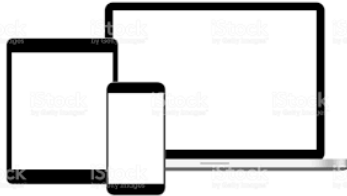


Physical Science Research Associates

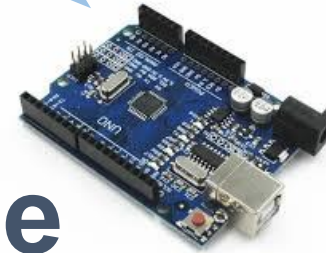
is introducing

Personal
Computing &
Mobile



OneCode

Microcontrollers
& Devices



Automation

An Introductory Courseware in Programing
for Elementary and Middle School

OneCode

Introduction to Programming for kids

Comprehensive courseware specifically designed to introduce kids to the world of software development and computer programming

Goals:

- To develop core programming skills in children beyond specific programming languages and environments

Features:

- Designed to evolve with the skills developed by the kids along the duration of the program
- Interactive and hands-on from the very early introductory stages
- Comprehensive by design, addressing software development from the personal computing and mobile world to the basis of robotics and industrial automation

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Introduction to Programing for kids

The courseware is divided in six stages, comprising three early development and three main stages. Each stage is designed as a follow up to the previous one, introducing more in-depth concepts, advancing creative thinking and developing new skills.

Each stage contains several learning units, designed to address particular concepts in computer programing, which teaches students not only how to code but how to THINK and develop core programing foundations beyond any particular programing language or environment.

Many units feature “go beyond” lessons, addressing more challenging activities and tasks, and designed to provide real insides on the foundations of computer science.

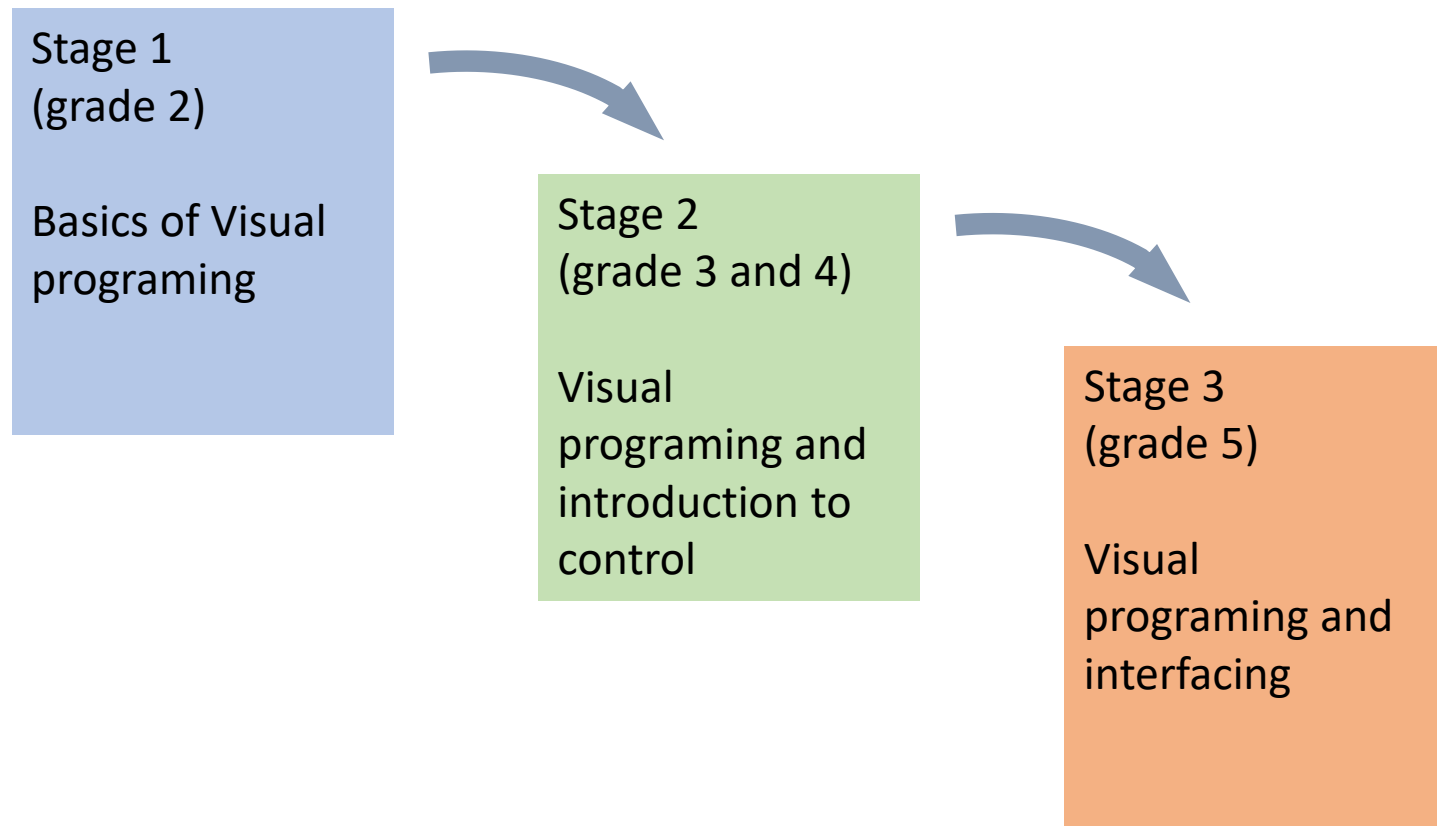
The Curriculum is not only aligned with the existing academic standards, such as Common Core and NGSS, but goes way beyond it in all aspects.

