Level 1 Pathway

Scope and Sequence

Summary

The Level 1 Pathway is a collection of beginner level tutorials and challenges designed for students that are new to coding. The pathway begins with how to use the components in the electronics kit, and progresses to STEAM based challenges. All of the content utilizes Block-pi, our block-based coding language.

In this pathway, students will be able to build and program interactive projects in the real world. They'll blink lights, buzz buzzers, push buttons, and more. The lessons were created so that students have opportunities to get hands on, while developing an understanding of code concepts.

Level 1 is perfect for beginners because in a block based language, students can write code without having to type out each command. Snapping blocks together also helps prevent things like spelling, syntax, and placement errors. By eliminating the possibility of written errors, block-based coding allows users to focus on computational thinking and logic. The blocks were also created to show the underlying Python language so that students have an easier time understanding the text-based code they'll eventually move on to.

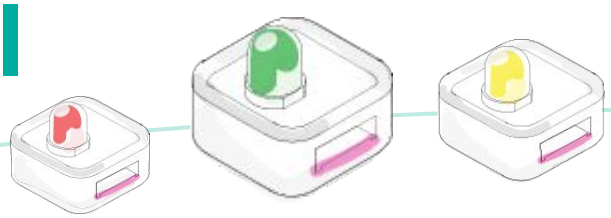
All challenges include step-by-step instructions with visuals to aid students throughout the process.

Lesson Sequence

- Block-Pi LED Tutorial
- Block-Pi Button Tutorial
- Block-Pi Buzzer Tutorial
- Block-pi Rover Lights
- Block-pi 2022 Digits
- Block-pi Rover World Tunnel Card
- Block-pi Electric Heart
- Block-pi Let It Grow
- Block-pi Traffic Lights

Block-pi LED Tutorial

Estimated time: 20 minutes



Description
In this tutorial students will learn how to connect and control a LED component. They will learn how to identify digital ports, connect LEDs to the device, run simple block programs, and modify code.

Objectives	**Students will learn:** • How to connect and program a digital component, combining hardware and software. • Ways to connect a device to a web browser using an IP address, or other digital address. • How to run and test basic block-based code programs.
Guided Question	How can hardware and software be combined to collect and exchange data?
Outcomes	Students will build and program a device to utilize LEDs. Students will connect the pi-top to Further, add the components, and test sample code programs. Visual and written instructions are provided to guide students through the tutorial.
Concepts	Computer science, wiring and controlling electronics, LEDs, digital ports
CS Concepts	Hardware and software, IP address, loops, print functions, sleep
CSTA Level 1A Standards	1A-CS-02 Use appropriate terminology in identifying and describing the function of common physical components of computing systems (hardware).
	1A-CS-03 Describe basic hardware and software problems using accurate terminology.
	1A-AP-10 Develop programs with sequences and simple loops, to express ideas or address a problem.
	1A-AP-14 Debug (identify and fix) errors in an algorithm or program that includes sequences and simple loops.
	1A-IC-18 Keep login information private, and log off of devices appropriately.
CSTA Level 1B Standards	1B-CS-02 Model how computer hardware and software work together as a system to accomplish tasks.
	1B-CS-03 Determine potential solutions to solve simple hardware and software problems using common troubleshooting strategies.
	1B-AP-10 Create programs that include sequences, events, loops, and conditionals.
	1B-AP-15 Test and debug (identify and fix errors) a program or algorithm to ensure it runs as intended.

Block-pi Button Tutorial

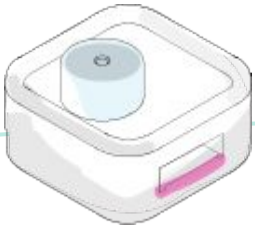
Estimated time: 20 minutes

Description
In this tutorial students will learn how to connect a button component and program it to control a LED. They will learn how to identify digital ports, connect a button to the device, and run simple block programs.

