PLTW GATEWAY | Unit Outline
PA STEELS

App Creators

Standards	Goals
Lesson 1: Let's Create an App | 19 days Activity 1.1: The App Revolution **Technology and Engineering** 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. 3.5.6-8.CC Consider historical factors that have contributed to the development of technologies and human progress.	• Explore a coding environment. • Create, deploy, and test an app. • Identify ways that computing has changed how people live, work, and play.
Activity 1.2: Amazing Algorithms	• Break a complex task into a sequence of small steps. • Use flowcharts to plan an algorithm. • Write specific, clear, and complete directions to complete a task.
Activity 1.3: The Germ Guide App **Technology and Engineering** 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.U Evaluate and assess the strengths and weaknesses of various design solutions given established principles and elements of design. 3.5.6-8.JJ Apply informed problem-solving strategies to the improvement of existing devices or processes or the development of new approaches.	• Break a complex task into a sequence of small steps. • Create a user interface based on potential user interactions. • Create appropriate event handlers to respond to user-initiated events during runtime.
Activity 1.4: Coding with Conditions **Technology and Engineering** 3.5.6-8.F Analyze examples of technologies that have changed the way people think, interact, live, and communicate. 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.U Evaluate and assess the strengths and weaknesses of various design solutions given established principles and elements of design. 3.5.6-8.JJ Apply informed problem-solving strategies to the improvement of existing devices or processes or the development of new approaches.	• Represent conditional statements in a flowchart. • Create, edit, and test algorithms that include conditional statements.
Activity 1.5: Decision Time **Technology and Engineering** 3.5.6-8.K Use devices to control technological systems. 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. 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.	

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Activity 1.5: Decision Time cont. 3.5.6-8.Q Apply a technology and engineering design thinking process. 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. 3.5.6-8.JJ Apply informed problem-solving strategies to the improvement of existing devices or processes or the development of new approaches.	• Use flowcharts to plan a program. • Create algorithms that include conditionals. • Use an iterative process to develop an app.
Activity 1.6: Bug Blasters **Technology and Engineering** 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.JJ Apply informed problem-solving strategies to the improvement of existing devices or processes or the development of new approaches.	• Debug a program. • Use pair programming to collaborate. • Describe one's role and expectations within a team.
Activity 1.7: Game Time **Technology and Engineering** 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.R Develop innovative products and systems that solve problems and extend capabilities based on individual or collective needs and wants. 3.5.6-8.JJ Apply informed problem-solving strategies to the improvement of existing devices or processes or the development of new approaches.	• Create an app that uses sprites, animation, and variables. • Use trace tables to track the values of variables in a program. • Collaborate and plan within a team.
Project 1.8: Build an App **Technology and Engineering** 3.5.6-8.K Use devices to control technological systems. 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. 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.R Develop innovative products and systems that solve problems and extend capabilities based on individual or collective needs and wants. 3.5.6-8.V Refine design solutions to address criteria and constraints. 3.5.6-8.X Defend decisions related to a design problem. 3.5.6-8.JJ Apply informed problem-solving strategies to the improvement of existing devices or processes or the development of new approaches.	• Collaboratively design, build, and test an app using the design process. • Demonstrate effective communication skills.

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Lesson 2: Game Design | 15 days Activity 2.1: Game Time	• Break a complex task into a sequence of small steps. • Analyze a program to reduce redundant lines of code. • Identify how abstraction hides the complexity of a task.
Activity 2.2: Loop Me In **Technology and Engineering** 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.T Create solutions to problems by identifying and applying human factors in design. 3.5.6-8.JJ Apply informed problem-solving strategies to the improvement of existing devices or processes or the development of new approaches.	• Analyze a game's user appeal and experience. • Analyze, break down, and explain the logic of an algorithm. • Plan, analyze, and modify or create algorithms that include loops.
Activity 2.3: Making the List **Technology and Engineering** 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.JJ Apply informed problem-solving strategies to the improvement of existing devices or processes or the development of new approaches.	• Store and access data stored in lists. • Extend or apply previously created code to a new purpose.
Activity 2.4 Game Plan **Technology and Engineering** 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.T Create solutions to problems by identifying and applying human factors in design. 3.5.6-8.JJ Apply informed problem-solving strategies to the improvement of existing devices or processes or the development of new approaches.	• Analyze a game's user appeal and experience. • Analyze, break down, and explain the logic of an algorithm. • Analyze and then modify the way a game is played or the way it looks.
Project 2.5 That's My Jam **Technology and Engineering** 3.5.6-8.K Use devices to control technological systems. 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. 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.	• Modify, build, and test an app using the design process. • Demonstrate effective communication skills.

