

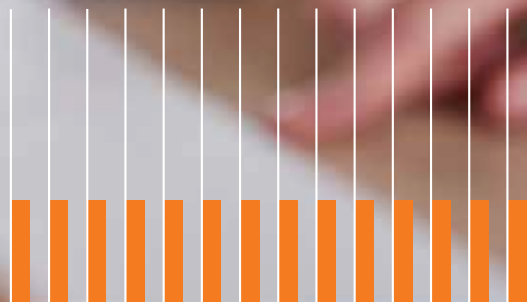
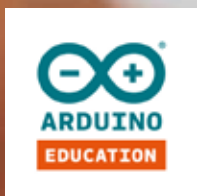


ARDUINO[®] EDUCATION 2023



EMPOWER SCIENTISTS
AND ARTISTS OF THE FUTURE
WITH CREATIVE STEAM LESSONS

SPECTRUMED.CA



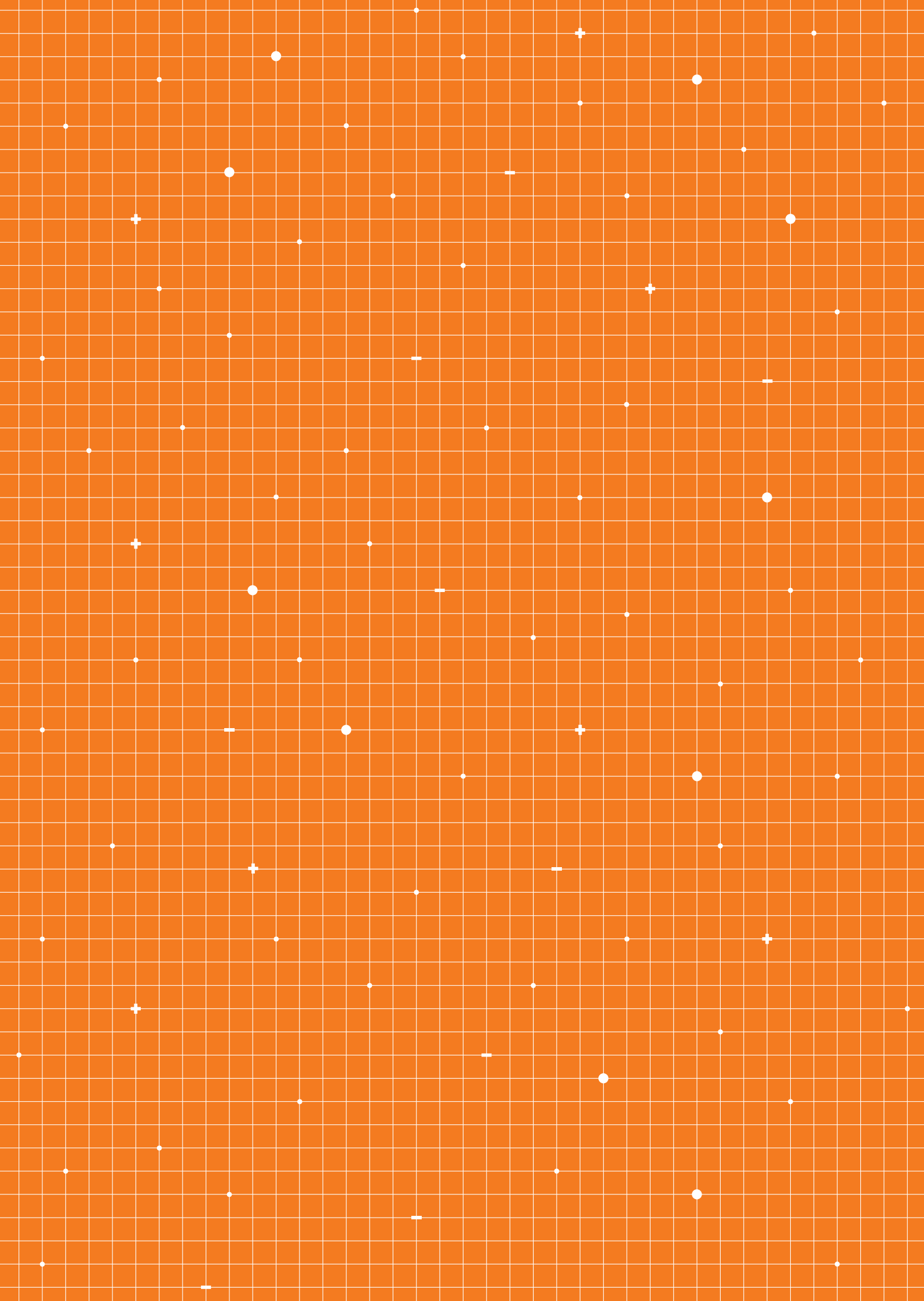


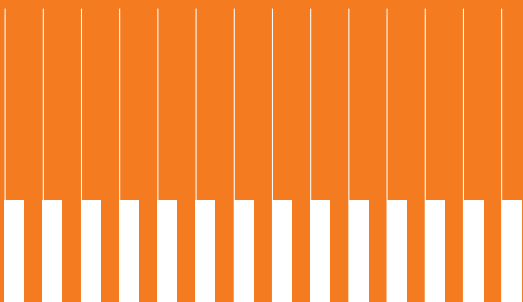
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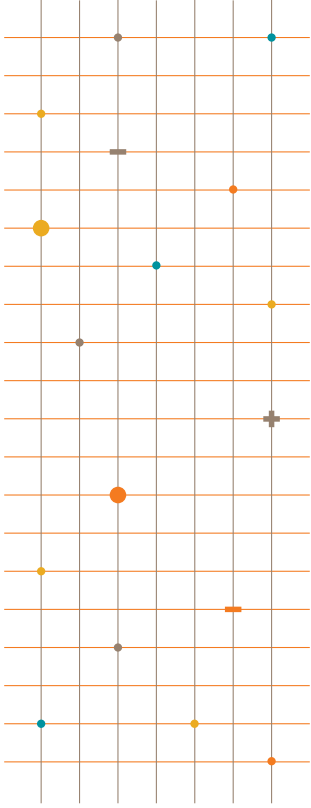


WELCOME TO ARDUINO® EDUCATION!

IN THIS CATALOG, YOU'LL FIND OUR FULL RANGE OF STANDARDS-LINKED STEAM KITS. YOU'LL DISCOVER HOW EACH KIT BENEFITS STUDENTS AND BOOSTS NOT ONLY THEIR LEARNING, BUT ALSO THE FUTURE SKILLS THEY NEED TO SUCCEED. MOST OF OUR KITS DON'T REQUIRE ANY EXPERIENCE TO GET STARTED - THEY'RE EASY TO USE, WITH POWERFUL LEARNING OUTCOMES!



ABOUT ARDUINO® EDUCATION



Arduino® Education classroom programs progress students through STEAM from middle school to university, increasing in complexity to challenge them as they develop their skills. All programs include a range of electronics such as programmable boards, sensors, accessories, and mechanical parts; simple open-source software; online content for students to build hands-on projects, and guided training and support for educators.

KEY TO ARDUINO EDUCATION ICONS



Science, Technology,
Engineering, Art, Math



Early Language
& Literacy



Coding



Free Website
Downloads



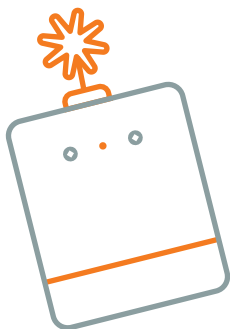
Social & Emotional
Development



Free App
Available



Creative
Exploration



OUR VISION, MISSION AND VALUES



VISION

Arduino Education makes technology, programming, and coding accessible to everyone, putting it into the hands of every student and educator.

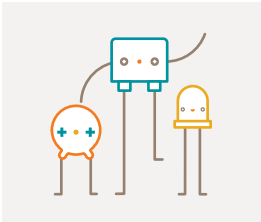
MISSION

We are focused on creating the next generation of scientists and artists with STEAM programs that progress students and help them thrive through middle school, high school, university, and beyond. Our technology, programming, and curriculum content are creative tools - just like brushes and paint.

VALUES

We champion students as they progress through their STEAM education from middle school to university by providing relevant, creative, and fun technology, programming, and curriculum content that enables them to thrive. We support the needs of educators by giving them the tools they need to feel at ease in delivering successful STEAM lessons and teaching their students 21st-century skills.

ARDUINO® LEARNING EVOLUTION



Our aim is to help students achieve their dream careers in **STEAM**. Our cross-curriculum content and open-source approach are essential tools for STEAM classes that develop with students as they progress, preparing them for a successful future.

This evolution shows how students can continue learning new STEAM skills using different Arduino Education programs and kits as they progress through their education.



Middle School

Guide middle school students from their very first steps with electronics into a world of robotics, computational thinking, and programming. Introduce new concepts on a continuous learning curve with extensive cross-curriculum open-source programs that are aligned with NGSS and help develop future skills such as collaboration, critical thinking, creativity, and problem-solving.



High School

Build on students' established foundation of programming, electronics, and mechanics with fun, cross-curriculum, open-source STEAM projects and easy-to-assemble experiments, all aligned with NGSS. Enhance future skills while delivering modular lessons where students learn by doing and take their STEAM skills to the next level.



University

State-of-the-art open-source technology engages university students in fundamental engineering concepts, key aspects of mechatronics, and complex programming functions, as well as the Internet of Things. High-quality learning materials and demanding projects will challenge them intellectually and help them develop their skills - all while having fun.



