



HILLSBOROUGH TOWNSHIP PUBLIC SCHOOLS

Office of Curriculum and Instruction

CURRICULUM MAP

COURSE TITLE	AP Computer Science Principles						
GRADE BAND		PreK-4		5-6		7-8	<input checked="" type="checkbox"/> 9-12
DEPARTMENT	Mathematics						
LAST REVISION DATE	N/A						
BOE APPROVAL DATE	August 22, 2022						

COURSE OVERVIEW

AP Computer Science Principles (AP CSP) is a full-year, rigorous course that introduces students to the foundational concepts of computer science and explores the impact computing and technology have on our society. This College Board aligned course covers a broad range of foundational topics including: programming, algorithms, the Internet, big data, digital privacy and security, and the societal impacts of computing.

Prerequisites: The College Board suggests students successfully complete a first year high school Algebra course prior to enrolling in AP CSP. An Algebra course will provide a strong foundation in problem solving, basic linear functions, composition of functions, and the Cartesian (x,y) coordinate system. These skills and topics are essential for student facility in this course.

Pedagogical Approach: The AP CS Principles curriculum employs a blended learning model. It takes a student-centered approach powered by technology to help realize the goal of high achievement for all students. The course promotes student engagement, independent thought and interactive collaboration with peers. Student-centric lessons, activities and assessments are paired with augmentative teacher-centric lessons, activity and task guides and reporting to empower teachers to empower students.

Six Computational Thinking Practices: The six Computational Thinking Practices contain skills that students should develop to not just learn about content, but to change their way of thinking.

Computational Thinking Practices					
P1	P2	P3	P4	P5	P6
Computational Solution Design	Algorithms and Program Development	Abstraction in Program Development	Code Analysis	Computing Innovations	Responsible Computing

Five Big Ideas: The course material focuses on Five Big Ideas. These ideas encompass concepts

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that are foundational to computer science.

Big Ideas				
Big Idea 1 (CRD)	Big Idea 2 (DAT)	Big Idea 3 (AAP)	Big Idea 4 (CSN)	Big Idea 5 (IOC)
Creative Development	Data	Algorithms and Programming	Computing Systems and Networks	Impact of Computing

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UNIT OF STUDY	Unit 1: Computational Thinking
PACING	14 days
ESSENTIAL QUESTIONS	
<ul style="list-style-type: none">● How can you work collaboratively with other students to improve an overall project?	
ENDURING UNDERSTANDINGS	
<ul style="list-style-type: none">● CRD-1 Incorporating multiple perspectives through collaboration improves computing innovations as they are developed.● CRD-2 Developers create and innovate using an iterative design process that is user-focused, that incorporates implementation/feedback cycles, and that leaves ample room for experimentation and risk-taking.	
LEARNING TARGETS	
<ul style="list-style-type: none">● Program Development<ul style="list-style-type: none">○ Students will examine strategies for approaching large-scale problems○ Students will explore the non-linear approach to solving problems with the iterative development process.○ Students will identify a number of common features of algorithms, including sequencing, selection, and repetition.○ Students will design and evaluate text-based algorithms.○ Students will examine the need for clarity and precision in communicating an algorithmic solution to a problem.○ Students will examine the shortcomings and ambiguities of natural languages.○ Students will identify the elements of clear communication, including well-specified grammar, vocabulary, and syntax.○ Students will analyze the need for artificial programming languages.○ Students will compare high-level languages with low-level languages.○ Students will examine the process in which a program is written in a high-level language, compiled into a low-level language, loaded into memory, and then executed by a processor.● Big Picture<ul style="list-style-type: none">○ Students will examine the benefits of working collaboratively.○ Students will utilize a graphical editor to read, construct, and execute dynamic programs.○ Students will examine, modify, and execute programs developed by others.○ Students will examine how well-specified behavior of objects can be constructed through sequential actions and operations.○ Students will examine a number of common programming errors.○ Students will explore a number of common debugging strategies.○ Students will develop solutions for correcting common programming errors.● Program State	

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- Students will write programs that incorporate dynamic, user-driven, keyboard controls and input.
- Students will examine how the dynamic state of an object or program can be stored and changed using variables.
- Students will analyze the role of clear, descriptive names for objects, behaviors, variables, and other identifiers in maintaining the readability of code.
- Students will analyze and evaluate the correctness of their programs.

ASSESSMENTS

Pre-Assessment(s)	<ul style="list-style-type: none"> ● Entry Questionnaire
Formative	<ul style="list-style-type: none"> ● Unit 1 Quiz 1 ● Unit 1 Quiz 2
Summative	<ul style="list-style-type: none"> ● Unit 1 Exam
Benchmark / Common	<ul style="list-style-type: none"> ● None

NEW JERSEY STUDENT LEARNING STANDARDS (NJSL)

Must include the standard # & verbiage

- 8.1.12.CS.4: Develop guidelines that convey systematic troubleshooting strategies that others can use to identify and fix errors.
- 8.1.12.AP.1: Design algorithms to solve computational problems using a combination of original and existing algorithms.
- 8.1.12.AP.4: Design and iteratively develop computational artifacts for practical intent, personal expression, or to address a societal issue.
- 8.1.12.AP.7: Collaboratively design and develop programs and artifacts for broad audiences by incorporating feedback from users.
- 8.1.12.AP.8: Evaluate and refine computational artifacts to make them more usable and accessible.
- 8.2.12.NT.1: Explain how different groups can contribute to the overall design of a product.