Objectives	**Students will learn:** • How to connect and program digital components, combining hardware and software. • Ways to connect a device to a web browser using an IP address, or other digital address. • How to run and test basic block-based code programs.
Guided Question	How can hardware and software be combined to collect and exchange data? How can a button be used to control when a LED turns on and off?
Outcomes	Students will build and program a device that uses buttons to control responses. Students will connect the pi-top to Further, add the components, and test sample code programs. Visual and written instructions are provided to guide students through the tutorial.
Concepts	Computer science, wiring and controlling electronics, LEDs, buttons, digital ports
CS Concepts	Hardware and software, IP address, loops, conditionals, sleep
CSTA Level 1A Standards	1A-CS-02 Use appropriate terminology in identifying and describing the function of common physical components of computing systems (hardware).
	1A-CS-03 Describe basic hardware and software problems using accurate terminology.
	1A-AP-10 Develop programs with sequences and simple loops, to express ideas or address a problem.
	1A-AP-14 Debug (identify and fix) errors in an algorithm or program that includes sequences and simple loops.
	1A-IC-18 Keep login information private, and log off of devices appropriately.
CSTA Level 1B Standards	1B-CS-02 Model how computer hardware and software work together as a system to accomplish tasks.
	1B-CS-03 Determine potential solutions to solve simple hardware and software problems using common troubleshooting strategies.
	1B-AP-10 Create programs that include sequences, events, loops, and conditionals.
	1B-AP-15 Test and debug (identify and fix errors) a program or algorithm to ensure it runs as intended.

Block-pi Buzzer Tutorial

Estimated time: 20 minutes



Description
In this tutorial students will learn how to connect and program a buzzer component. They will learn how to identify digital ports, connect a buzzer to the device, and run simple block programs.

Objectives	**Students will learn:** • How to connect and program digital components, combining hardware and software. • Ways to connect a device to a web browser using an IP address, or other digital address. • How to run and test basic block-based code programs.
Guided Question	How can hardware and software be combined to collect and exchange data?
Outcomes	Students will build and program a device to control a buzzer component. Students will connect the pi-top to Further, add the component, and test sample code programs. Visual and written instructions are provided to guide students through the tutorial.
Concepts	Computer science, wiring and controlling electronics, buzzer, digital ports
CS Concepts	Hardware and software, IP address, loops, print functions, sleep
CSTA Level 1A Standards	1A-CS-02 Use appropriate terminology in identifying and describing the function of common physical components of computing systems (hardware).
	1A-CS-03 Describe basic hardware and software problems using accurate terminology.
	1A-AP-10 Develop programs with sequences and simple loops, to express ideas or address a problem.
	1A-AP-14 Debug (identify and fix) errors in an algorithm or program that includes sequences and simple loops.
	1A-IC-18 Keep login information private, and log off of devices appropriately.
CSTA Level 1B Standards	1B-CS-02 Model how computer hardware and software work together as a system to accomplish tasks.
	1B-CS-03 Determine potential solutions to solve simple hardware and software problems using common troubleshooting strategies.
	1B-AP-10 Create programs that include sequences, events, loops, and conditionals.
	1B-AP-15 Test and debug (identify and fix errors) a program or algorithm to ensure it runs as intended.

Block-pi Rover Lights

Estimated time: 60 - 100 minutes

Description
In this block-based challenge, students will create an interactive Mars rover themed project. They will create the design, add LEDs to resemble headlights, and run code. At the end of the challenge, students will have the opportunity to program an engaging user experience.

Objectives	**Students will learn:** • How to connect and program digital components, combining hardware and software. • How to manipulate sleep commands to control the amount of time a LED stays on. • How to modify and test block-based code programs to utilize a button or sensor. • To use distance detected by a sensor to control the outcome.
Guided Question	How can computer hardware and software work together as a system to accomplish tasks? How can you control the amount of time a LED stays on? What code should be used? How can a sensor be used to control the execution of certain parts of a program?
Outcomes	Students will color and construct a Mars rover themed design. They will wire components to the pi-top and insert the LEDs through the holes in the project to represent headlights. Sample code will be tested to turn the headlights on. Students will then modify code to first be able to utilize a button for control, then an ultrasonic sensor.
Concepts	Art, computer science, wiring and controlling electronics, LEDs, buzzer, ultrasonic sensor, distance, digital ports
CS Concepts	Hardware and software, IP address, loops, print functions, sleep, conditionals, debugging, thresholds
CSTA Level 1A Standards	1A-CS-02 Use appropriate terminology in identifying and describing the function of common physical components of computing systems (hardware).
	1A-CS-03 Describe basic hardware and software problems using accurate terminology.
	1A-AP-09 Model the way programs store and manipulate data by using numbers or other symbols to represent information.
	1A-AP-10 Develop programs with sequences and simple loops, to express ideas or address a problem.
	1A-AP-11 Decompose (break down) the steps needed to solve a problem into a precise sequence of instructions.
	1A-AP-14 Debug (identify and fix) errors in an algorithm or program that includes sequences and simple loops.