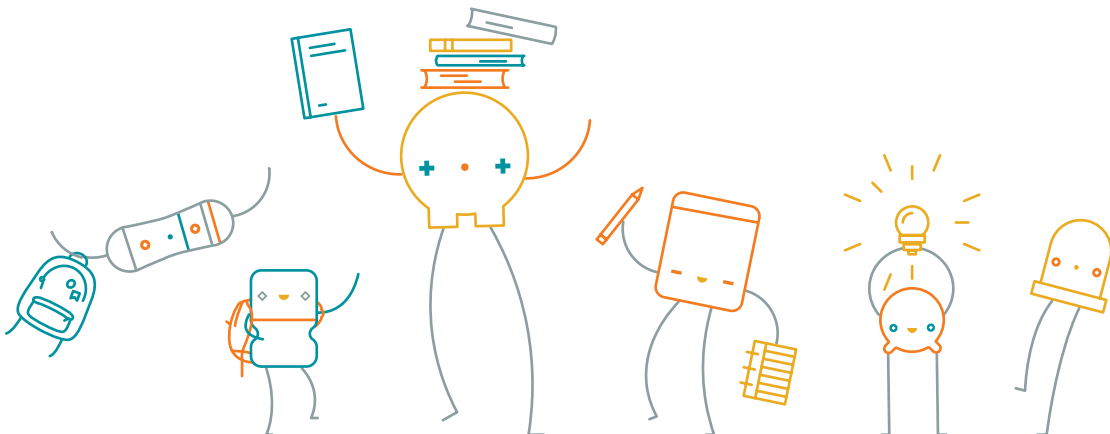
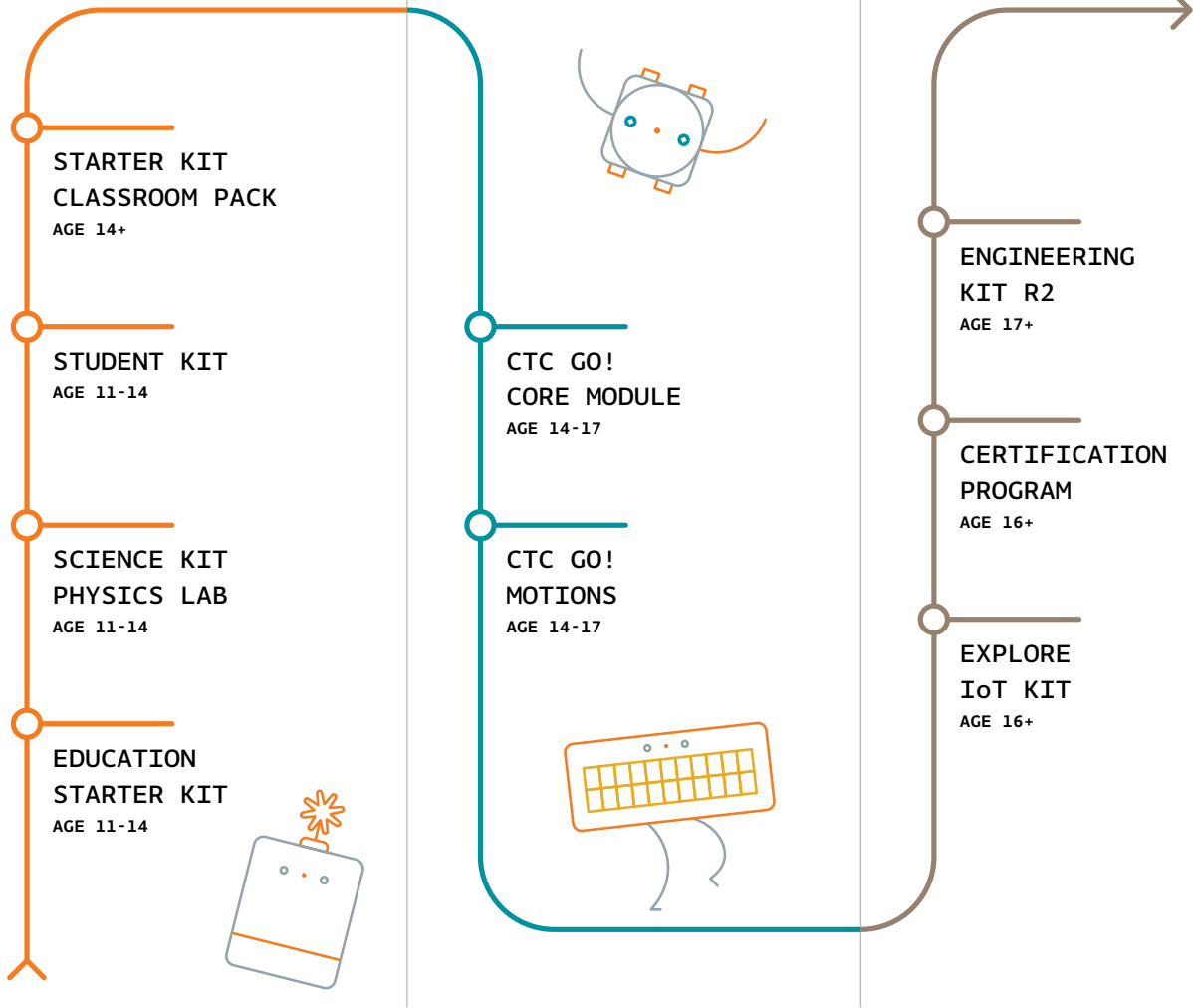
MIDDLE SCHOOL



HIGH SCHOOL/
SECONDARY SCHOOL



UNIVERSITY/
COLLEGE

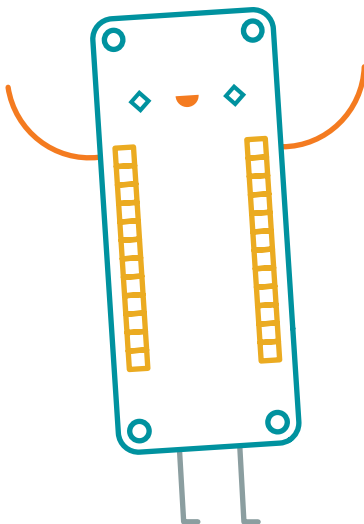


HOW WE SUPPORT THE TEACHERS



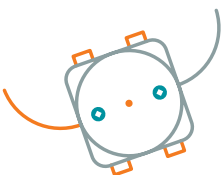
Our team of educational experts are focused on creating STEAM programs that support educators and students in different ways:

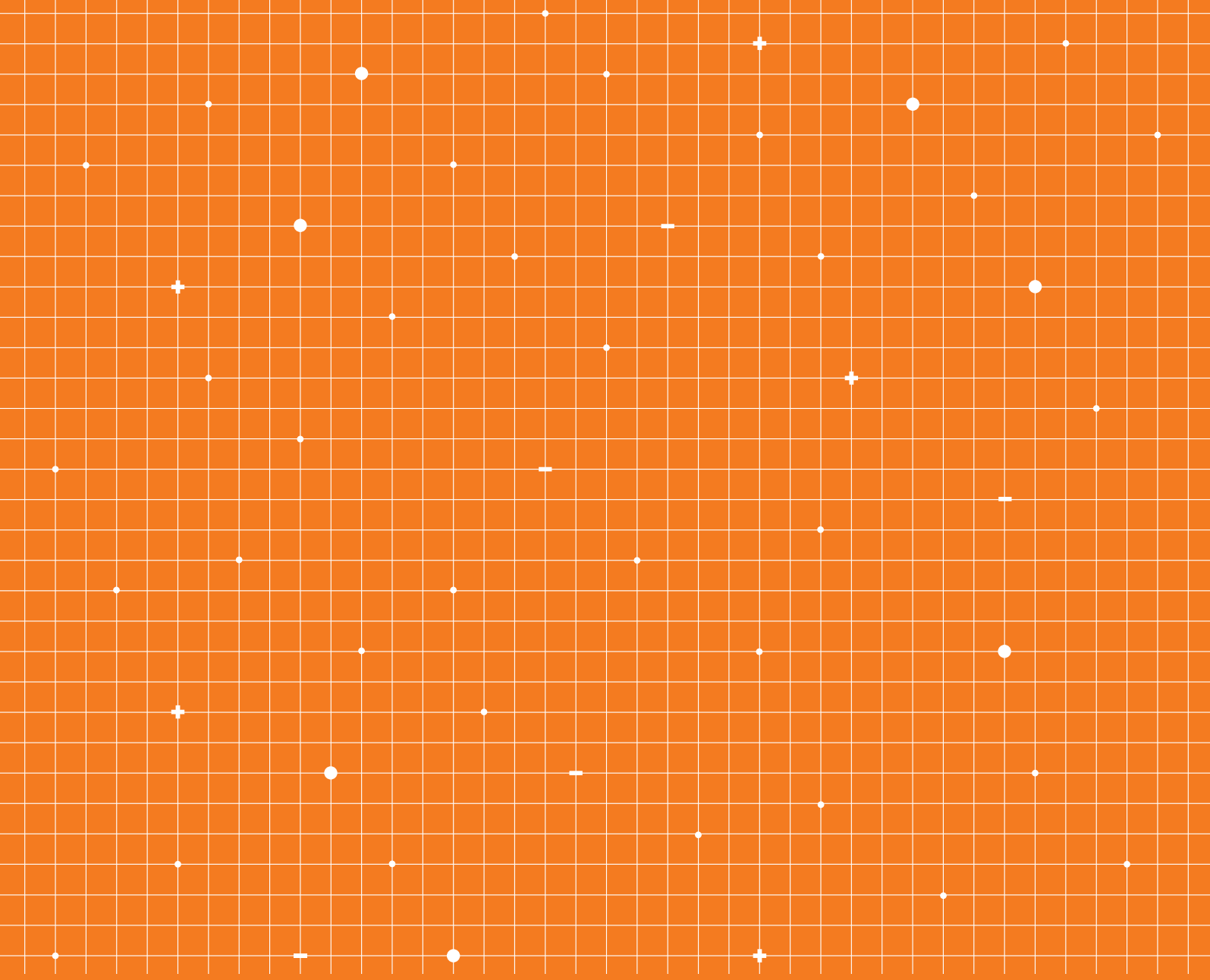
- ◆ **Classroom management** - you have all the tools you need to deliver successful STEAM lessons and confidently teach your students critical future skills.
- ◆ **Educators training** - most of our kits include onboarding webinars which guide you through the content and online tools. Educator training - we provide complete guidelines, extra tips, and suggestions.
- ◆ **Hands-on workshops** - we and our partners regularly organize hands-on workshops. These workshops provide the opportunity to experience Arduino and learn how it can be applied across STEAM subjects.
- ◆ **Dedicated online content** - all the materials you need for each lesson, resources to help with lesson preparation, teachers tips, timing suggestions for classroom management, and curriculum links.
- ◆ **Lesson planning** - within the content, you'll find that each lesson is carefully planned to efficiently manage the set-up, teaching and the practical experimentation in the time available.
- ◆ **Further support** - we're available to answer any questions you may have, and we respond quickly.