INTERDISCIPLINARY CONNECTIONS

Must include the standard # & verbiage

Comprehensive Health & Physical Education

- None.

English Language Arts

- RST.11-12.4 - Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context.

Mathematics

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<ul style="list-style-type: none"> ● A-SSE-A.1 Interpret expressions that represent a quantity in terms of its context.
Science
<ul style="list-style-type: none"> ● None.
World Languages
<ul style="list-style-type: none"> ● None.
CAREER READINESS, LIFE LITERACIES, & KEY SKILLS CONNECTIONS <i>Must include the standard # & verbiage</i>
9.1-Personal Financial Literacy
<ul style="list-style-type: none"> ● None.
9.2-Career Awareness, Exploration, Preparation, and Training
<ul style="list-style-type: none"> ● 9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas.
9.4-Life Literacies & Key Skills
<ul style="list-style-type: none"> ● 9.4.12.TL.3: Analyze the effectiveness of the process and quality of collaborative environments. ● 9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving.
CAREERS ASSOCIATED WITH THIS UNIT
<ul style="list-style-type: none"> ● Software developer, web developer, business analyst, mobile application designer or developer
DIVERSITY, EQUITY, & INCLUSION CONNECTIONS <i>Required in grades K-12 per N.J.S.A. 18A:35-4:36a & the Amistad Law N.J.S.A. 18A 52:16A-88 Required in grades 7-12 per N.J.S.A. 18A:35-4.35</i>
<ul style="list-style-type: none"> ● None.
SOCIAL EMOTIONAL LEARNING CONNECTIONS <i>NJ SEL sub-competencies are listed that are addressed in this unit</i>
Self-Awareness
<ul style="list-style-type: none"> ● Recognize one’s personal traits, strengths, and limitations ● Recognize the importance of self-confidence in handling daily tasks and challenges
Self-Management

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- Understand and practice strategies for managing one’s own emotions, thoughts, and behaviors.
- Recognize the skills needed to establish and achieve personal and educational goals.
- Identify and apply ways to persevere or overcome barriers through alternative methods to achieve one’s goals.

Social Awareness

- Recognize and identify the thoughts, feelings, and perspectives of others.
- Demonstrate an awareness of the expectations for social interactions in a variety of settings.

Relationship Skills

- Utilize positive communication and social skills to interact effectively with others.
- Identify who, when, where, or how to seek help for oneself or others when needed.

Responsible Decision-Making

- Develop, implement, and model effective problem-solving and critical thinking skills.
- Identify the consequences associated with one’s actions in order to make constructive choices.

MODIFICATIONS/ACCOMMODATIONS - *ELL, Special Education, Gifted, At Risk of Failure, 504*

- Accommodations for all subject areas may be viewed [here](#).

RESOURCES – *Cited print and electronic sources*

Educator Resources

- Project STEM
- College Board
- CodeHS
- Coding Rooms
- MIT App Inventor

Student Resources

- Project STEM
- College Board
- CodeHS
- Coding Rooms
- MIT App Inventor

Parent Resources

- College Board

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Course Title: AP Computer Science Principles

UNIT OF STUDY	Unit 2: Programming
PACING	22 days
ESSENTIAL QUESTIONS	
<ul style="list-style-type: none">● How do programs and apps group different actions together based on user interaction, such as pressing buttons?	
ENDURING UNDERSTANDINGS	
<ul style="list-style-type: none">● AAP-2 The way statements are sequenced and combined in a program determines the computed result. Programs incorporate iteration and selection constructs to represent repetition and make decisions to handle varied input values.● AAP-3 Programmers break down problems into smaller and more manageable pieces. By creating procedures and leveraging parameters, programmers generalize processes that can be reused. Procedures allow programmers to draw upon existing code that has already been tested, allowing them to write programs more quickly and with more confidence.	
LEARNING TARGETS	
<ul style="list-style-type: none">● Control Structures<ul style="list-style-type: none">○ Students will examine a number of common features of algorithms, including sequencing, selection, and repetition.○ Students will examine how well-specified behavior of objects can be constructed through sequential actions and operations.○ Students will examine the uses of selection statements in programming.○ Students will analyze the differences between simple selection and complex, nested selection statements.○ Students will examine the use of the Boolean operators "AND," "OR," and "NOT" in constructing complex conditional statements.○ Students will examine the uses of iteration statements in programming.○ Students will consider how to make a sequence of events more efficient with iteration statements.○ Students will combine sequencing, selection, and repetition structures alongside programming constructs like user input and variables to create computational artifacts.● Coding Skills<ul style="list-style-type: none">○ Students will examine how pseudocode can outline algorithmic processes.○ Students will read, execute, and construct algorithms in AP-style pseudocode.● Procedural Abstraction<ul style="list-style-type: none">○ Students will compare the methods and relative efficiencies of different algorithms.● Decidability and Efficiency	

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- Students will examine the factors that affect the decidability of a problem.
- Students will identify which problems can and cannot always be solved by an algorithm.
- Students will examine methods of comparing equivalent algorithms for relative efficiency.
- Students will evaluate the relative efficiency of equivalent algorithms.
- Students will identify factors that allow solutions to scale efficiently.
- Big Picture
 - Students will examine the implications of Moore's Law on the research and development of new and existing technologies.
- Hardware Abstraction
 - Students will explore the logical processes implemented in hardware design documentation.