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Block-pi Rover Lights

Estimated time: 60 - 100 minutes

CSTA Level 1A Standards	1A-AP-15 Using correct terminology, describe steps taken and choices made during the iterative process of program development.
	1A-IC-18 Keep login information private, and log off of devices appropriately.
CSTA Level 1B Standards	1B-CS-02 Model how computer hardware and software work together as a system to accomplish tasks.
	1B-CS-03 Determine potential solutions to solve simple hardware and software problems using common troubleshooting strategies.
	1B-DA-06 Organize and present collected data visually to highlight relationships and support a claim.
	1B-AP-08 Compare and refine multiple algorithms for the same task and determine which is the most appropriate.
	1B-AP-09 Create programs that use variables to store and modify data.
	1B-AP-10 Create programs that include sequences, events, loops, and conditionals.
	1B-AP-11 Decompose (break down) problems into smaller, manageable subproblems to facilitate the program development process.
	1B-AP-12 Modify, remix, or incorporate portions of an existing program into one's own work, to develop something new or add more advanced features.
	1B-AP-15 Test and debug (identify and fix errors) a program or algorithm to ensure it runs as intended.

Block-pi 2022 Digits

Estimated time: 60 - 100 minutes

Description
In this STEAM focused challenge students will create and build the digits for 2022! They will assume the role of an engineer to construct the numbers and add the electronic. Then they will put on their programming hats to finalize the experience. Students will learn to program LEDs and code buzzer sound effects, initiated with the press of a button.

Objectives	**Students will learn:** • How to connect and program digital components, combining hardware and software. • The parts of a code program, from variables to a loop containing if and else statements. • How to modify a program to enhance the user experience. • That components can replace other digital components on a device and the code can be related or different depending on input/ output.
Guided Question	How can hardware replace like hardware, yet require different code? List two benefits for using sound with the visual signals of the countdown. Think of real life situations where this would be important. How can a program be changed to make the user experience more interesting?
Outcomes	Students will construct a set of 3D number twos for 2022. They will wire and arrange 6 LEDs so that each number two lays over 3 lights. Students will test the sample code to turn the lights on, and then modify it so that a button controls the process. The lesson also includes an opportunity for students to program a countdown and use a buzzer in the project.
Concepts	Art, computer science, wiring and controlling electronics, LEDs, buzzer, digital ports
CS Concepts	Hardware and software, IP address, loops, print functions, sleep, conditionals, random
CSTA Level 1A Standards	1A-CS-02 Use appropriate terminology in identifying and describing the function of common physical components of computing systems (hardware).
	1A-CS-03 Describe basic hardware and software problems using accurate terminology.
	1A-AP-10 Develop programs with sequences and simple loops, to express ideas or address a problem.
	1A-AP-11 Decompose (break down) the steps needed to solve a problem into a precise sequence of instructions.
	1A-AP-14 Debug (identify and fix) errors in an algorithm or program that includes sequences and simple loops.

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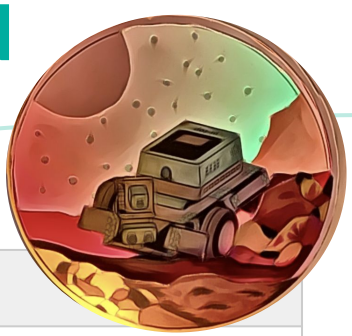
Block-pi 2022 Digits

Estimated time: 60 - 100 minutes

CSTA Level 1A Standards	1A-IC-18 Keep login information private, and log off of devices appropriately.
CSTA Level 1B Standards	1B-CS-01 Describe how internal and external parts of computing devices function to form a system.
	1B-CS-02 Model how computer hardware and software work together as a system to accomplish tasks.
	1B-CS-03 Determine potential solutions to solve simple hardware and software problems using common troubleshooting strategies.
	1B-AP-08 Compare and refine multiple algorithms for the same task and determine which is the most appropriate.
	1B-AP-09 Create programs that use variables to store and modify data.
	1B-AP-10 Create programs that include sequences, events, loops, and conditionals.
	1B-AP-11 Decompose (break down) problems into smaller, manageable subproblems to facilitate the program development process.
	1B-AP-12 Modify, remix, or incorporate portions of an existing program into one's own work, to develop something new or add more advanced features.
	1B-AP-13 Use an iterative process to plan the development of a program by including others' perspectives and considering user preferences.
	1B-AP-15 Test and debug (identify and fix errors) a program or algorithm to ensure it runs as intended.
	1B-IC-18 Discuss computing technologies that have changed the world, and express how those technologies influence, and are influenced by, cultural practices.
	1B-IC-19 Brainstorm ways to improve the accessibility and usability of technology products for the diverse needs and wants of users.