ARDUINO® EDUCATION KITS AT A GLANCE

SCHOOL LEVEL	ARDUINO KIT	AGE	SUBJECT MATTER COVERED	DESCRIPTION	WHERE CAN YOU USE THIS KIT?
MIDDLE SCHOOL	SCIENCE KIT PHYSICS LAB	11-14	Science, Technology, Engineering, Math	Enable middle school students to think and act like real scientists	REMOTE LEARNING, CLASSROOM
	EDUCATION STARTER KIT	11-14	Science, Technology, Engineering	Learn electronics and get started with programming in your classroom step-by-step. No experience necessary!	CLASSROOM
	STUDENT KIT	11-14	Science, Technology, Engineering	A programming and electronics kit designed for homeschooling including step-by-step lessons and complete guidance	REMOTE LEARNING, SELF-LEARNING
	STARTER KIT CLASSROOM PACK	14+	Science, Technology, Engineering, Arts	Get started with electronics quickly and easily. No experience necessary!	CLASSROOM
HIGH SCHOOL/ SECONDARY SCHOOL	CTC GO! CORE MODULE	14-17	Science, Technology, Engineering, Math	Everything you need to create fun, engaging, and relevant STEAM lessons for high school students	CLASSROOM
	CTC GO! MOTIONS	14-17	Science, Technology, Engineering, Math	Build on your high school students' STEAM knowledge with more complex programming concepts that develop computational thinking and 21st-century skills	CLASSROOM
UNIVERSITY/ COLLEGE	EXPLORE IoT KIT	16+	Science, Technology, Engineering, Arts	Innovate, create, transform: take your first step in building internet-connected objects. Explore the Internet of Things with Arduino Education	REMOTE LEARNING, CLASSROOM
	ENGINEERING KIT R2	17+	Science, Technology, Engineering, Math	Challenge engineering students and help them develop mechatronic engineering skills with the Arduino Engineering Kit R2	REMOTE LEARNING, SELF-LEARNING, ENGINEERING LAB







COVID-19

With the outbreak of COVID-19 across the world and 90% of children learning from home, there was a clear and urgent need to support educators, parents, and students however we could.

As we usually focus on a collaborative approach to STEAM learning, with students working together in teams as they progress through hands-on projects, we quickly realized that a completely new approach would be required to continue to provide educators and students with an engaging STEAM learning experience.

After consulting with educators, parents, students, and educational partners around the world, we defined and delivered a four-pillared rapid response to the COVID-19 outbreak, based upon:

- Remote learning resources - information, articles, and tips on teaching and learning remotely
- Video tutorials - focused on “ease of use”
- EDUvision - a series of weekly live online shows
- The new Student Kit - designed for use at home and for self-learning (see page 16)



REMOTE LEARNING

Teachers were suddenly faced with the challenge of educating their students despite schools being closed. Rather than being overwhelmed by the challenge, educators began to search for a solution, developing their own methods and sharing them for the benefit of all.

In response, we launched a remote learning platform to deliver online support to educators, parents, and students, to give them the tools to feel comfortable and confident in completing successful STEAM lessons at home.

Visit [ARDUINO.CC/REMOTELARNING](https://www.arduino.cc/remotelearning) to find out more.



ARDUINO SCIENCE KIT PHYSICS LAB

Enable middle school students to think and act like real scientists.

Science teachers who want to bring an inquiry-based, hands-on approach to their middle school classrooms can enable their students to think and act like real scientists with **Science Kit Physics Lab**.

The kit challenges students to explore and explain the physics behind amusement park rides. They examine forces, motion, magnetism, and conductivity, make their own hypotheses like real scientists, then check their assumptions and log data on the Arduino Science Journal app, a digital notebook for recording observations and conducting and documenting experiments in real-time. Students can simply run their experiments straight out of the box with plug-and-play projects.

The Science Kit Physics Lab was co-developed with Google. It's fully integrated with Google Classroom, which allows teachers to share the activities included in the kit and create assignments from students' experiments within their Google Classroom.

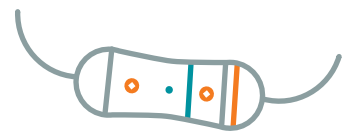
ARDUINO-EDUCATION-SCIENCE-KIT-
PHYSICS-LAB
SKU: 735541

QUICK LOOK

- Age: 11-14
- No. of students per kit: 2
- No. of projects: 9 physics experiments
- Total learning time: 90 minutes per project
- Languages: English or Spanish only (other languages to follow soon)

THE KIT INCLUDES

- Arduino MKR WiFi 1010
- Science carrier board
- Two silicone standoffs
- Flat micro USB cable
- Light sensor
- Temperature sensor module
- Cables
- Magnet
- Silicone gaskets, and more



Connects with the
SCIENCE JOURNAL APP (see page 30)



Works with



Google Classroom

Certified





KEY LEARNING VALUES

- Present experimental data in tables and charts
- Evaluate a scientific hypothesis
- Explore possible variables to design an open-ended investigation
- Distinguish between a conductor and an insulator
- Investigate the effect of magnetism
- Identify and compare thermal conductivity of different materials
- Describe the motion of a pendulum, measure its period and frequency, and identify the forces acting on it

BENEFITS OF THE SCIENCE KIT

- Enables students to think critically, solve problems, and get them acquainted with data analysis
- No prior electronics knowledge is necessary
- Extensive physics learning outcomes help students thrive in science
- Create a playful, collaborative environment where students want to learn
- Meet key curriculum targets with links to NGSS and the English National Curriculum for Science

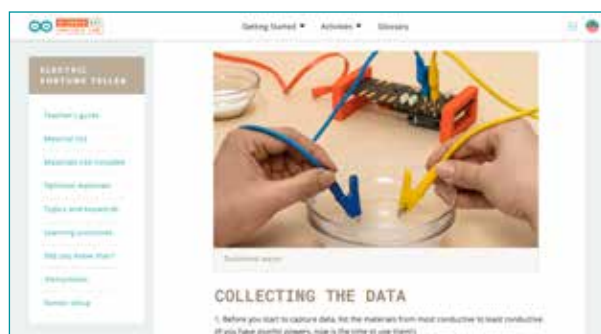
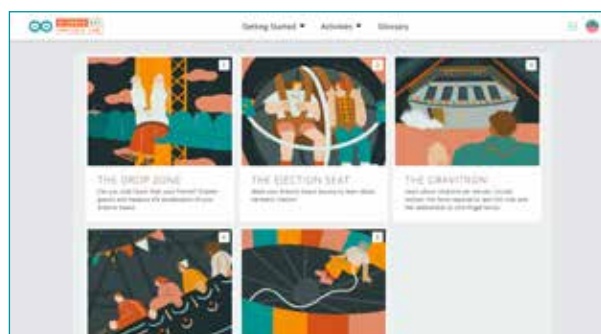
Curriculum alignment

All learning materials in the Science kit are aligned with Next Generation Science Standard (NGSS) for K-12 in the U.S. and the National Curriculum of England, used in international schools across the world.

Content

The kit comes with an online content learning platform for students with a detailed glossary, tutorial section, building instructions and 9 hands-on experiments covering electromagnetism and thermodynamics, and kinetics and kinematics.

The projects are based on amusement park rides such as a pirate ship, electric fortune teller and a haunted house!



What teachers say

"THE ARDUINO SCIENCE KIT PHYSICS LAB IS A ONE STOP SHOP FOR ALL THE EXPERIMENTS THAT YOU CAN DO. COVERING MAGNETISM AND MOTION, COMBINED INTO ONE BOX MAKING IT REALLY ACCESSIBLE FOR STUDENTS. THEY CAN JUST PICK IT UP AND GET GOING."

- Graeme Wood, Teacher, ARK Burlington Danes Academy, UK

spectrumed.ca



ARDUINO EDUCATION STARTER KIT

Learn electronics and get started with programming in your classroom step-by-step. No experience necessary.

Teach middle school students the basics of programming, coding, and electronics including current, voltage, and digital logic. The Education Starter Kit is designed for use in the classroom, with students working together to complete the lessons and projects.

Lessons and projects can be paced according to your students' abilities, allowing each student to learn at their own level. You can integrate the kit throughout the curriculum, including subjects such as physics, chemistry, and even history!

Curriculum alignment

This Student Kit follows the US common standards and focuses on core concepts of coding and electronics.