With OneCode, PhySciRA realized a goal to provide teachers with a unique and a complete tool to teach students a “cybernetics” – the art of integrating a human and a machine into a Whole.

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Introduction to Programming for kids Elementary School (grades 2 to 5)

OneCode early stages



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Introduction to Programming for kids

Stage 1

Learning Objectives:

- Introduction to the early concepts of software and computer programming
- Introduction to the role of technology in our lives and how to interact with it
- Development of early visual programming skills
- Application of computer programming into problem solving

Stage duration: 36 lessons divided in eight units

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Introduction to Programming for kids

Stage 1 Units

Unit	Title	Lessons
1	Computer programs	4
2	The math calculator	3
3	A more advanced math calculator	4
4	What time is it?	5
5	Shapes that we can make	5
6	Making a program	5
7	Lets play	5
8	Our first game	5

Go beyond lessons:

- Unit 3: Is it even or odd?
- Unit 4: Dates, words or numbers?

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Introduction to Programming for kids

Stage 2

Learning Objectives:

- Basic concepts of software and computer programming
- The role of computer technology in our lives and how to interact with it
- Development of visual programming skills
- Application of computer programming into problem solving

Stage duration: 72 lessons in twelve units

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Introduction to Programming for kids

Stage 2 Units

Unit	Title	Lessons
1	Lets review	3
2	More computer programs	4
3	Why decimals?	6
4	Measuring the time	6
5	A remote control	8
6	Changing colors	6
7	Components	8
8	Controls for the components	8
9	Moving around	8
10	New games	6
11	Lets play more	8
12	Music	9

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Stage 2 Units

Go beyond lessons:

- Unit 4: The unit of time
- Unit 6: How many colors?
- Unit 9: Move and stop, and move gain
- Unit 12: A song

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Stage 3

Learning Objectives:

- Introduction to software and computer programming
- Introduction to computer technology and control
- Development of visual programming skills
- Application of computer programming into problem solving

Stage duration: 36 lessons in seven units

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Introduction to Programming for kids

Stage 3 Units

Unit	Title	Lessons
1	Lets review	3
2	Why do we need programs?	4
3	Controls and components	6
4	The math of the shapes	6
5	And, the math of the colors?	4
6	Music	7
7	The music controls	6