Block-pi Rover World Tunnel Card

Estimated time: 80 - 120 minutes



Description
In this STEAM focused challenge, students will create and build an interactive tunnel card! They will use their creativity to customize the layers, become an engineer and construct the product, then finalize the rover's world by programming LED visual effects - initiated with the press of a button.

Objectives	**Students will learn:** • How to enhance art projects with electronics and coding. • How to create and modify block based programs to solve problems or meet a task. • To use appropriate terminology when describing choices made during program development, or when discussing problems. • To compare and refine multiple algorithms for the same task and determine which is the most appropriate.
Guided Question	How can hardware and software be combined to collect and exchange data? Describe the program you created and the steps taken to achieve the goals, determined by you as a student. Use appropriate terminology.
Outcomes	At the beginning of the lesson students will collect materials and prepare the design elements for creation. Students will construct a STEAM based prototype and use code to control the tunnel card's interactive experience. The lesson progresses to more advanced tasks where students have the opportunity to apply the knowledge gained during the challenge. As students work through the challenge, they should self-assess their works of art and design - considering standards of craftsmanship, skill mastery, intent, and meaning as part of the creative and engineering design process.
Concepts	Computer science, art, engineering, wiring and controlling electronics, prototyping
CS Concepts	Hardware and software, IP address, loops, print functions, sleep, variables, conditionals, commands
CSTA Level 1A Standards	1A-CS-02 Use appropriate terminology in identifying and describing the function of common physical components of computing systems (hardware).
	1A-CS-03 Describe basic hardware and software problems using accurate terminology.
	1A-AP-10 Develop programs with sequences and simple loops, to express ideas or address a problem.

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Block-pi Rover World Tunnel Card

Estimated time: 80 - 120 minutes

CSTA Level 1A Standards	1A-AP-12 Develop plans that describe a program's sequence of events, goals, and expected outcomes.
	1A-AP-14 Debug (identify and fix) errors in an algorithm or program that includes sequences and simple loops.
	1A-AP-15 Using correct terminology, describe steps taken and choices made during the iterative process of program development.
	1A-IC-18 Keep login information private, and log off of devices appropriately.
CSTA Level 1B Standards	1B-CS-01 Describe how internal and external parts of computing devices function to form a system.
	1B-CS-02 Model how computer hardware and software work together as a system to accomplish tasks.
	1B-CS-03 Determine potential solutions to solve simple hardware and software problems using common troubleshooting strategies.
	1B-AP-08 Compare and refine multiple algorithms for the same task and determine which is the most appropriate.
	1B-AP-09 Create programs that use variables to store and modify data.
	1B-AP-10 Create programs that include sequences, events, loops, and conditionals.
	1B-AP-11 Decompose (break down) problems into smaller, manageable subproblems to facilitate the program development process.
	1B-AP-12 Modify, remix, or incorporate portions of an existing program into one's own work, to develop something new or add more advanced features.
	1B-AP-15 Test and debug (identify and fix errors) a program or algorithm to ensure it runs as intended.
	1B-AP-17 Describe choices made during program development using code comments, presentations, and demonstrations.

Block-pi Electric Heart

Estimated time: 50 - 90 minutes

Description
In this block-based challenge, students will create an origami heart project and program it to glow and sparkle. To make things more interesting, they will add an ultrasonic sensor to the set up and program it to activate the events when a person or object is detected near the sensor.