ARDUINO-EDUCATION-STARTER-KIT
SKU: 735540

QUICK LOOK

- Age: 11-14
- No. of students per kit: 8 (in groups of 2)
- No. of projects: 9 lessons & 2 open-ended projects
- Total learning time: 25 hours
- Languages: English only (other languages to follow soon)

THE KIT INCLUDES

- Access to exclusive online content including learning guidance notes, step-by-step lessons and extra materials such as resources, invention spotlights and a digital logbook with solutions
- 4x Arduino Uno Rev3
 - Breadboards
 - Cables, batteries, wires, LEDs, resistors, push buttons
 - Multimeters
 - Potentiometers, capacitors, phototransistors, temperature sensors
 - Motors



Remote learning version available:
STUDENT KIT (see page 16)





KEY LEARNING VALUES

- Basic concepts of electricity
- Safety in class
- Schematics
- Writing code
- Controlling a circuit
- Coding concepts
- Controlling a servo motor
- Producing sounds, tones, and music
- Measuring the intensity of light

BENEFITS OF THE EDUCATION STARTER KIT

- Easy to get started
- No prior coding or electronics experience is required
- Projects are fun and engaging with real-world topics
- Boost critical thinking collaborative learning, and problem-solving skills
- Teach engaging lessons that are relevant, playful, and enable all students to thrive
- Increase your own confidence and teamwork skills with specially-designed content
- Rich educational content for both educators and students

Content

The online content provides entire 90 minute step-by-step-lessons with information and materials- such as detailed teacher's guidance, key words, exercises, extra optional activities, concepts, history and interesting facts, for a complete and in-depth class experience.

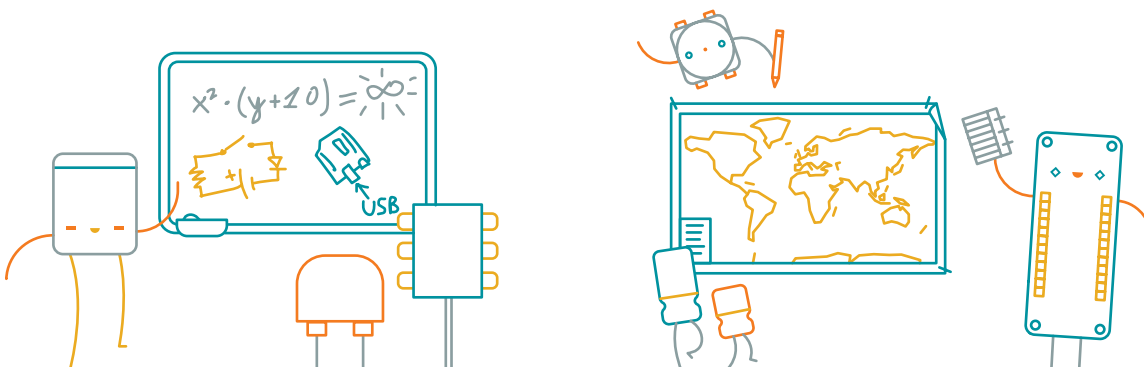
Each lesson builds off the previous one, giving students a further opportunity to apply the skills and concepts they have already learned.

The Arduino Student Kit comes with a logbook. Exercises related to the concepts learned during the lessons. Students answer the exercises as a way of reinforcing their newly-learned knowledge.

What students say

"I THOUGHT THE ARDUINO EDUCATION STARTER KIT WAS A FUN WAY TO GET INTO THE CLASSROOM...AND GET TO WORK WITH CODING"

- Gavin, Middle School Student, Pittsburg, USA





ARDUINO STUDENT KIT

The spark of creativity in one affordable home-school electronics kit.

Get started with the basics of electronics, programming, and coding. No prior knowledge is necessary - the kit will guide you through 11 exciting activities, introducing concepts like current, voltage, resistance, and developing important 21st century skills, such as problem-solving and critical thinking.

Each kit includes hardware, access to online learning content, and dedicated support, making it ideal for remote teaching, homeschooling, and self-learning.

What teachers say

"I THOROUGHLY ENJOYED THE ACTIVITIES PROVIDED IN THE ARDUINO STUDENT KIT. THE KIT IS A GREAT VALUE FOR THE MONEY, ESPECIALLY SINCE IT INCLUDES A HIGH-QUALITY MULTIMETER. [...] THE THOROUGH NATURE OF THE TEACHER AND STUDENT MATERIALS MEANS I CAN DELIVER MEANINGFUL LEARNING ACROSS IN-CLASS, REMOTE, OR BLENDED-LEARNING ENVIRONMENTS. THAT FLEXIBILITY IS APPRECIATED AND DEFINITELY MAKES THIS A UNIQUE SOLUTION."

- Jim Brown, NBCT, Grade 5-6 STEM teacher,
Sand Creek Middle School, Albany, New York

ARDUINO-EDUCATION-STUDENT-KIT-SELF-LEARNING

SKU: 735548

QUICK LOOK

- Age: 11-14
- No. of students per kit: 1
- No. of projects: 9 lessons & 2 open-ended projects
- Total learning time: 25 hours
- Languages: English only (other languages to follow soon)

THE KIT INCLUDES

- Access to exclusive online content including learning guidance notes, step-by-step lessons and extra materials such as resources, invention spotlights and a digital logbook with solutions
- Arduino Uno Rev3
 - Breadboard
 - Cables, batteries, wires, LEDs, resistors, push buttons
 - Multimeter
 - Potentiometers, capacitors, phototransistor, temperature sensor
 - Servo Motor



Classroom version available:
EDUCATION STARTER KIT (see page 14)





KEY LEARNING VALUES

- Basic concepts of electricity
- Safety
- Schematics
- Writing code
- Controlling a circuit
- Coding concepts
- Controlling a servo motor
- Producing sounds, tones, and music
- Measuring the intensity of light

BENEFITS OF THE STUDENT KIT

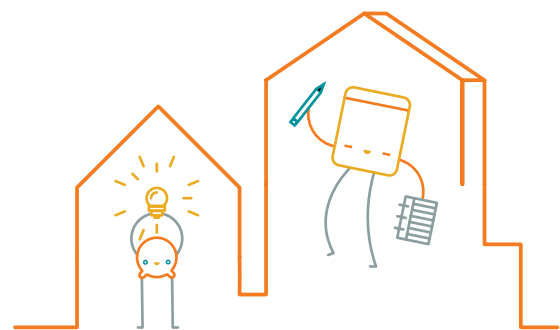
- Affordable
- Quick and easy to get started with step-by-step lessons
- No experience required for educators, parents or children
- Lessons are fun and engaging with real-world topics
- Use the kit at home just like students would be using in class
- Go at the speed of individual ability
- Improve problem-solving and critical thinking skills

Curriculum alignment

This Student Kit follows the US common standards and focuses on core concepts of coding and electronics.

Content

You can use the kit for remote teaching, as the online platform contains all the content students need: exclusive learning guidance, tips for remote learning, nine 90-minute lessons, and two open-ended projects. Each lesson builds off the previous one, providing a further opportunity for students to apply skills and concepts they've already learned. You can track your students' progression and achievements via a logbook, which students complete as they work through each lesson. The beginning of each lesson provides an overview, estimated completion times, and learning objectives. Throughout each lesson, there are tips and information that help to make the learning experience easier, and key answers and extension ideas are also provided.





ARDUINO STARTER KIT SINGLE OR CLASSROOM PACK

Get started with electronics quickly and easily.

Quickly and easily get started with learning electronics using the Arduino Starter Kit. You can use the starter kit to teach students about current, voltage, and digital logic as well as the fundamentals of programming. There's an introduction to sensors and actuators and how to understand both digital and analog signals. Within all this, you'll be teaching students how to think critically, learn collaboratively, and solve problems.

Each Arduino Starter Kit can be used by two students, so the classroom pack is ideal for a classroom of twelve students.

Content

The 170-page guide book is one of the key features of this kit. It provides full instructions for each of the 15 projects, and helps students (and educators) easily follow the program.

ARDUINO-STARTER-KIT-CLASSROOM-6-PACK

SKU: 735545

ARDUINO-STARTER-KIT-SINGLE ENGLISH

SKU: 735546

ARDUINO-STARTER-KIT-SINGLE FRENCH

SKU: 735546F

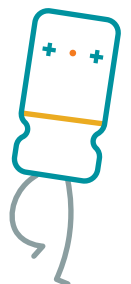
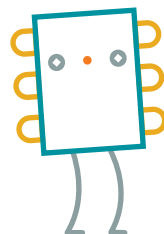
QUICK LOOK

- Age: 14+
- No. of students per kit: 2
- No. of projects: 15
- Total learning time: 11.5 hours
- Languages: Available in English or French

THE KIT INCLUDES

Each of the six Arduino Starter Kits you get in the classroom pack includes:

- Arduino Uno
- USB cable
- Breadboard
- Wires, pushbuttons, LCDs, LEDs, diodes, resistors
- Phototransistors
- Potentiometers
- Temperature sensor
- Tilt sensor
- Motors
- Transistors
- Capacitors... and more!





