



Computer Science for Innovators and Makers

Standards	Goals
<p>Lesson 1: Blink! 15-16 days Activity 1.1: The Brain Technology and Engineering 3.5.6-8.F Analyze examples of technologies that have changed the way people think, interact, live, and communicate.</p>	<ul style="list-style-type: none"> • Explore how computers receive, process, and send information. • Examine the parts of a microcontroller. • Reflect on the role of a computer scientist.
<p>Activity 1.2: What To Do Technology and Engineering 3.5.6-8.LL Compare how different technologies involve different sets of processes.</p>	<ul style="list-style-type: none"> • Break a complex task into a sequence of small steps. • Use algorithmic thinking to write specific, clear, and complete directions. • Demonstrate effective communication skills.
<p>Activity 1.3: How To Do It Technology and Engineering 3.5.6-8.J Use tools, materials, and machines to safely diagnose, adjust, and repair systems. 3.5.6-8.K Use devices to control technological systems. 3.5.6-8.Q Apply a technology and engineering design thinking process. 3.5.6-8.EE Differentiate between inputs, processes, outputs, and feedback in technological systems.</p>	<ul style="list-style-type: none"> • Explore a coding environment. • Plan a program sequence.
<p>Activity 1.4: Crush the Bug Technology and Engineering 3.5.6-8.J Use tools, materials, and machines to safely diagnose, adjust, and repair systems. 3.5.6-8.JJ Apply informed problem-solving strategies to the improvement of existing devices or processes or the development of new approaches.</p>	<ul style="list-style-type: none"> • Use code tracing to break down a program into logical parts to look for errors. • Analyze, revise, and test a program or device hardware to fix errors.
<p>Project 1.5 The Blinking Message Technology and Engineering 3.5.6-8.J Use tools, materials, and machines to safely diagnose, adjust, and repair systems. 3.5.6-8.K Use devices to control technological systems. 3.5.6-8.P (ETS) Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem. 3.5.6-8.Q Apply a technology and engineering design thinking process. 3.5.6-8.JJ Apply informed problem-solving strategies to the improvement of existing devices or processes or the development of new approaches.</p>	<ul style="list-style-type: none"> • Design and program a computing solution.Goal • Engage in problem-solving and be creative when developing solutions.



Computer Science for Innovators and Makers

Standards	Goals
<p>Lesson 2: The Ins and Outs 16-17 days</p> <p>Activity 2.1: Need Input</p> <p>Technology and Engineering</p> <p>3.5.6-8.F Analyze examples of technologies that have changed the way people think, interact, live, and communicate.</p> <p>3.5.6-8.J Use tools, materials, and machines to safely diagnose, adjust, and repair systems.</p> <p>3.5.6-8.K Use devices to control technological systems.</p> <p>3.5.6-8.Q Apply a technology and engineering design thinking process.</p> <p>3.5.6-8.EE Differentiate between inputs, processes, outputs, and feedback in technological systems.</p> <p>3.5.6-8.FF Demonstrate how systems thinking involves considering relationships between every part, as well as how the systems interact with the environment in which it is used.</p> <p>3.5.6-8.JJ Apply informed problem-solving strategies to the improvement of existing devices or processes or the development of new approaches.</p>	<ul style="list-style-type: none"> • Work with others to create and modify programs that use input devices. • Use pair programming to collaborate.
<p>Activity 2.2: Responding Output</p> <p>Technology and Engineering</p> <p>3.5.6-8.J Use tools, materials, and machines to safely diagnose, adjust, and repair systems.</p> <p>3.5.6-8.K Use devices to control technological systems.</p> <p>3.5.6-8.Q Apply a technology and engineering design thinking process.</p> <p>3.5.6-8.V Refine design solutions to address criteria and constraints.</p> <p>3.5.6-8.EE Differentiate between inputs, processes, outputs, and feedback in technological systems.</p> <p>3.5.6-8.FF Demonstrate how systems thinking involves considering relationships between every part, as well as how the systems interact with the environment in which it is used.</p> <p>3.5.6-8.JJ Apply informed problem-solving strategies to the improvement of existing devices or processes or the development of new approaches.</p>	<ul style="list-style-type: none"> • Work with others to create and modify programs that use output devices. • Build a physical computing device.
<p>Activity 2.3: Get Connected</p> <p>Technology and Engineering</p> <p>3.5.6-8.J Use tools, materials, and machines to safely diagnose, adjust, and repair systems.</p> <p>3.5.6-8.K Use devices to control technological systems.</p> <p>3.5.6-8.L Design methods to gather data about technological systems.</p> <p>3.5.6-8.Q Apply a technology and engineering design thinking process.</p> <p>3.5.6-8.EE Differentiate between inputs, processes, outputs, and feedback in technological systems.</p> <p>3.5.6-8.FF Demonstrate how systems thinking involves considering relationships between every part, as well as how the systems interact with the environment in which it is used.</p> <p>3.5.6-8.JJ Apply informed problem-solving strategies to the improvement of existing devices or processes or the development of new approaches.</p>	<ul style="list-style-type: none"> • Explore wireless technology. • Develop and modify algorithms that use variables.