ASSESSMENTS

Pre-Assessment(s)	<ul style="list-style-type: none"> ● Unit 2 Pre-Assessment
Formative	<ul style="list-style-type: none"> ● Unit 2 Quiz 1 ● Unit 2 Quiz 2
Summative	<ul style="list-style-type: none"> ● Password Generator Project ● Unit 2 Exam
Benchmark / Common	<ul style="list-style-type: none"> ● Quarterly #1

NEW JERSEY STUDENT LEARNING STANDARDS (NJSL)

Must include the standard # & verbiage

- 8.1.12.DA.4: Explain the relationship between binary numbers and the storage and use of data in a computing device.
- 8.1.12.AP.1: Design algorithms to solve computational problems using a combination of original and existing algorithms.
- 8.1.12.AP.3: Select and combine control structures for a specific application based upon performance and readability, and identify trade-offs to justify the choice.
- 8.2.12.ED.4: Design a product or system that addresses a global problem and document decisions made based on research, constraints, trade-offs, and aesthetic and ethical considerations and share this information with an appropriate audience.
- 8.2.12.EC.1: Analyze controversial technological issues and determine the degree to which individuals, businesses, and governments have an ethical role in decisions that are made.

INTERDISCIPLINARY CONNECTIONS

Must include the standard # & verbiage

Comprehensive Health & Physical Education

- None.

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English Language Arts
<ul style="list-style-type: none"> W.11-12.1. Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
Mathematics
<ul style="list-style-type: none"> A-SSE.B.3. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.
Science
<ul style="list-style-type: none"> None.
Visual & Performing Arts
<ul style="list-style-type: none"> None.
World Languages
<ul style="list-style-type: none"> None.
CAREER READINESS, LIFE LITERACIES, & KEY SKILLS CONNECTIONS <i>Must include the standard # & verbiage</i>
9.1-Personal Financial Literacy
<ul style="list-style-type: none"> None.
9.2-Career Awareness, Exploration, Preparation, and Training
<ul style="list-style-type: none"> 9.4.5.DC.4: Model safe, legal, and ethical behavior when using online or offline technology.
9.4-Life Literacies & Key Skills
<ul style="list-style-type: none"> 8.2.2.ED.2: Collaborate to solve a simple problem, or to illustrate how to build a product using the design process.
CAREERS ASSOCIATED WITH THIS UNIT
<ul style="list-style-type: none"> Software developer, web developer, business analyst, mobile application designer or developer, systems architect, IT project manager
DIVERSITY, EQUITY, & INCLUSION CONNECTIONS <i>Required in grades K-12 per N.J.S.A. 18A:35-4:36a & the Amistad Law N.J.S.A. 18A 52:16A-88 Required in grades 7-12 per N.J.S.A. 18A:35-4.35</i>
<ul style="list-style-type: none"> None.

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SOCIAL EMOTIONAL LEARNING CONNECTIONS

NJ SEL sub-competencies are listed that are addressed in this unit

Self-Awareness

- Recognize one’s personal traits, strengths, and limitations.
- Recognize the importance of self-confidence in handling daily tasks and challenges.

Self-Management

- Recognize the skills needed to establish and achieve personal and educational goals.
- Identify and apply ways to persevere or overcome barriers through alternative methods to achieve one’s goals.

Social Awareness

- Demonstrate an awareness of the expectations for social interactions in a variety of settings.

Relationship Skills

- Utilize positive communication and social skills to interact effectively with others.
- Identify who, when, where, or how to seek help for oneself or others when needed.

Responsible Decision-Making

- Develop, implement, and model effective problem-solving and critical thinking skills.

MODIFICATIONS/ACCOMMODATIONS - *ELL, Special Education, Gifted, At Risk of Failure, 504*

- Accommodations for all subject areas may be viewed [here](#).

RESOURCES – *Cited print and electronic sources*

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Student Resources

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Parent Resources

- College Board

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UNIT OF STUDY	Unit 3: Data Representation
PACING	25 days
ESSENTIAL QUESTIONS	
<ul style="list-style-type: none">● How can we use 1s and 0s to represent something complex like a video of a marching band playing a song?	
ENDURING UNDERSTANDINGS	
<ul style="list-style-type: none">● DAT-1 The way a computer represents data internally is different from the way the data are interpreted and displayed for the user. Programs are used to translate data into a representation more easily understood by people.● DAT-2 Programs can be used to process data, which allows users to discover information and create new knowledge.	
LEARNING TARGETS	
<ul style="list-style-type: none">● Binary Encoding of Information<ul style="list-style-type: none">○ Students will examine how numerical values are represented using different bases, including decimal and binary.○ Students will explore methods of converting values from decimal to binary and binary to decimal.○ Students will examine the exponential relationship between the number of digits and their range of representable values.○ Students will examine how alphanumeric characters and symbols may be represented using ASCII and Unicode character mappings.○ Students will analyze the differences in state space between ASCII and Unicode standards.○ Students will explore how the interpretation of binary data is dependent upon its intended format and use, including base-64, bitmaps (*.BMP), plaintext (*.TXT), audio (*.MP3), etc. Coding Skills○ Students will construct a Scratch program that simulates candles on a birthday cake being lit so as to show the user's age in binary.● Digital Approximations<ul style="list-style-type: none">○ Students will examine the implications of variable-width encodings (e.g., Morse code) versus fixed-width encodings (e.g., Baudot code).○ Students will explore ways in which natural phenomena may be represented digitally.○ Students will analyze the extent to which digital approximations accurately reflect the reality that they represent.○ Students will analyze the differences between discrete (digital) and continuous (analog) representations of natural phenomena.○ Students will examine the social implications of the ease with which perfect digital copies can be made.	