KEY LEARNING VALUES

- Learn the basics of using Arduino in a hands-on way
- The most common and useful electronic components
- Take your first steps into the world of electronics with interactive and sensing objects
- Programming logic and syntax

BENEFITS OF THE STARTER KIT

- No prior coding or electronics experience is required
- Easy and simple to get started
- Projects are fun and engaging with real-world topics
- Boost students' critical thinking, collaborative learning, and problem-solving skills

INSIDE THE PROJECTS BOOK

- 01. GET TO KNOW YOUR TOOLS
- 02. SPACESHIP INTERFACE
- 03. LOVE-O-METER
- 04. COLOR MIXING LAMP
- 05. MOOD CUE
- 06. LIGHT THEREMIN
- 07. KEYBOARD INSTRUMENT
- 08. DIGITAL HOURGLASS
- 09. MOTORIZED PINWHEEL
- 10. ZOETROPE
- 11. CRYSTAL BALL
- 12. KNOCK LOCK
- 13. TOUCHY-FEELY LAMP
- 14. TWEAK THE ARDUINO LOGO
- 15. HACKING BUTTONS

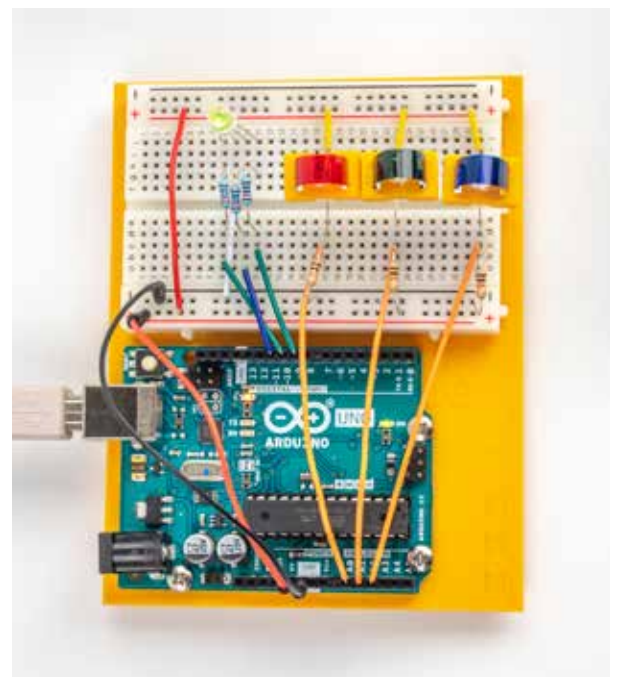
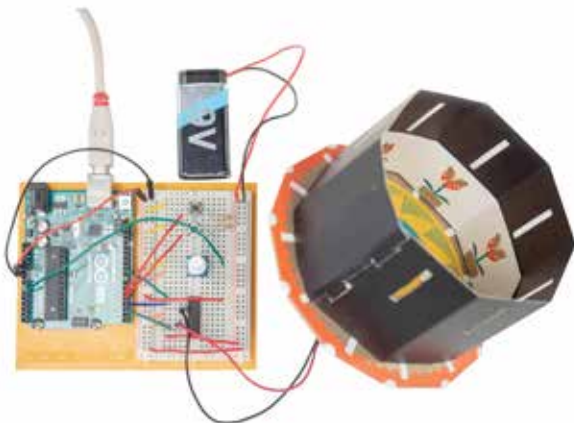
What is the Arduino Starter Kit Classroom Pack?

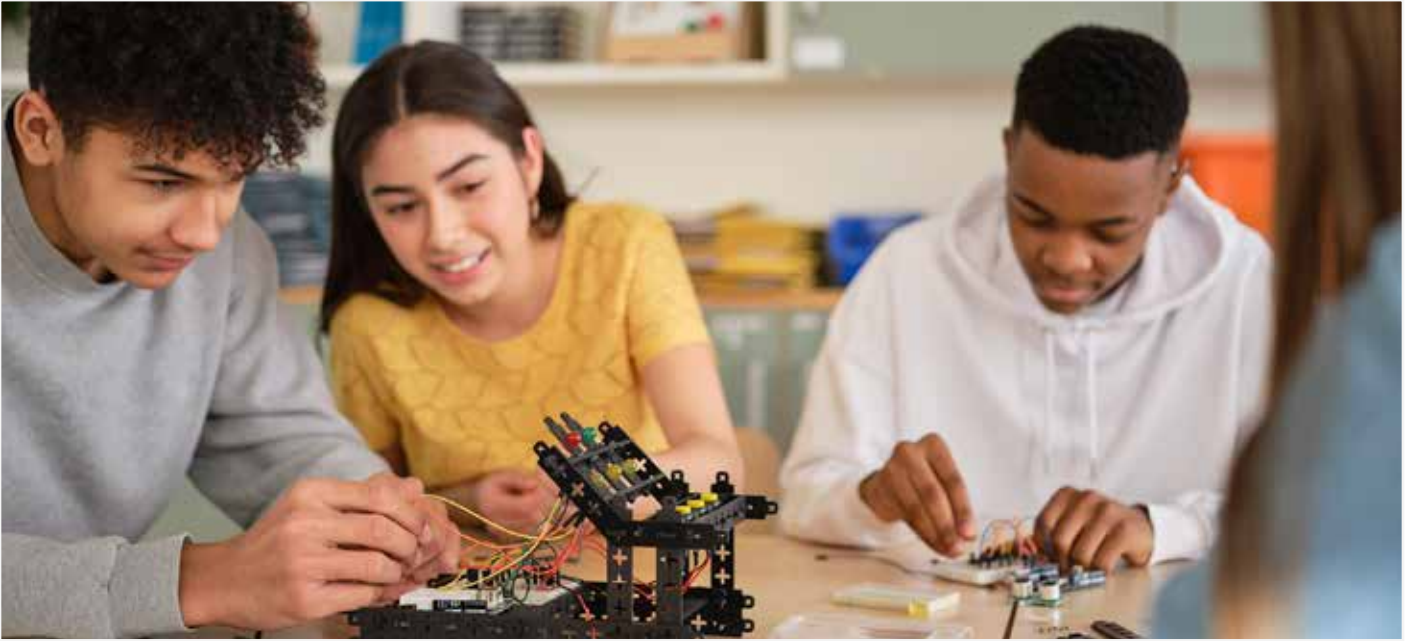
This classroom pack contains six Arduino Starter Kits. You can use the starter kits to walk your middle school students through the basics of electronics in a hands-on way, by learning through building creative projects. You get a selection of the most common and useful electronic components and a guide book with instructions for 15 projects that help students take their first steps into the world of electronics. Starting with the basics of electronics before moving on to more complex projects, the kit helps students control the physical world using sensors and actuators.

What you say

"IN ARDUINO STARTER KIT THE PROJECTS ARE BASIC, BUT THE BOOKLET IS WELL-PRESENTED, TELLING YOU NOT ONLY HOW TO ASSEMBLE THE PROJECT AND WRITE THE PROGRAM FOR IT, BUT ALSO EXPLAINING THE PROGRAM CODE LINE BY LINE SO YOU CAN LEARN THE MEANING BEHIND THE CODE (ALTHOUGH YOU CAN ALSO SKIP THE EXPLANATION AND JUST WRITE OUT THE CODE)."

- Andy, United Kingdom





ARDUINO CTC GO! CORE MODULE

Everything you need to create fun, engaging, and relevant STEAM lessons for high school students.

Engage high school students in **STEAM** subjects and teach them how to use technology as a tool in a hands-on learning environment. A modular program including 15 hours of curriculum-aligned lessons and everything you need for 24 students, **CTC GO! - Core Module** enables students to create and test a series of fun, real-world experiments. Think of it like brushes and paint - you're giving students what they need to learn and thrive while the collaborative approach teaches them important 21st-century skills.

What makes this kit really stand out is the training and support it comes with. This includes a welcome training webinar with an Arduino Education expert, training videos which explain each lesson's concepts, shorter videos which expand on lesson content, and direct email support from an education expert.

[ARDUINO-EDUCATION-CTC-GO-CORE-MODULE-ENGLISH](#)

SKU: 735543

[ARDUINO-EDUCATION-CTC-GO-CORE-MODULE-FRENCH](#)

SKU: 735543F

QUICK LOOK

- Age: 14-17
- No. of students per kit: 24 students & 3 teachers
- No. of projects: 20 (8 practical lessons, 6 project building, 6 experimental sessions)
- Total learning time: 15 hours
- Languages: Available in English or French

THE KIT INCLUDES

- 8 Arduino UNO WiFi Rev2 programmable boards
- 8 Arduino Education shields
- Two different-sized breadboards for every board
- Electronic components including resistors, LEDs, pushbuttons and buzzers
- Sensors including potentiometers, light and ultrasonic sensors
- Modular building pieces for building eight different guided projects
- Replacement parts, and much more



Extra feature expansion available:
CTC GO! MOTIONS (see page 22)





KEY LEARNING VALUES

- Understanding the basics of electronics, reading schematics, and connecting commonly used components
- Understanding the basics of text-based programming language, controlling components, and reading data using code
- Creative ways of using technology, designing and developing physical computing projects
- Working collaboratively to tackle real-world problems within given constraints and instructions

BENEFITS OF THE CTC GO! CORE

- Everything you need for high school STEAM lessons in one place
- Easy to get started, with all the support you need
- Teach engaging lessons that are relevant, fun, and enable all students to thrive
- Enhance students' problem-solving and communication skills
- Create a playful, collaborative environment where students want to learn

Curriculum alignment

All materials are created following latest education standards and relevant 21st century skills and aligned with the National Curriculum of England.

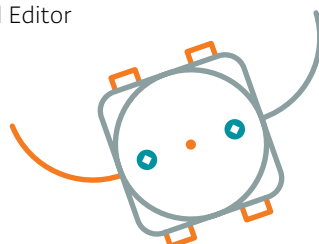
Content

Additionally, the software platform for educators provides all the materials you need for each lesson, resources to help you with lesson preparation, content tips, timing suggestions for classroom management, and curriculum links. Educators also have access to the software platform for pupils, which includes step-by-step instructions, assembly videos, and fun activities to help them get started with programming, electronics and building fully-functional, interactive projects.

What you say

"IN THE CTC KITS, THE STUDENT-LED LESSONS NAVIGATE USERS THROUGH WIRING THEIR OWN CIRCUITS AND THEN PROGRAMMING THE INCLUDED ARDUINO BOARD VIA THE ARDUINO SOFTWARE (IDE) TO MAKE LEARNING COME TO LIFE ON THE TABLE IN FRONT OF THEM."