Computer Science for Innovators and Makers

Standards	Goals
<p>Project 2.4: Secrets and Safes</p> <p>Technology and Engineering</p> <p>3.5.6-8.J Use tools, materials, and machines to safely diagnose, adjust, and repair systems.</p> <p>3.5.6-8.K Use devices to control technological systems.</p> <p>3.5.6-8.M (ETS) Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.</p> <p>3.5.6-8.N (ETS) Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.</p> <p>3.5.6-8.P (ETS) Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.</p> <p>3.5.6-8.Q Apply a technology and engineering design thinking process.</p> <p>3.5.6-8.U Evaluate and assess the strengths and weaknesses of various design solutions given established principles and elements of design.</p> <p>3.5.6-8.V Refine design solutions to address criteria and constraints.</p> <p>3.5.6-8.W (ETS) Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.</p> <p>3.5.6-8.X Defend decisions related to a design problem.</p> <p>3.5.6-8.EE Differentiate between inputs, processes, outputs, and feedback in technological systems.</p> <p>3.5.6-8.FF Demonstrate how systems thinking involves considering relationships between every part, as well as how the systems interact with the environment in which it is used.</p> <p>3.5.6-8.JJ Apply informed problem-solving strategies to the improvement of existing devices or processes or the development of new approaches.</p>	<ul style="list-style-type: none"> • Follow a design process to effectively develop a physical computing solution. • Collaborate within a team. • Demonstrate effective communication skills.
<p>Lesson 3: Program the Physical World 13 days</p> <p>Activity 3.1: Clean Up Your Code</p> <p>Technology and Engineering</p> <p>3.5.6-8.J Use tools, materials, and machines to safely diagnose, adjust, and repair systems.</p> <p>3.5.6-8.K Use devices to control technological systems.</p> <p>3.5.6-8.Q Apply a technology and engineering design thinking process.</p> <p>3.5.6-8.JJ Apply informed problem-solving strategies to the improvement of existing devices or processes or the development of new approaches.</p>	<ul style="list-style-type: none"> • Simplify code to make it easier to read.



Computer Science for Innovators and Makers

Standards	Goals
<p>Problem 3.2: Interactions</p> <p>Technology and Engineering</p> <p>3.5.6-8.M (ETS) Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.</p> <p>3.5.6-8.N (ETS) Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.</p> <p>3.5.6-8.P (ETS) Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.</p> <p>3.5.6-8.Q Apply a technology and engineering design thinking process.</p> <p>3.5.6-8.U Evaluate and assess the strengths and weaknesses of various design solutions given established principles and elements of design.</p> <p>3.5.6-8.V Refine design solutions to address criteria and constraints.</p> <p>3.5.6-8.W (ETS) Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.</p> <p>3.5.6-8.X Defend decisions related to a design problem.</p> <p>3.5.6-8.FF Demonstrate how systems thinking involves considering relationships between every part, as well as how the systems interact with the environment in which it is used.</p> <p>3.5.6-8.JJ Apply informed problem-solving strategies to the improvement of existing devices or processes or the development of new approaches.</p>	<ul style="list-style-type: none"> • Follow a design process to effectively develop a physical computing solution. • Collaborate within a team. • Demonstrate effective communication skills.