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- Big Picture
 - Students will examine and discuss the legality of reselling "used" digital music.
- Lists
 - Students will examine the use of lists as ordered data structures that may contain multiple values.
 - Students will investigate the use of index values to represent the position of an item in a list.
 - Students will analyze the implications of accessing an index position beyond the bounds of a list.
 - Students will investigate common operations for processing elements of a list, including searching for an element, removing an element, swapping the positions of two elements, or sorting an entire list into ascending or descending order.
 - Students will examine the implications of case-sensitivity on ordered lists of strings.
 - Students will consider how lists can appear in pseudocode.

ASSESSMENTS

Pre-Assessment(s)	<ul style="list-style-type: none"> ● Unit 3 Pre-Assessment
Formative	<ul style="list-style-type: none"> ● Unit 3 Quiz 1 ● Unit 3 Quiz 2
Summative	<ul style="list-style-type: none"> ● Unintend'oo Project ● Unit 3 Exam
Benchmark / Common	<ul style="list-style-type: none"> ● Mini Task Create

NEW JERSEY STUDENT LEARNING STANDARDS (NJSL)

Must include the standard # & verbiage

- 8.1.12.AP.1 Design algorithms to solve computational problems using a combination of original and existing algorithms.
- 8.1.12.AP.3 Select and combine control structures for a specific application based upon performance and readability, and identify trade-offs to justify the choice.
- 8.1.12.DA.2 Describe the trade-offs in how and where data is organized and stored.
- 8.1.12.DA.3 Translate between decimal numbers and binary numbers.
- 8.1.12.DA.4 Explain the relationship between binary numbers and the storage and use of data in a computing device.
- 8.1.12.DA.5 Create data visualizations from large data sets to summarize, communicate, and support different interpretations of real-world phenomena.
- 8.2.12.ED.4 Design a product or system that addresses a global problem and document decisions made based on research, constraints, trade-offs, and aesthetic and ethical considerations and share this information with an appropriate audience.

INTERDISCIPLINARY CONNECTIONS

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<i>Must include the standard # & verbiage</i>
<i>Comprehensive Health & Physical Education</i>
<ul style="list-style-type: none"> • None.
<i>English Language Arts</i>
<ul style="list-style-type: none"> • RST.11-12.4 - Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context. • RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem • SL.11-12.5 Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.
<i>Mathematics</i>
<ul style="list-style-type: none"> • A-SSE-A.1 Interpret expressions that represent a quantity in terms of its context. • HSN-Q.A.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
<i>Science</i>
<ul style="list-style-type: none"> • HS-ETS1-4 Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.
<i>Visual & Performing Arts</i>
<ul style="list-style-type: none"> • None.
<i>World Languages</i>
<ul style="list-style-type: none"> • None.
CAREER READINESS, LIFE LITERACIES, & KEY SKILLS CONNECTIONS
<i>Must include the standard # & verbiage</i>
<i>9.1-Personal Financial Literacy</i>
<ul style="list-style-type: none"> • None.
<i>9.2-Career Awareness, Exploration, Preparation, and Training</i>
<ul style="list-style-type: none"> • 9.4.12.Cl.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas.

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9.4-Life Literacies & Key Skills

- 8.2.2.ED.2: Collaborate to solve a simple problem, or to illustrate how to build a product using the design process.

CAREERS ASSOCIATED WITH THIS UNIT

- Digital Media Specialist, UX Designer, mobile app developer, video game developer, systems architect

DIVERSITY, EQUITY, & INCLUSION CONNECTIONS

Required in grades K-12 per [N.J.S.A. 18A:35-4:36a](#) & the Amistad Law [N.J.S.A. 18A 52:16A-88](#)

Required in grades 7-12 per [N.J.S.A. 18A:35-4.35](#)

- None.

SOCIAL EMOTIONAL LEARNING CONNECTIONS

[NJ SEL](#) sub-competencies are listed that are addressed in this unit

Self-Awareness

- Recognize one's personal traits, strengths, and limitations.
- Recognize the importance of self-confidence in handling daily tasks and challenges.

Self-Management

- Recognize the skills needed to establish and achieve personal and educational goals.
- Identify and apply ways to persevere or overcome barriers through alternative methods to achieve one's goals.

Social Awareness

- Demonstrate an awareness of the expectations for social interactions in a variety of settings.

Relationship Skills

- Utilize positive communication and social skills to interact effectively with others.
- Identify who, when, where, or how to seek help for oneself or others when needed.

Responsible Decision-Making

- Develop, implement, and model effective problem-solving and critical thinking skills.

MODIFICATIONS/ACCOMMODATIONS - ELL, Special Education, Gifted, At Risk of Failure, 504

- Accommodations for all subject areas may be viewed [here](#).