- Corinne Pachl, Technical Editor





ARDUINO CTC GO! MOTIONS EXPANSION PACK

Build on your high school students' STEAM knowledge with more complex programming concepts that develop computational thinking and 21st-century skills.

If you've taken your students through the CTC GO! - Core Module, the **Motions Expansion Pack** will build on what they have already learned about how to use technology as a tool and how to apply that knowledge in the real world.

The **Motions Expansion Pack** challenges students to go a step further in computing and design and technology by introducing them to new and more complex programming concepts that develop their logical reasoning, computational thinking, and problem-solving skills. As an educator, you'll still get all the teaching support you need with webinars, videos, guides, and direct contact with an expert.



This kit is an add-on pack for the CTC GO! CORE MODULE (see page 20)

ARDUINO-EDUCATION-CTC-GO-CORE-MODULE-THE-MOTIONS-EXPANSION-PACK
SKU: 735544

QUICK LOOK

- Age: 14-17
- No. of students per kit: 24 students & 3 teachers
- No. of projects: 4 (4 lessons and 4 projects)
- Total learning time: 10.5 hours
- Languages: English only (other languages to follow soon)

THE KIT INCLUDES

- 16 servo motors
- Batteries and wires
- Mechanical assembly pieces
- Two markers
- Two screwdrivers, plus more
- 14 learning sessions of 45 minutes each:
 - Four guided lessons to learn how to start working with motors
 - Three guided project-building sessions to apply this knowledge
 - Seven self-guided project-building sessions





KEY LEARNING VALUES

- Understanding the basics of servo control and being able to translate servo's rotational and linear motion by using gears and pulleys
- Expanding programming knowledge and concepts, controlling multiple attributes by reading data from sensors
- Being creative in ways of using resources and technology to design and develop physical computing projects
- Working collaboratively and efficiently to tackle real-world problems by following a design process

BENEFITS OF THE CTC GO! MOTIONS

- Extend students' learning and challenge them to go one step further
- Boost learning outcomes in STEAM subjects
- An easy-to-implement, seamless addition to the Core Module
- Teach engaging lessons that are relevant, playful, and enable all students to thrive
- Enhance students' problem-solving and teamwork skills with specially-designed content and class dynamics

Curriculum alignment

All materials are created following latest education standards and relevant 21st century skills and aligned with the National Curriculum of England.

Content

The Motions Expansion Pack contains 14 learning sessions, including four guided activities lessons to learn how to start working with motors, three guided project-building sessions to apply the acquired knowledge, and seven self-guided project-building sessions.



What you say

"THE ARDUINO EDUCATION CTC KITS HAVE STUDENTS GO THROUGH THIS ENGINEERING DESIGN LOOP IN EACH LESSON, WHICH ENABLES THEM TO PRACTICE ADAPTABILITY, CREATIVITY, AND PERSISTENCE. THESE SKILLS, AND OTHER 21ST-CENTURY SKILLS, CARRY STUDENTS INTO THE CAREERS OF TOMORROW."

- Corinne Pachl, Technical Editor



ARDUINO EXPLORE IoT KIT

Innovate, create, transform: take your first step in building internet-connected objects. Explore the Internet of Things with Arduino Education.

Get advanced high school and college students started with creating connected devices - known as the **Internet of Things** - quickly and easily. They'll learn how to build internet-connected objects such as a home security alarm, a classroom tracker, and an urban farming device, by following the step-by-step tutorials for ten different projects - fun, creative experiments with real-life components. Create connections, make a complex subject simple, allow students to innovate, and enhance their understanding of real-world technology with the Arduino Explore IoT Kit.

What you say

"ONE OF THE MOST POWERFUL LEARNING OPPORTUNITIES THE INTERNET OF THINGS CAN INSPIRE IN CLASSROOMS IS THE ABILITY TO CREATE SYSTEMS THAT LEVERAGE MANY DATA SOURCES AND CAN COMMUNICATE WITHOUT BEING PHYSICALLY TETHERED TO EACH OTHER."

- Sara Willner-Giwerc, Doctoral Student Mechanical Engineering, Tufts University, Boston

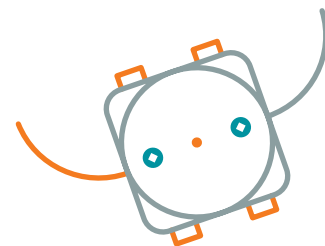
ARDUINO-EDUCATION-EXPLORE-IOT-KIT
SKU: 735542

QUICK LOOK

- Age: 14+
- No. of students per kit: 2
- No. of projects: 10
- Total learning time: 10 hours of classes, 45 minutes per lesson
- Languages: English only (other languages to follow soon)

THE KIT INCLUDES

- Arduino MKR1010
- MKR IoT Carrier designed for this kit
- Temperature, humidity, pressure, UV, moisture, and PIR sensors
- Accelerometer
- Plug-and-play connectors and cables, and much more



Find out more about
ARDUINO IOT CLOUD (see page 31)





KEY LEARNING VALUES

- Control physical objects, such as a displays or lights, remotely
- Collecting, processing, and storing data
- Graphing and visualizing data and understanding its meaning
- Serial communication, APIs, JSON, and web servers
- Network security considerations
- Different sensors and how to use them
- Collect data about movement using an accelerometer, pressure, and motion sensors
- Actuators and how to use them

BENEFITS OF THE EXPLORE IOT KIT

- Get started quickly and easily with the Internet of Things
- Make a complex subject simple and accessible
- Enhance students' understanding of real-world technology and its applications
- Learn critical future skills for 21st century careers
- Be an innovator - learn how to use technology to make an impact on society
- Build functional prototypes inspired by real-world applications
- Gain confidence in designing and making your own connected projects
- Combine your knowledge with actual industry innovations

Curriculum alignment

The learning content of the Explore IoT Kit is aligned with the Computer Science Standards (CSTA).

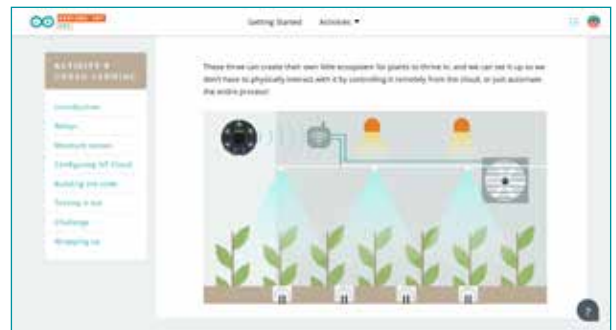
Content

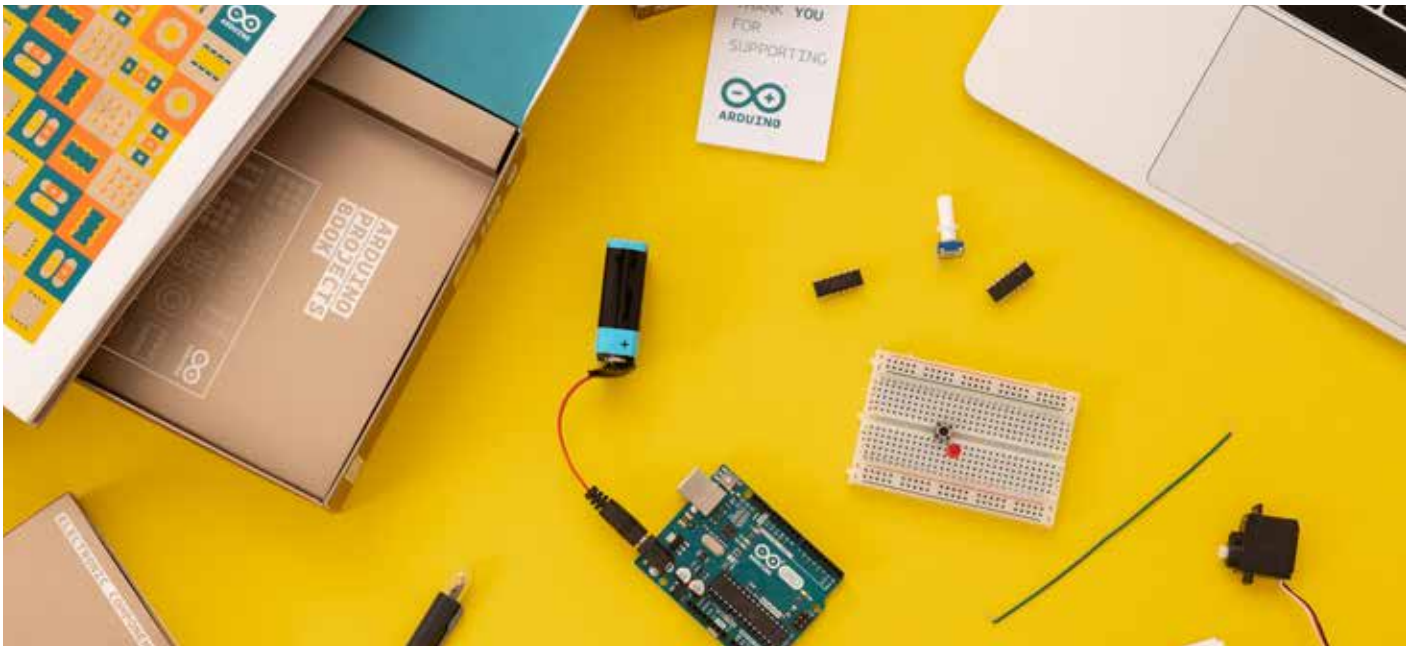
With this kit, you get access to an online platform with all the content, information and activities you need to learn the basics of IoT in one place. The content contains 10 step-by-step hands-on activities, covering the fundamentals of IoT, including hardware, networking, algorithms and programming, security, and data handling. There are also 10 open-ended challenges which extend students' learning.