Objectives	**Students will learn:** • To debug errors in an algorithm or program that includes sequences and simple loops. • To create programs that use variables to store and modify data. • How internal and external parts of computing devices function to form a system. • To brainstorm ways to improve the accessibility and usability of technology products for the diverse needs and wants of users.
Guided Question	What are the effects when values are changed in code? List two ways that you could add to this code and make the experience more interesting for people.
Outcomes	Students will create a paper art construction to use throughout the challenge. They will add two LEDs to it and test code to observe different effects, including the use of sound files. Students will add a sensor to the device and debug intentional errors to allow the device to respond to objects or people that are close to it.
Concepts	Origami, computer science, wiring and controlling electronics, LEDs, sensors, digital ports
CS Concepts	Hardware and software, IP address, loops, conditionals, thresholds, sleep, wav files, random, debugging
CSTA Level 1A Standards	1A-CS-02 Use appropriate terminology in identifying and describing the function of common physical components of computing systems (hardware).
	1A-CS-03 Describe basic hardware and software problems using accurate terminology.
	1A-AP-09 Model the way programs store and manipulate data by using numbers or other symbols to represent information.
	1A-AP-10 Develop programs with sequences and simple loops, to express ideas or address a problem.
	1A-AP-11 Decompose (break down) the steps needed to solve a problem into a precise sequence of instructions.
	1A-AP-12 Develop plans that describe a program's sequence of events, goals, and expected outcomes.

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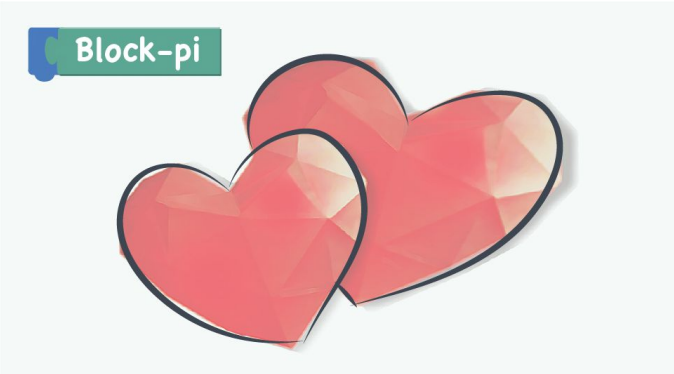
Block-pi Electric Heart

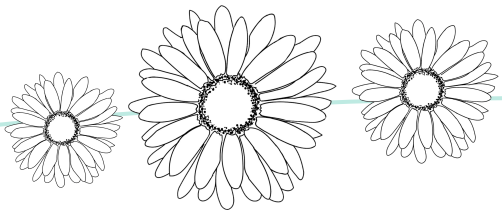
Estimated time: 50 - 90 minutes

CSTA Level 1A Standards	1A-AP-14 Debug (identify and fix) errors in an algorithm or program that includes sequences and simple loops.
	1A-AP-15 Using correct terminology, describe steps taken and choices made during the iterative process of program development.
	1A-IC-18 Keep login information private, and log off of devices appropriately.
CSTA Level 1B Standards	1B-CS-01 Describe how internal and external parts of computing devices function to form a system.
	1B-CS-02 Model how computer hardware and software work together as a system to accomplish tasks.
	1B-CS-03 Determine potential solutions to solve simple hardware and software problems using common troubleshooting strategies.
	1B-AP-08 Compare and refine multiple algorithms for the same task and determine which is the most appropriate.
	1B-AP-09 Create programs that use variables to store and modify data.
	1B-AP-10 Create programs that include sequences, events, loops, and conditionals.
	1B-AP-12 Modify, remix, or incorporate portions of an existing program into one's own work, to develop something new or add more advanced features.
	1B-AP-13 Use an iterative process to plan the development of a program by including others' perspectives and considering user preferences.
	1B-AP-15 Test and debug (identify and fix errors) a program or algorithm to ensure it runs as intended.
	1B-IC-19 Brainstorm ways to improve the accessibility and usability of technology products for the diverse needs and wants of users.



Block-pi Let It Grow

Estimated time: 50 - 180 minutes



Description
Students will create a 3D (or 2D) model of a plant, and add components inside of the design to search out optimal places plants can grow. A light sensor will be used to detect the amount of light in the surrounding environment. Colored LEDs will be added and programmed to activate, depending on how much light is being detected. This lesson has a large science connection because it touches on the process of photosynthesis and what plants need to survive.