RESOURCES – [Cited](#) print and electronic sources

Hillsborough Township Public Schools Curriculum Map
Course Title: AP Computer Science Principles

Educator Resources

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Parent Resources

- College Board

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UNIT OF STUDY	Unit 4: Digital Media Processing
PACING	36 days
ESSENTIAL QUESTIONS	
<ul style="list-style-type: none">● What data do smartphones generate, and what are they being used for?	
ENDURING UNDERSTANDINGS	
<ul style="list-style-type: none">● DAT-2 Programs can be used to process data, which allows users to discover information and create new knowledge.● IOC-2 The use of computing innovations may involve risks to personal safety and identity.	
LEARNING TARGETS	
<ul style="list-style-type: none">● Introduction to Python<ul style="list-style-type: none">○ Students will explore the capabilities of a text-based programming language (Python).○ Students will compare and contrast the programming capabilities of a visual programming language (Scratch) with those of a text-based programming language (Python).○ Students will understand the importance of using proper punctuation and syntax when coding in a text-based programming language.● Control Structures<ul style="list-style-type: none">○ Students will write code using common programming constructs like conditional if() for selection and while() loops for iteration.○ Students will use boolean, relational and conditional expressions.● Abstraction<ul style="list-style-type: none">○ Students will write code using data abstraction (lists).○ Students will create and use procedural abstractions in order to make their programs more readable and versatile.● Image Manipulation<ul style="list-style-type: none">○ Students will examine the structure of raster images as compositions of individual pixels.○ Students will explore various methods of representing color, including RGB, CMYK, and HSV.○ Students will explore the various colors that can be produced by the combination of different ratios of red, green, and blue light.○ Students will perform base conversions for decimal, binary, and hexadecimal number systems.○ Students will modify the color channels of pixels in an image to produce a variety of effects.○ Students will design algorithms for modifying the pixels in an image in prescribed ways to create custom image filters.	

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- Students will explore the difference between lossy and lossless encoding schemes of several common image file formats.
- Big Picture
 - Students will explore the positive and negative consequences of digitally altering images.
 - Students will discuss the ethics of digitally manipulating images, especially in the context of journalism.
 - Students will discuss the issues related to intellectual property.
 - Students will explore the limitations and rights associated with a number of common licenses, including Creative Commons.
- Audio Manipulation
 - Students will analyze the differences between analog and digital sound.
 - Students will explore the roles that sampling rate and bit depth play in determining the quality of digitized sound.
 - Students will explore methods of programmatically generating digital audio.
 - Students will explore methods of programmatically altering and modifying digital audio by adjusting volume, pitch, and sampling rate.
 - Students will explore the methods and effects of compression algorithms in reducing the amount of data needed to represent an audio sample.

ASSESSMENTS

Pre-Assessment(s)	<ul style="list-style-type: none"> ● Mini Create Task
Formative	<ul style="list-style-type: none"> ● Unit 4 Quiz 1 ● Unit 2 Quiz 2
Summative	<ul style="list-style-type: none"> ● Image Filter Project ● Unit 4 Exam ● Performance Task
Benchmark / Common	<ul style="list-style-type: none"> ● Quarterly #2

NEW JERSEY STUDENT LEARNING STANDARDS (NJSL)

Must include the standard # & verbiage

- 8.1.12.AP.2: Create generalized computational solutions using collections instead of repeatedly using simple variables.
- 8.1.12.AP.3: Select and combine control structures for a specific application based upon performance and readability, and identify trade-offs to justify the choice.
- 8.1.12.AP.4: Design and iteratively develop computational artifacts for practical intent, personal expression, or to address a societal issue.
- 8.1.12.AP.5: Decompose problems into smaller components through systematic analysis, using constructs such as procedures, modules, and/or objects.
- 8.2.12.NT.2: Redesign an existing product to improve form or function.

Hillsborough Township Public Schools Curriculum Map

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- 8.2.12.EC.1: Analyze controversial technological issues and determine the degree to which individuals, businesses, and governments have an ethical role in decisions that are made.

INTERDISCIPLINARY CONNECTIONS

Must include the standard # & verbiage

Comprehensive Health & Physical Education

- None.

English Language Arts

- RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem
- SL.11-12.5 Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.

Mathematics

- HSN-Q.A.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Science

- None.

Visual & Performing Arts

- 1.2.12prof.Cr3b: Refine and modify media artworks, emphasizing aesthetic quality and intentionally accentuating stylistic elements to reflect an understanding of personal goals and preferences.
- 1.2.12acc.Pr6b: Evaluate the benefits and impacts at the personal, local and social level from presenting media artworks, such as benefits to people or to a situation.

World Languages

- None.

CAREER READINESS, LIFE LITERACIES, & KEY SKILLS CONNECTIONS

Must include the standard # & verbiage

9.1-Personal Financial Literacy

- None.

9.2-Career Awareness, Exploration, Preparation, and Training

Hillsborough Township Public Schools Curriculum Map
Course Title: AP Computer Science Principles

- 9.4.5.DC.4: Model safe, legal, and ethical behavior when using online or offline technology.

9.4-Life Literacies & Key Skills

- 8.2.2.ED.2: Collaborate to solve a simple problem, or to illustrate how to build a product using the design process.

CAREERS ASSOCIATED WITH THIS UNIT

- Digital Media Specialist, UX Designer, mobile app developer, video game developer, systems architect

DIVERSITY, EQUITY, & INCLUSION CONNECTIONS

Required in grades K-12 per [N.J.S.A. 18A:35-4:36a](#) & the Amistad Law [N.J.S.A. 18A 52:16A-88](#)

Required in grades 7-12 per [N.J.S.A. 18A:35-4.35](#)

- None.