What is the MKR IoT Carrier?

The MKR IoT Carrier has been designed to help students and teachers focus more on software and testing and less on wiring the circuits, as is an extension of the board, and makes wiring and troubleshooting easier.

THE KIT INCLUDES A 12-MONTH FREE TRIAL TO THE ARDUINO CREATE MAKER PLAN, OFFERING UNLIMITED COMPILATION TIME AND EXTENDED ACCESS TO THE ARDUINO IOT CLOUD.





ARDUINO CERTIFICATION PROGRAM - FUNDAMENTALS

Certify your skills in electronics, programming, and physical computing.

Officially certify your skills and knowledge in Arduino-related electronics, programming, and physical computing. The Fundamentals exam is the first tier in the Arduino Certification Program (ACP), which enhances your professional skills while providing official recognition throughout your development.

Developed in consultation with interaction designers and electronic engineering professionals and taking leading technology curricula as its foundation, the Arduino Certification Program assesses skills based on practical tasks from the Arduino Starter Kit. This kit, which is included with Fundamentals, provides all the components, project book, and support you need to get started with coding, electronics, and Arduino in a hands-on way.

You can also take the exam on its own, without having to purchase the Starter Kit. Demo the exam in your language at [CREATE.ARDUINO.CC/EDU/COURSES/LOCAL/QUIZ](https://create.arduino.cc/edu/courses/local/quiz)

ARDUINO-FUNDAMENTALS-BUNDLE-WITH-ACTIVATION-CODE

SKU: 735556 (BUNDLE)

ARDUINO-FUNDAMENTALS-EXAM-CERTIFICATION

SKU: 735554 (EXAM ONLY)

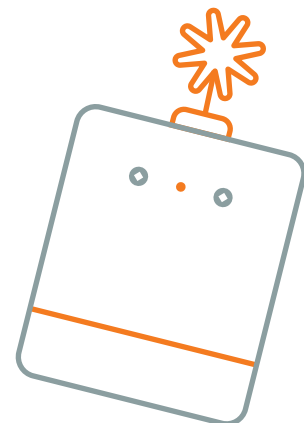
QUICK LOOK

- Age: 16+
- Multiple-choice, online exam
- Answer 36 questions in 75 minutes
- Languages: English, Spanish, German, Italian, Chinese (French to follow soon)

THE KIT INCLUDES

There are two ways to get certified:

- You can purchase the exam on its own (you will have one attempt to pass it).
- You can purchase the exam along with the Arduino Starter Kit as the Fundamentals bundle.





EXAM SUBJECT AREAS

- ELECTRICITY - Understanding concepts such as resistance, voltage, power and capacitance, and how to measure and calculate them
- READING CIRCUITS AND SCHEMATICS - Understanding how electronics are represented visually, and reading and analyzing electronic circuits
- ARDUINO IDE - Understanding the functionality of the Arduino development environment, serial communication, libraries, and errors
- ARDUINO BOARDS - Understanding the constitution and capabilities of an Arduino board and the functions of its different parts
- FREQUENCY AND DUTY CYCLE - Understanding the concepts of Pulse Width Modulation (PWM) and frequency, and being able to calculate duty cycle
- ELECTRONIC COMPONENTS - Understanding how various electronic components such as LEDs, sensors, buttons, and motors work, and how to use them in a circuit
- PROGRAMMING SYNTAX AND SEMANTICS - Understanding the building blocks of the Arduino programming language such as functions, arguments, variables, and loops
- PROGRAMMING LOGIC - Ability to program various electronic components and read, analyze and troubleshoot Arduino code

BENEFITS OF TAKING THE EXAM

- Add the Fundamentals certification to your resumé to demonstrate your knowledge of electronics, programming, and coding
- Increase your confidence in Arduino related electronics, programming and physical computing
- Become part of a wider professional network

What is the Arduino Certification Program - Fundamentals?

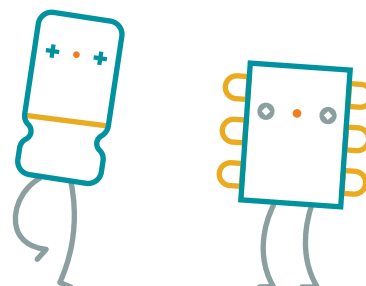
The 75-minute Fundamentals exam is web-based and consists of 36 questions. To obtain your certification, you will need to pass with at least 70 points out of 100 - and there's no long wait for results, as they are available straight after submission.

Once successful, you'll receive a certificate accompanied by a unique QR code. This code allows you to prove the authenticity of your certification and, if you choose to, share the code with others so they can access the certificate's digital information and check its authenticity.

What you say

"THE ARDUINO CERTIFICATION PROGRAM WAS VERY IMPORTANT FOR ME TO BE ABLE TO DEMONSTRATE THAT THIS WAS NOT JUST A HOBBY OR A SECONDARY ACTIVITY, I WANTED TO OFFICIALLY CERTIFIED MY SKILLS. IT WAS A REALLY NICE EXPERIENCE, AND I AM LOOKING FORWARD TO CONTINUING WITH THE NEXT CERTIFICATION LEVELS"

- Sergio Pinilla Valencia, Mechatronics Engineer graduate, University of Caldas, Colombia, 2020





ARDUINO ENGINEERING KIT R2

Challenge engineering students and help them develop mechatronic engineering skills.

The **Engineering Kit R2** is a versatile, hands-on, project-based learning tool that provides students with an understanding of basic engineering and mechatronic core concepts through real-world connected projects that create an outcome-driven learning environment.

Students are able to connect what they learn with real-world industries, are encouraged to think critically, and improve their depth of knowledge by learning theoretical concepts through experimentation. The kit demonstrates key control system concepts, core aspects of mechatronics, and MATLAB and Simulink programming. Ideal for advanced high school and college students, the projects cover the basics of model-based design, control systems, image processing, robotics, signal processing, and more - plus they're fun to do!

Content

You can freely tailor the kit to students' needs and your own curriculum, freely adapting the content to your own ideas and experiments, for example as part of laboratories and final projects. There's lots of opportunity for experimentation, as students can design and develop new solutions. They can also use the kit to experiment at home for extended learning.

ARDUINO-EDUCATION-ENGINEERING-KIT-REV-2

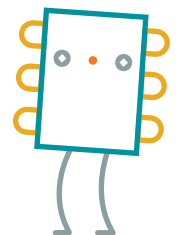
SKU: 735549

QUICK LOOK

- Age: 17+
- No. of students per kit: 2-3
- No. of projects: 3
- Languages: English only (other languages to follow soon)

THE KIT INCLUDES

- Arduino Nano 33 IoT
- Nano Motor Carrier
- Mechanical pieces to assemble the projects
- Batteries, motors, cables, wheels
- Webcam, and much more!
- A hard plastic, stackable toolbox ideal for storage and years of use
- A one-year individual license for MATLAB and Simulink
- Student e-learning platform



In partnership with





KEY LEARNING VALUES

- System modeling
- Control theory
- Robotics and mechatronics
- Image and video processing
- Text-based programming with MATLAB
- Visual programming with Simulink
- How to analyze and visualize data
- How to model and simulate behavior of dynamic systems

BENEFITS OF THE ENGINEERING KIT

- Extensive learning outcomes provide students with a strong understanding of basic engineering concepts
- Students want to learn because the projects are fun and create an outcome-driven environment
- Broaden your students' 21st-century skills with collaborative learning and problem-solving, and challenge them to think critically
- Help students connect their knowledge with real-world industries
- Educators can freely tailor the kit to their students' needs and their own curriculum
- Improve depth of knowledge by learning theoretical concepts in a hands-on way

Curriculum alignment

The content of this kit is based on the latest mechatronics and robotics curriculums of different universities.

What projects are included?

The Arduino Engineering Kit R2 features three projects:

- **Self-balancing motorcycle:** Design a control system to keep this motorcycle upright using a flywheel for balance
- **Webcam controlled rover:** Build and program a rover that can navigate between given reference points using a camera to locate its position and move objects with a forklift mechanism
- **Drawing robot:** Build and program a robot that can duplicate any drawing it's given on a whiteboard

The kit includes access to an online platform with step-by-step guidance, lessons, and other learning materials. Each kit includes a one year individual trial licence for Matlab and Simulink.

About Mathworks

In order to prepare students for real life environments, we partnered with MathWorks in the development of this kit. MATLAB and Simulink make the complex math and engineering computations in the kit's projects easier and more intuitive. Top engineering schools around the world use these programs in both curriculum and research, so students will be learning valuable skills they'll use in the future.

What you say

"I AM IMPRESSED WITH THE CONTENT, KUDOS. IT HAS EVERYTHING THAT I NEED FOR MY SENIOR-LEVEL ENGINEERING STUDENTS. AS A PROFESSOR, I CAN TAKE AND EXTEND IT...WITHOUT HAVING TO DO A LOT ON MY OWN I CAN RUN THE PROJECTS AND THEN I CAN DIG DEEPER."

- Tom Rendon, Tulsa University, 2019





ARDUINO SCIENCE JOURNAL APP

Transform smartphones, tablets, and Chromebooks into science notebooks that encourage students to explore their world.

The **Arduino Science Journal** app, originally the Google Science Journal, is a pocket-sized science lab that encourages students to explore their world like a real scientist. They'll record data, document observations, and experiment. The app is classroom-friendly, since it has been designed to teach the scientific method, problem-solving, and applying mathematical skills.

It can be used on its own, or explored together with external sensors that are compatible with microcontrollers that connect using Bluetooth. By using external sensors, students can extend their experimentation and learning. For a more in-depth experience of the world of science, different topic-related lessons are based on the use of the Arduino Science Journal app, which is available for students and teachers alike.

