2, I did train a small, little with spotting model.

So hey, what more do I need to know?

I'm going to tell you that there is much more than just getting the model right.

I hinted at this in course 2.

But when it comes to actually deploying the model on device,

you really have to think about where is the audio stream coming from.

It's not a file on your computer.

It literally streams in from the input sensor.

And how do you couple that input sensor with your neural network

and make sure all of these things run in a timely fashion?

And there's also the aspect of post processing.

If some of these things seem new or a little complicated,



**That's a wrap
Thank you!**