SOCIAL EMOTIONAL LEARNING CONNECTIONS

***NJ SEL** sub-competencies are listed that are addressed in this unit*

Self-Awareness

- Recognize one's personal traits, strengths, and limitations.
- Recognize the importance of self-confidence in handling daily tasks and challenges.

Self-Management

- Recognize the skills needed to establish and achieve personal and educational goals.
- Identify and apply ways to persevere or overcome barriers through alternative methods to achieve one's goals.

Social Awareness

- Demonstrate an awareness of the expectations for social interactions in a variety of settings.

Relationship Skills

- Utilize positive communication and social skills to interact effectively with others.
- Identify who, when, where, or how to seek help for oneself or others when needed.

Responsible Decision-Making

- Develop, implement, and model effective problem-solving and critical thinking skills.

MODIFICATIONS/ACCOMMODATIONS - ELL, Special Education, Gifted, At Risk of Failure, 504

- Accommodations for all subject areas may be viewed [here](#).

Hillsborough Township Public Schools Curriculum Map
Course Title: AP Computer Science Principles

RESOURCES – *Cited print and electronic sources*

Educator Resources

- Project STEM
- College Board
- CodeHS
- Coding Rooms
- MIT App Inventor

Student Resources

- Project STEM
- College Board
- CodeHS
- Coding Rooms
- MIT App Inventor

Parent Resources

- College Board

Hillsborough Township Public Schools Curriculum Map
Course Title: AP Computer Science Principles

UNIT OF STUDY	Unit 5: Big Data
PACING	25 days
ESSENTIAL QUESTIONS	
<ul style="list-style-type: none">● When is it more appropriate to use a computer to analyze data than to complete the analysis by hand?	
ENDURING UNDERSTANDINGS	
<ul style="list-style-type: none">● DAT-2 Programs can be used to process data, which allows users to discover information and create new knowledge.● IOC-1 While computing innovations are typically designed to achieve a specific purpose, they may have unintended consequences.	
LEARNING TARGETS	
<ul style="list-style-type: none">● Data Science<ul style="list-style-type: none">○ Students will relate the impact of computing to ubiquitous and large-scale data processing.○ Students will explore the ways that patterns within large data sets can be used in a predictive manner.○ Students will discuss the risks and benefits of drawing conclusions from patterns found in large data sets.○ Students will combine visuals, content knowledge, and interaction to create a dynamic infographic that clearly communicates discrete information about a data set.○ Students will identify the characteristics that differentiate usable data from unusable data.○ Students will identify the characteristics that differentiate useful data from useless data.● Data Aggregation<ul style="list-style-type: none">○ Students will explore the purposes of various processing tasks, including collection, knowledge extraction, and data storage.○ Students will identify multiple techniques for data collection, both on and off of the Internet.○ Students will analyze the characteristics of structured and unstructured data.○ Students will extract structured information from unstructured data.○ Students will examine methods of extracting information from online sources, including structured and unstructured search engines, screen scrapers, and spiders.○ Students will explore the basic features and functionality of modern relational databases.○ Students will debate the implications of large-scale data storage and data persistence on privacy and utility, including the costs associated with each.	

Hillsborough Township Public Schools Curriculum Map
Course Title: AP Computer Science Principles

- Big Picture
 - Students will apply the technique of crowdsourcing to a novel data collection problem.
 - Students will examine the security risks and responsibilities assumed by companies that collect and store sensitive personal data.
 - Students will examine the causes and impact of data breaches involving sensitive personal data.
- Data Analysis (including Supplemental)
 - Students will analyze the tradeoff of utility and confidence in descriptive, predictive, and prescriptive data analysis.
 - Students will investigate traditional statistical hypothesis testing and exploratory data analysis.
 - Students will investigate the use of data mining in the discovery of patterns in large data sets.
 - Students will examine the use of cluster analysis, anomaly detection, regression analysis, and data classification in the processing of large data sets.
 - Students will use automatic summarization tools to create computer-generated summaries of a large data set.
- Models and Simulations
 - Students will use models and simulations to represent phenomena.
 - Students will explore how models may use different abstractions or levels of abstraction depending on the objects or phenomena being posed.
 - Students will utilize models and simulations to formulate, refine, and test hypotheses.
 - Students will examine how simulations mimic real world events without the cost or danger of building and testing the phenomena in the real world.

ASSESSMENTS

Pre-Assessment(s)	<ul style="list-style-type: none"> ● Unit 5 Pre-Assessment
Formative	<ul style="list-style-type: none"> ● Unit 5 Quiz 1 ● Unit 5 Quiz 2
Summative	<ul style="list-style-type: none"> ● TEDxKinda Project ● Unit 5 Exam
Benchmark / Common	<ul style="list-style-type: none"> ● None.

NEW JERSEY STUDENT LEARNING STANDARDS (NJSL)

Must include the standard # & verbiage

- 8.1.12.AP.2: Create generalized computational solutions using collections instead of repeatedly using simple variables.
- 8.1.12.DA.2: Describe the trade-offs in how and where data is organized and stored.
- 8.1.12.DA.5: Create data visualizations from large data sets to summarize, communicate, and support different interpretations of real-world phenomena.

Hillsborough Township Public Schools Curriculum Map

Course Title: AP Computer Science Principles

- 8.2.12.EC.3: Synthesize data, analyze trends, and draw conclusions regarding the effect of a technology on the individual, culture, society, and environment and share this information with the appropriate audience.
- 8.2.12.ETW.2: Synthesize and analyze data collected to monitor the effects of a technological product or system on the environment.