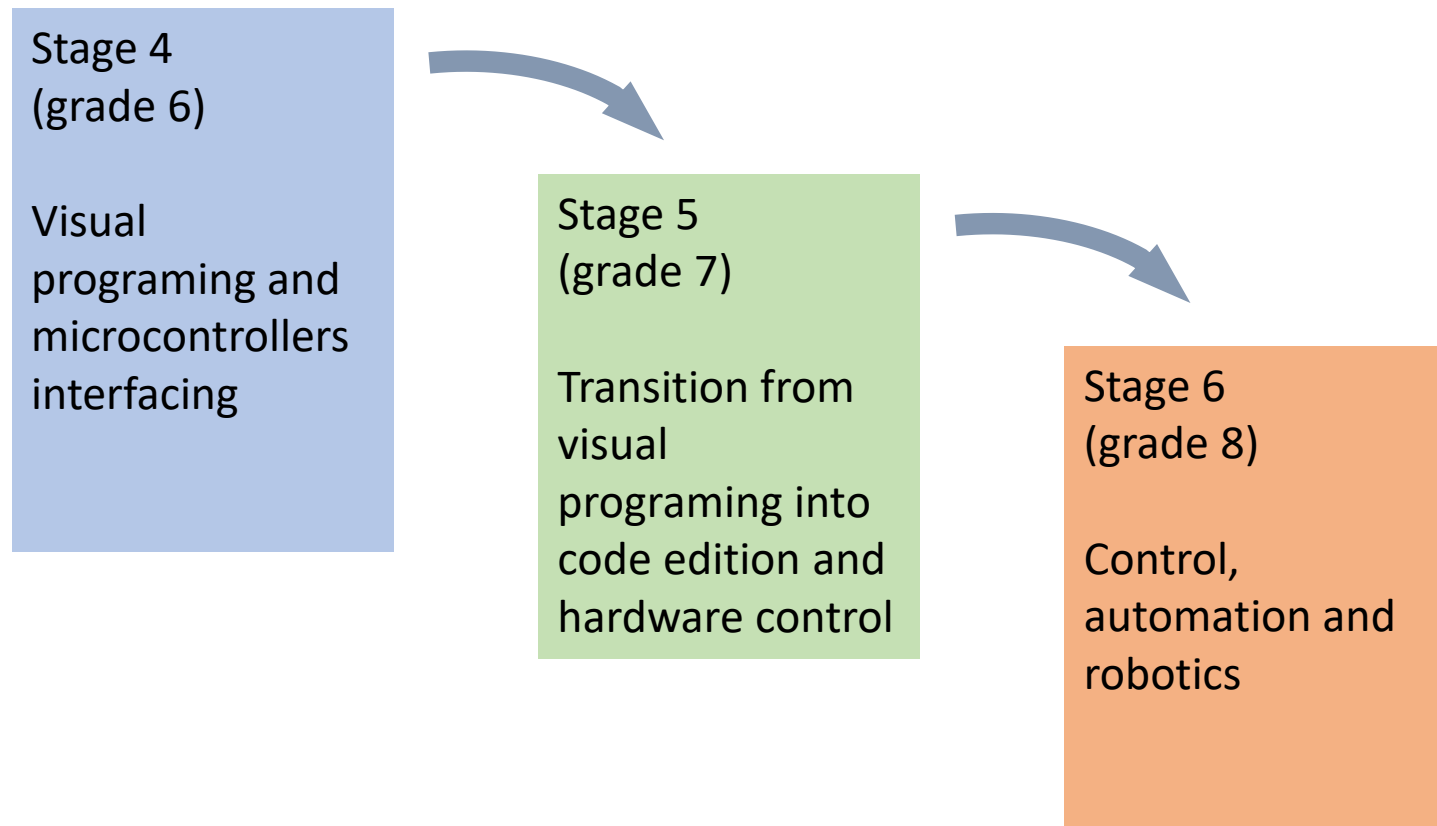
Go beyond lessons:

- Unit 4: The shapes calculator
- Unit 6: Songs
- Unit 7: Another interface

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Introduction to Programming for kids Middle School (grades 6 to 8)

OneCode main stages



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Introduction to Programming for kids

Stage 4

Learning Objectives:

- Introduction to software and computer programming
- Development of visual programming skills
- Basic principles of engineering

Stage duration: 72 lessons in twelve units

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Introduction to Programming for kids

Stage 4 Units

Unit	Title	Lessons
1	Going back	4
2	Components and controls	6
3	Functions and operations	8
4	A microcontroller	5
5	The interface	4
6	Reading values	5
7	Sensors	8
8	Switches and buttons	6
9	A display	6
10	Data transfer	4
11	Data processing	10
12	The project	6

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Introduction to Programming for kids

Stage 4 Units

Go beyond lessons:

- Unit 4: Microcontrollers vs Microprocessors
- Unit 6: Voltage and current
- Unit 9: Characters and pixels
- Unit 10: The serial port

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Introduction to Programming for kids

Stage 5

Learning Objectives:

- Introduction to software and computer programming
- Introduction to explicit programming and programming languages
- Basic principles of engineering

Stage duration: 72 lessons in eleven units

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Introduction to Programming for kids

Stage 5 Units

Unit	Title	Lessons
1	Going back, again?	3
2	The language that the computers talk	3
3	Binary arithmetic	3
4	The data types	5
5	Where is the code?	6
6	Visual and explicit	6
7	The interface and the code	8
8	Controls	8
9	Communications	8
10	Analog and digital	12
11	The project	10

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Introduction to Programming for kids

Stage 4 Units

Go beyond lessons:

- Unit 3: Lets talk to Mars! Hexadecimals
- Unit 4: 32bits vs 64 bits. Does it matter?
- Unit 6: Programming languages. Are they the same?
- Unit 9: The network and networking
- Unit 10: Digital to analog and analog to digital

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Introduction to Programing for kids