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Project 2.5 That's My Jam cont. 3.5.6-8.R Develop innovative products and systems that solve problems and extend capabilities based on individual or collective needs and wants. 3.5.6-8.T Create solutions to problems by identifying and applying human factors in design. 3.5.6-8.U Evaluate and assess the strengths and weaknesses of various design solutions given established principles and elements of design. 3.5.6-8.V Refine design solutions to address criteria and constraints. 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. 3.5.6-8.X Defend decisions related to a design problem. 3.5.6-8.JJ Apply informed problem-solving strategies to the improvement of existing devices or processes or the development of new approaches.	
Lesson 2: Taking it to the Next Level | 16 days **Activity 2.1: Keep Me in the Loop** **Technology and Engineering** 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.JJ Apply informed problem-solving strategies to the improvement of existing devices or processes or the development of new approaches.	• Plan, analyze, and create algorithms that include loops. • Trace the value of a variable for each iteration of a loop. • Identify how abstraction hides the complexity of a task.
Activity 2.2: Programming with Procedures **Technology and Engineering** 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.JJ Apply informed problem-solving strategies to the improvement of existing devices or processes or the development of new approaches.	• Break a complex task into a sequence of small steps. • Analyze a program and reduce redundant lines of code.
Activity 2.3: Playing with Lists **Technology and Engineering** 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.JJ Apply informed problem-solving strategies to the improvement of existing devices or processes or the development of new approaches.	• Store and access data stored in lists. • Extend or apply previously created code to a new purpose.

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Activity 2.4: Disease Tracker **Technology and Engineering** 3.5.6-8.K Use devices to control technological systems. 3.5.6-8.L Design methods to gather data about technological systems. 3.5.6-8.Q Apply a technology and engineering design thinking process. 3.5.6-8.R Develop innovative products and systems that solve problems and extend capabilities based on individual or collective needs and wants. 3.5.6-8.T Create solutions to problems by identifying and applying human factors in design. 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. 3.5.6-8.JJ Apply informed problem-solving strategies to the improvement of existing devices or processes or the development of new approaches.	• Store, access, and update data stored in lists. • Collaborate and plan within a team.
Activity 2.4: Extension Persistent Data (Optional) **Technology and Engineering** 3.5.6-8.K Use devices to control technological systems. 3.5.6-8.L Design methods to gather data about technological systems. 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.	• Store, access, and update data stored in lists. • Collaborate and plan within a team.
Project 2.5: Fitness Challenge App **Technology and Engineering** 3.5.6-8.K Use devices to control technological systems. 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. 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.R Develop innovative products and systems that solve problems and extend capabilities based on individual or collective needs and wants. 3.5.6-8.T Create solutions to problems by identifying and applying human factors in design.	• Design, build, and test an app using the design process. • Demonstrate effective communication skills.

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Project 2.5: Fitness Challenge App cont. 3.5.6-8.U Evaluate and assess the strengths and weaknesses of various design solutions given established principles and elements of design. 3.5.6-8.V Refine design solutions to address criteria and constraints. 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. 3.5.6-8.X Defend decisions related to a design problem. 3.5.6-8.JJ Apply informed problem-solving strategies to the improvement of existing devices or processes or the development of new approaches.	
Lesson 3: The App Challenge | 10 days Problem 3.1: The Great App Challenge **Technology and Engineering** 3.5.6-8.K Use devices to control technological systems. 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. 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. 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.R Develop innovative products and systems that solve problems and extend capabilities based on individual or collective needs and wants. 3.5.6-8.T Create solutions to problems by identifying and applying human factors in design. 3.5.6-8.U Evaluate and assess the strengths and weaknesses of various design solutions given established principles and elements of design. 3.5.6-8.V Refine design solutions to address criteria and constraints. 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. 3.5.6-8.X Defend decisions related to a design problem. 3.5.6-8.JJ Apply informed problem-solving strategies to the improvement of existing devices or processes or the development of new approaches.	• Design, build, and test an app that meets the design requirements using the design process. • Design solutions to optimize the user experience. • Demonstrate effective communication skills.