INTERDISCIPLINARY CONNECTIONS

Must include the standard # & verbiage

Comprehensive Health & Physical Education

- None.

English Language Arts

- NJSLSA.R7. Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.
- SL.9-10.4. Present information, findings, and supporting evidence clearly, concisely, and logically. The content, organization, development, and style are appropriate to task, purpose, and audience.
- SL.9-10.5. Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance findings, reasoning, and evidence and to add interest.

Mathematics

- N.Q.A.2 Define appropriate quantities for the purpose of descriptive modeling.
- S-ID A. Summarize, represent, and interpret data on a single count or measurement variable

Science

- HS-ETS1-4 Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.

Visual & Performing Arts

- None.

World Languages

- None.

CAREER READINESS, LIFE LITERACIES, & KEY SKILLS CONNECTIONS

Must include the standard # & verbiage

9.1-Personal Financial Literacy

Hillsborough Township Public Schools Curriculum Map
Course Title: AP Computer Science Principles

<ul style="list-style-type: none"> • None.
9.2-Career Awareness, Exploration, Preparation, and Training
<ul style="list-style-type: none"> • 9.4.5.DC.4: Model safe, legal, and ethical behavior when using online or offline technology.
9.4-Life Literacies & Key Skills
<ul style="list-style-type: none"> • 8.2.2.ED.2: Collaborate to solve a simple problem, or to illustrate how to build a product using the design process.
CAREERS ASSOCIATED WITH THIS UNIT
<ul style="list-style-type: none"> • Data analyst, cyber security specialist, data scientist, data engineer, quality assurance analyst, marketing data analyst, web data analyst, software engineer, data architect
DIVERSITY, EQUITY, & INCLUSION CONNECTIONS
<i>Required in grades K-12 per N.J.S.A. 18A:35-4:36a & the Amistad Law N.J.S.A. 18A 52:16A-88 Required in grades 7-12 per N.J.S.A. 18A:35-4.35</i>
<ul style="list-style-type: none"> • None.
SOCIAL EMOTIONAL LEARNING CONNECTIONS
<i>NJ SEL sub-competencies are listed that are addressed in this unit</i>
Self-Awareness
<ul style="list-style-type: none"> • Recognize one’s personal traits, strengths, and limitations. • Recognize the importance of self-confidence in handling daily tasks and challenges.
Self-Management
<ul style="list-style-type: none"> • Recognize the skills needed to establish and achieve personal and educational goals. • Identify and apply ways to persevere or overcome barriers through alternative methods to achieve one’s goals.
Social Awareness
<ul style="list-style-type: none"> • Demonstrate an awareness of the expectations for social interactions in a variety of settings.
Relationship Skills
<ul style="list-style-type: none"> • Utilize positive communication and social skills to interact effectively with others. • Identify who, when, where, or how to seek help for oneself or others when needed.
Responsible Decision-Making
<ul style="list-style-type: none"> • Develop, implement, and model effective problem-solving and critical thinking skills.

Hillsborough Township Public Schools Curriculum Map
Course Title: AP Computer Science Principles

MODIFICATIONS/ACCOMMODATIONS - ELL, Special Education, Gifted, At Risk of Failure, 504

- Accommodations for all subject areas may be viewed [here](#).

RESOURCES – *Cited print and electronic sources*

Educator Resources

- Project STEM
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- MIT App Inventor

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- MIT App Inventor

Parent Resources

- College Board

Hillsborough Township Public Schools Curriculum Map
Course Title: AP Computer Science Principles

UNIT OF STUDY	Unit 6: Innovative Technologies
PACING	20 days
ESSENTIAL QUESTIONS	
<ul style="list-style-type: none">● When an Internet service outage occurs in a different part of your town or city, how are you still able to access the Internet?	
ENDURING UNDERSTANDING	
<ul style="list-style-type: none">● CSN-1 Computer systems and networks facilitate the transfer of data.● CSN-2 Parallel and distributed computing leverage multiple computers to more quickly solve complex problems or process large data sets.● IOC-2 The use of computing innovations may involve risks to personal safety and identity.	
LEARNING TARGETS	
<ul style="list-style-type: none">● Big Picture<ul style="list-style-type: none">○ Students will examine computing innovations and consider their impact on the economy, society, culture and environment.○ Students will investigate the socioeconomic causes and effects related to the digital divide.○ Students will discuss the benefits and risks of open versus closed platforms.● Implications of Computing<ul style="list-style-type: none">○ Students will explore the ways that innovations in digital technology can impact the lives of individuals and communities.○ Students will analyze the role that digital technology plays in their everyday lives.○ Students will analyze the role that digital technology plays in their social communications and interactions.○ Students will explore the impact that instant access to global search, news, and information has had on individuals and communities.○ Students will analyze the benefits and risks of cloud computing.● The Internet<ul style="list-style-type: none">○ Students will examine the overall design and architecture of the Internet.○ Students will explore the role of servers, routers, gateways, and clients.○ Students will examine the domain name system and its role in network routing.○ Students will examine a number of standard network protocols, including IP, TCP, UDP, SMTP, HTTP, and FTP.○ Students will investigate the series of components and events that are involved in the transmission of an email or SMS text over the network.○ Students will investigate the series of components and events that are involved in the transmission of an HTML request from a Web browser.● Cryptography	