Objectives	**Students will learn:** • What photosynthesis is and why it is beneficial to plants and humans. • How technology can be used to improve everyday applications and real life processes. • How to use code to change the sensitivity of a device and improve function.
Guided Question	How do plants and/or animals use their external parts to help them survive, grow, and meet their needs? What is photosynthesis and why it is beneficial to plants and humans? How can technology be used to improve everyday applications and real life processes. Describe two ways that you can make the device more sensitive. List two situations where this device and it's functionality could help solve a problem.
Outcomes	Students will construct a 3D or 2D model of a plant. A light sensor and 3 colored LEDs will be added to the prototype and controlled through code. The goal is to use the set up to discover the amount of light available in the room or their environment and connect it to topics related to plants. Students will learn to identify and correct errors in a program by fixing the code so that the red LED functions properly. At the end of the challenge, students will have the opportunity to change the sensitivity of the device through code.
Concepts	Plants, photosynthesis, energy, light in the environment, computer science, wiring and controlling electronics, sensors
CS Concepts	Hardware and software, IP address, loops, sleep, thresholds, ranges, conditionals, branching, nesting
CSTA Level 1A Standards	1A-CS-02 Use appropriate terminology in identifying and describing the function of common physical components of computing systems (hardware).
	1A-CS-03 Describe basic hardware and software problems using accurate terminology.
	1A-DA-06 Collect and present the same data in various visual formats.
	1A-DA-07 Identify and describe patterns in data visualizations, such as charts or graphs, to make predictions.

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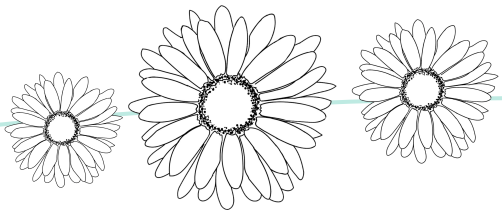
Block-pi Let It Grow

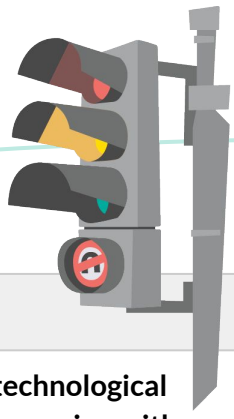
Estimated time: 50 - 180 minutes



CSTA Level 1A Standards	1A-AP-08 Model daily processes by creating and following algorithms (sets of step-by-step instructions) to complete tasks.
	1A-AP-09 Model the way programs store and manipulate data by using numbers or other symbols to represent information.
	1A-AP-10 Develop programs with sequences and simple loops, to express ideas or address a problem.
	1A-AP-11 Decompose (break down) the steps needed to solve a problem into a precise sequence of instructions.
	1A-AP-14 Debug (identify and fix) errors in an algorithm or program that includes sequences and simple loops.
	1A-AP-15 Using correct terminology, describe steps taken and choices made during the iterative process of program development.
	1A-IC-16 Compare how people live and work before and after the implementation or adoption of new computing technology.
	1A-IC-18 Keep login information private, and log off of devices appropriately.
CSTA Level 1B Standards	1B-CS-01 Describe how internal and external parts of computing devices function to form a system.
	1B-CS-02 Model how computer hardware and software work together as a system to accomplish tasks.
	1B-CS-03 Determine potential solutions to solve simple hardware and software problems using common troubleshooting strategies.
	1B-AP-08 Compare and refine multiple algorithms for the same task and determine which is the most appropriate.
	1B-AP-09 Create programs that use variables to store and modify data.
	1B-AP-10 Create programs that include sequences, events, loops, and conditionals.
	1B-AP-12 Modify, remix, or incorporate portions of an existing program into one's own work, to develop something new or add more advanced features.
	1B-AP-13 Use an iterative process to plan the development of a program by including others' perspectives and considering user preferences.
	1B-AP-15 Test and debug (identify and fix errors) a program or algorithm to ensure it runs as intended.
	1B-IC-19 Brainstorm ways to improve the accessibility and usability of technology products for the diverse needs and wants of users.

Block-pi Traffic Lights

Estimated time: 50 - 180 minutes



Description

In this block coding project students will create a series of safety lights to investigate the technological aspect of crosswalks and traffic lights. They will start by making and programming a zebra crossing with Belisha beacons (a type of safety signal light used in the United Kingdom), then develop their models into a more complex traffic light system to explore traffic light phase coordination.