The Arduino Science Journal is a **free, open-source app** that allows you to gather data about the world around you by harnessing the sensors in your smartphone as well as sensors connected to Arduino, or other third party hardware.

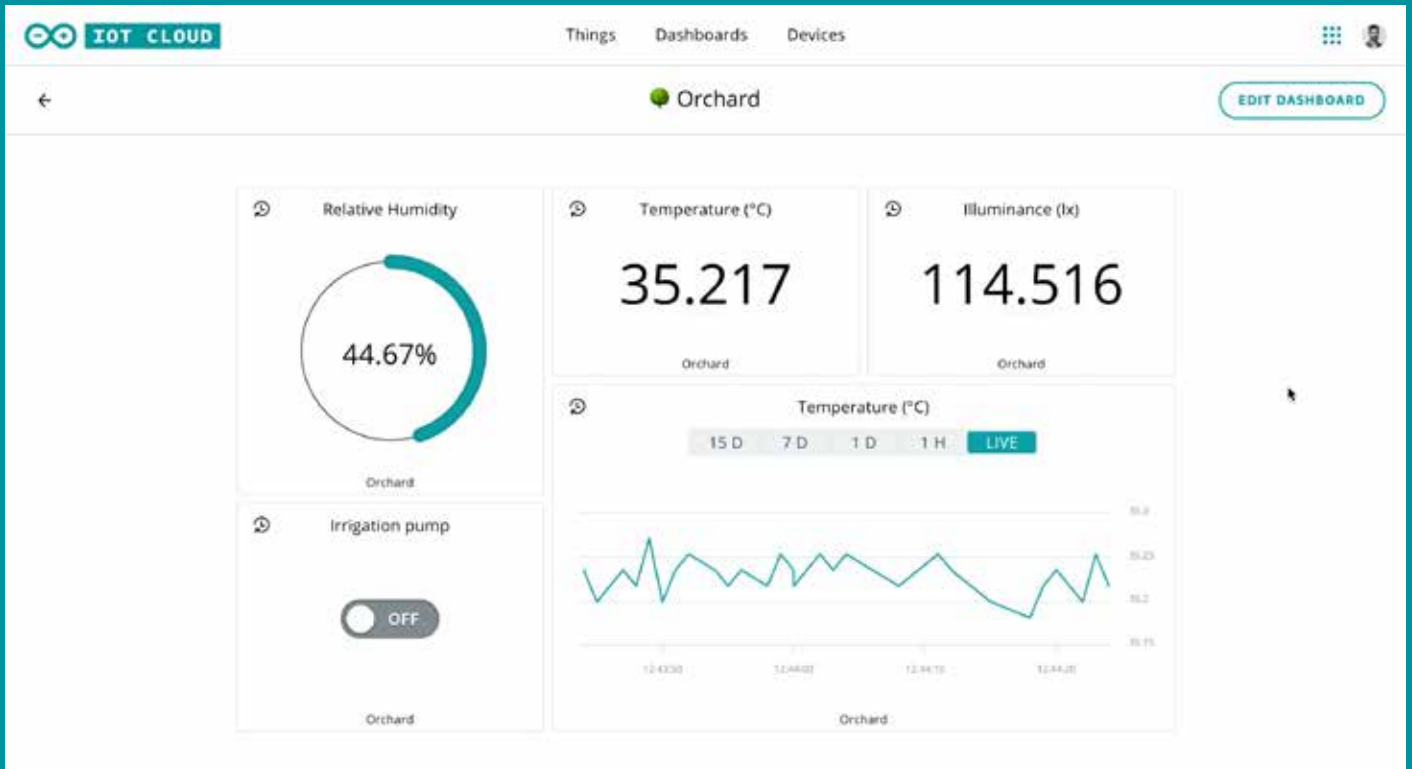
SJ.ARDUINO.CC

BENEFITS OF THE APP

- Enhance existing lesson plans
- Classroom & homeschool friendly
- Move learning outside
- Connect the digital and the physical worlds from your pocket
- Learn the scientific method through real life examples
- Set up scientific experiments in just a few minutes, record your data, and take notes and pictures wherever you are
- Build and run your own STEAM educational journey
- 45 languages available



Compatible with the ARDUINO SCIENCE KIT PHYSICS LAB (see page 12), the ARDUINO NANO 33 BLE SENSE, and third party hardware.



ARDUINO IoT CLOUD PLATFORM

Connect the Cloud to the world around you.

The **Arduino IoT Cloud** allows anyone to create IoT applications in just a few simple steps. With a combination of smart technology, user-friendly interfaces and powerful features, our cloud is for everyone: students and educators, makers, and professionals alike.

How does the Arduino IoT Cloud work?

It really is as simple as connecting a device, creating properties and a dashboard to monitor it.

1. Connect a device - a physical object, such as a hardware board, that can be contained inside a product. They're the hardware that runs the software, reads sensors, controls actuators and communicates with the Arduino IoT Cloud
2. A sketch will be automatically generated
3. Monitor and control your device with dashboards

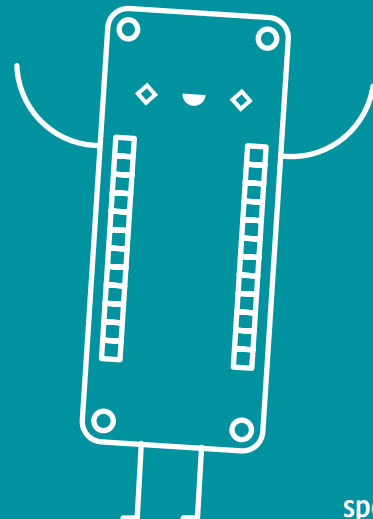
[CREATE.ARDUINO.CC/IOT](https://create.arduino.cc/IOT)

WITH IoT CLOUD YOU GET

- Direct links to the Create environment
- Automatically generated sketches
- The ability to build sensor networks
- Real time data monitoring
- Wi-Fi compatibility
- A dashboard with 15+ unique widgets



The Arduino IoT Cloud is compatible with the Explore IoT Kit (see page 24)



spectrumed.ca

ARDUINO BOARDS AND HARDWARE



Different types of boards

All boards can be programmed using the same programming language, and code snippets are interchangeable between boards.

Different boards provide different functionalities, such as WiFi or Bluetooth connectivity, embedded sensors, or more memory space for student-made programs. Boards can be expanded with sensors and actuators to build fully-functional systems.

Open source hardware & software

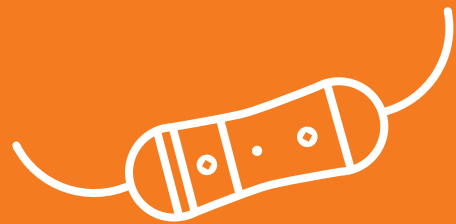
The open source hardware allows advanced students to go in depth into how the technology is built, and even learn how to make their own boards. Both the Arduino programming environment and the software running on the boards (known as the Arduino Core) are open source, and freely available for students to experiment with.

Arduino Education specific boards

Arduino Education boards are reusable, replaceable, and upgradeable. All the different types of boards have been tested for durability and student safety.

CONTENT

This openness extends to our content as well. Once you have Arduino boards or kits, you can expand on the content we provide you with, or create something entirely new. Boards are the base of Arduino kits, and content is tailored to each board and the extra parts included in the kit. You can add other parts, or even adjust the kit content to other boards.



ADD EXTRA FUNCTIONALITY TO YOUR PROJECTS



ARDUINO-EDUCATION-TINKERKIT-BRACCIO
 SKU: 735547

QUICK LOOK

- Age: 14+
- No. of students per kit: 1+
- No. of projects: 1+

PHYSICAL CHARACTERISTICS

- Plastic Parts x 21
- Screws x 63
- Flat Washer x 16
- Hexagon Nut x 7
- Springs x 2
- Servo Motors: 2 x SR 311, 4 x SR 431
- Arduino Compatible Shield x 1
- Power Supply 5V, 5A x 1
- Phillips Screwdriver x 1
- Spiral Cable Protection Wrap x 1

ARDUINO TINKERKIT BRACCIO

Extend the reach of your devices capabilities.

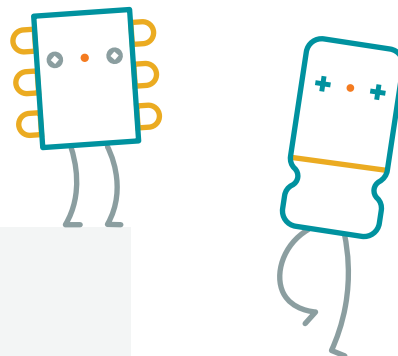
This fully operational robotic arm, controlled via Arduino, can be assembled in several ways for multiple tasks, such as moving objects. You can also attach a camera or solar panel. There are so many ways in which the Braccio can extend the reach of your devices.

Power

It is recommended to power the board via the jack connection with a regulated 5 VDC @ 5000 mA power supply provided in the box.

There is an on-board voltage regulator for higher voltages that protect the Braccio shield.

NOTE: The protection doesn't work for the Arduino Yun if you put the bridge between Vin and 5V on the Arm Robot Shield V1 (greater version of are called Braccio shield and has a power switch on the top of the shield).



ARDUINO BOARD NOT INCLUDED.



GET IN TOUCH

For more Arduino visit spectrumed.ca

NEED SOME HELP?

Email us at:
customerservice@spectrumed.com

"ARDUINO EDUCATION MAKES TECHNOLOGY, PROGRAMMING, AND CODING ACCESSIBLE TO EVERYONE, PUTTING IT INTO THE HANDS OF EVERY STUDENT AND EDUCATOR."

- David Cuartielles, Co-Founder, Arduino