Stage 6

Learning Objectives:

- Introduction to software and computer programing
- Introduction to explicit programing and programing languages
- Basic principles of engineering and computer science

Stage duration: 72 lessons in ten units

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Introduction to Programming for kids

Stage 6 Units

Unit	Title	Lessons
1	Going back. The composer	3
2	Software and firmware	4
3	Interfacing the world	3
4	Lets compile!	6
5	More microcontrollers	8
6	The control sequence	8
7	Execution interrupt	8
8	More programming languages	6
9	What else can we program?	10
10	The project	16

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Introduction to Programming for kids

Stage 4 Units

Go beyond lessons:

- Unit 2: The “Tron” problem
- Unit 4: Why a compiler? The machine code
- Unit 8: High level code or low level code?
- Unit 9: The apps

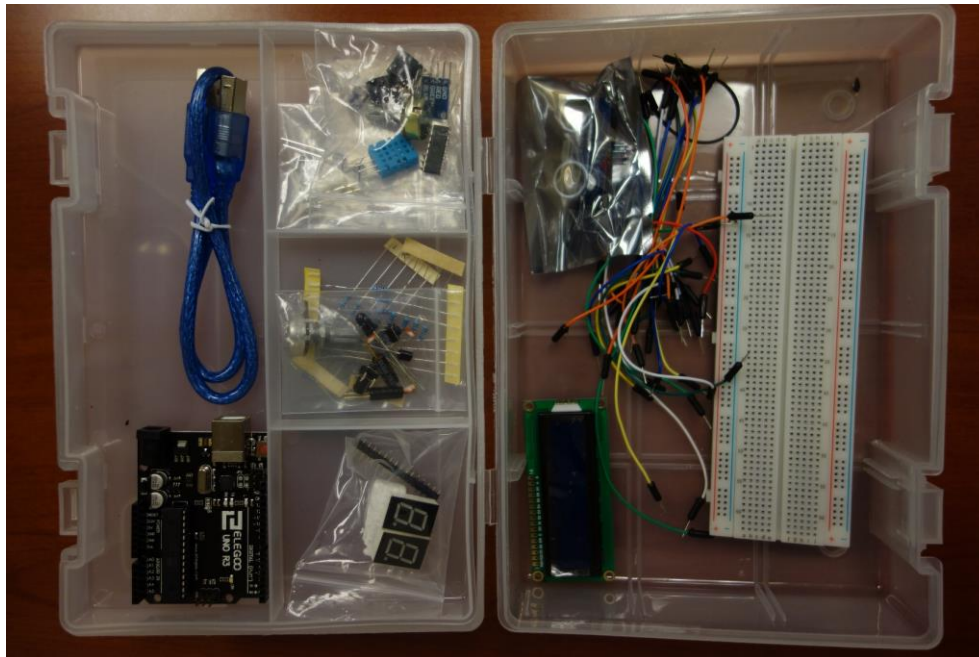
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Introduction to Programming for kids

OneCode main stages hardware kit

Contents:

- Arduino microcontroller
- Protoboard
- Jumper wires
- Resistors and capacitors
- Temperature and humidity sensor
- Ultrasonic proximity sensor
- Two rows LCD display
- Eight segments display elements
- LEDs



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Introduction to Programming for kids

Stage 1 Syllabus, examples

Unit 1: Computer programs

Lesson	Title
1	Computers and programs. What is a program?
2	Programing. How to create a program?
3,4	Visual programing. The composer

Unit 2: The math calculator

Lesson	Title
5	Teaching our computer to add two numbers
6	More math operations
7	Completing our calculator

Unit 3: A more complicated calculator

Lesson	Title
8	Selecting the operation
9	Memory. What is in your memory?
10,11	A more complicated calculator.
11*	Is it even or odd?

Unit 4: What time is it?

Lesson	Title
12	The clock
13	Analog and digital
14	Changing the time
15,16	What about the date?
16*	Words or numbers?

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Introduction to Programming for kids

Stage 4 Syllabus, examples

Unit 1: Going back

Lesson	Title
1	A bit of history. The soft in the hard.
2	Why visual programming. What about the real code?
3	The composer.
4	Working with our programs.

Unit 2: Components and controls

Lesson	Title
5,6	A visual component
6,7	The controls for the components
7,8	A logic control sequence

Unit 3: Functions and operations

Lesson	Title
1,2	A function? Defining a function
3,4	More sequences
5,6	Looping!
7,8	Logic operations

Unit 4: A microcontroller

Lesson	Title
1,2	The brain!
3	The code for the brain
4,5	Do we have a language?
5*	Microcontrollers vs Microprocessors