Objectives	**Students will learn:** • To model daily processes by creating and following algorithms to complete tasks. • To use data to highlight cause-and-effect relationships, predict outcomes, or communicate an idea. • To Model how computer hardware and software work together as a system to accomplish tasks. • To investigate computing technologies that have changed the world, and express how those technologies influence, and are influenced by, cultural practices.
Guided Question	What are traffic signals and cross walks? How do they contribute to or improve safety? How do your models compare to real life safety signals and processes? Why should loops be incorporated in programs that mimic various safety signals? What are variables and functions? Why do programmers use them?
Outcomes	The lesson starts out by teaching students how to use and code LEDs, which sets the foundation of the challenge. Students will then use loops to repeat code, create patterns to model real life applications, add functions to reuse sections, in addition to interacting with other python related concepts and practices. The lesson also includes engineering design tasks for students to construct models of real-world devices.
Concepts	Computer science, wiring and controlling electronics, safety & citizenship, PSHE (Personal, Social, Health & Economic education, urban planning, world cultures
CS Concepts	Hardware and software, IP address, importing from libraries, loops, print statements, functions, output/ input, modeling
CSTA Level 1A Standards	1A-CS-02 Use appropriate terminology in identifying and describing the function of common physical components of computing systems (hardware).
	1A-CS-03 Describe basic hardware and software problems using accurate terminology.
	1A-AP-08 Model daily processes by creating and following algorithms (sets of step-by-step instructions) to complete tasks.

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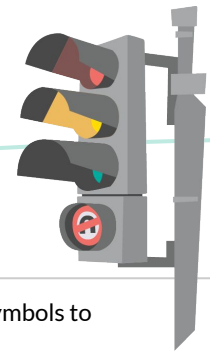
Block-pi Traffic Lights



Estimated time: 50 - 180 minutes

CSTA Level 1A Standards	1A-AP-09 Model the way programs store and manipulate data by using numbers or other symbols to represent information.
	1A-AP-10 Develop programs with sequences and simple loops, to express ideas or address a problem.
	1A-AP-11 Decompose (break down) the steps needed to solve a problem into a precise sequence of instructions.
	1A-AP-12 Develop plans that describe a program's sequence of events, goals, and expected outcomes.
	1A-AP-14 Debug (identify and fix) errors in an algorithm or program that includes sequences and simple loops.
	1A-AP-15 Using correct terminology, describe steps taken and choices made during the iterative process of program development.
	1A-IC-18 Keep login information private, and log off of devices appropriately.
CSTA Level 1B Standards	1B-CS-01 Describe how internal and external parts of computing devices function to form a system.
	1B-CS-02 Model how computer hardware and software work together as a system to accomplish tasks.
	1B-CS-03 Determine potential solutions to solve simple hardware and software problems using common troubleshooting strategies.
	1B-DA-07 Use data to highlight or propose cause-and-effect relationships, predict outcomes, or communicate an idea.
	1B-AP-08 Compare and refine multiple algorithms for the same task and determine which is the most appropriate.
	1B-AP-09 Create programs that use variables to store and modify data.
	1B-AP-10 Create programs that include sequences, events, loops, and conditionals.
	1B-AP-11 Decompose (break down) problems into smaller, manageable subproblems to facilitate the program development process.
	1B-AP-12 Modify, remix, or incorporate portions of an existing program into one's own work, to develop something new or add more advanced features.
	1B-AP-13 Use an iterative process to plan the development of a program by including others' perspectives and considering user preferences.
	1B-AP-15 Test and debug (identify and fix errors) a program or algorithm to ensure it runs as intended.

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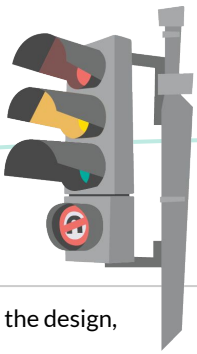
Block-pi Traffic Lights

Estimated time: 50 - 180 minutes



CSTA Level 1B Standards	1B-AP-16 Take on varying roles, with teacher guidance, when collaborating with peers during the design, implementation, and review stages of program development.
	1B-AP-17 Describe choices made during program development using code comments, presentations, and demonstrations.
	1B-IC-18 Discuss computing technologies that have changed the world, and express how those technologies influence, and are influenced by, cultural practices.
	1B-IC-19 Brainstorm ways to improve the accessibility and usability of technology products for the diverse needs and wants of users.