Hillsborough Township Public Schools Curriculum Map
Course Title: AP Computer Science Principles

- Students will identify the needs and applications of cryptography in our digital world.
- Students will encode and decode messages using common cryptographic techniques.
- Students will examine the mathematical foundation of cryptography.
- Students will analyze the differences between symmetric (single-key) encryption and asymmetric (public key) encryption.
- Students will examine the features of open and closed platforms and consider the role cryptography plays in systems security.
- **Cybersecurity**
 - Students will examine a number of common threats to cybersecurity, including distributed denial of service attacks (DDoS), phishing, viruses, and social engineering.
 - Students will identify the needs for robust cybersecurity.
 - Students will analyze the software, hardware, and human components of cybersecurity.
 - Students will analyze the function and effectiveness of common cybersecurity solutions, including antivirus software and firewalls.
- **Interconnectedness in Computing**
 - Students will investigate the origins and applications of the World Wide Web.
 - Students will analyze the impact of hyperlinked documents on how individuals find, acquire, and learn new information.
 - Students will analyze the legal, social, and commercial impact that the World Wide Web has had on society.
 - Students will examine the roles and applications of distributed computing.
 - Students will investigate and extrapolate from recent advances in computing to make predictions about the capabilities of future technologies.
 - Students will analyze how future technologies might impact individuals and societies.
 - Students will examine the legal and ethical implications of autonomous technology.

ASSESSMENTS

Pre-Assessment(s)	<ul style="list-style-type: none"> ● Unit 6 Pre-Assessment
Formative	<ul style="list-style-type: none"> ● Unit 6 Quiz 1 ● Unit 6 Quiz 2
Summative	<ul style="list-style-type: none"> ● Exploring Computing Innovations Project ● Unit 6 Exam
Benchmark / Common	<ul style="list-style-type: none"> ● Quarterly #3

NEW JERSEY STUDENT LEARNING STANDARDS (NJSL)

Must include the standard # & verbiage

Hillsborough Township Public Schools Curriculum Map

Course Title: AP Computer Science Principles

- 8.1.12.CS.2: Model interactions between application software, system software, and hardware.
- 8.1.12.NI.1: Evaluate the scalability and reliability of networks, by describing the relationship between routers, switches, servers, topology, and addressing.
- 8.1.12.NI.2: Evaluate security measures to address various common security threats.
- 8.1.12.NI.3: Explain how the needs of users and the sensitivity of data determine the level of security implemented.
- 8.1.12.NI.4: Explain how decisions on methods to protect data are influenced by whether the data is at rest, in transit, or in use.
- 8.1.12.IC.1: Evaluate the ways computing impacts personal, ethical, social, economic, and cultural practices.
- 8.2.12.ITH.1: Analyze a product to determine the impact that economic, political, social, and/or cultural factors have had on its design, including its design constraints.
- 8.2.12.ITH.3: Analyze the impact that globalization, social media, and access to open source technologies has had on innovation and on a society's economy, politics, and culture.
- 8.2.12.ETW.3: Identify a complex, global environmental or climate change issue, develop a systematic plan of investigation, and propose an innovative sustainable solution.
- 8.2.12.EC.1: Analyze controversial technological issues and determine the degree to which individuals, businesses, and governments have an ethical role in decisions that are made.

INTERDISCIPLINARY CONNECTIONS

Must include the standard # & verbiage

Comprehensive Health & Physical Education

- None.

English Language Arts

- NJSLSA.R7. Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.
- SL.9-10.5. Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance findings, reasoning, and evidence and to add interest.

Mathematics

- N.Q.A.2 Define appropriate quantities for the purpose of descriptive modeling.
- S-ID A. Summarize, represent, and interpret data on a single count or measurement variable

Science

Hillsborough Township Public Schools Curriculum Map
Course Title: AP Computer Science Principles

<ul style="list-style-type: none"> ● HS-ETS1-4 Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.
Visual & Performing Arts
<ul style="list-style-type: none"> ● None.
World Languages
<ul style="list-style-type: none"> ● None.
CAREER READINESS, LIFE LITERACIES, & KEY SKILLS CONNECTIONS <i>Must include the standard # & verbiage</i>
9.1-Personal Financial Literacy
<ul style="list-style-type: none"> ● None.
9.2-Career Awareness, Exploration, Preparation, and Training
<ul style="list-style-type: none"> ● 9.4.5.DC.4: Model safe, legal, and ethical behavior when using online or offline technology.
9.4-Life Literacies & Key Skills
<ul style="list-style-type: none"> ● 8.2.2.ED.2: Collaborate to solve a simple problem, or to illustrate how to build a product using the design process.
CAREERS ASSOCIATED WITH THIS UNIT
<ul style="list-style-type: none"> ● Information security analyst, software developer, software engineer, vulnerability analyst, cybersecurity consultant, network engineer, cryptography engineer
DIVERSITY, EQUITY, & INCLUSION CONNECTIONS <i>Required in grades K-12 per N.J.S.A. 18A:35-4:36a & the Amistad Law N.J.S.A. 18A 52:16A-88 Required in grades 7-12 per N.J.S.A. 18A:35-4.35</i>
<ul style="list-style-type: none"> ● None.
SOCIAL EMOTIONAL LEARNING CONNECTIONS <i>NJ SEL sub-competencies are listed that are addressed in this unit</i>
Self-Awareness
<ul style="list-style-type: none"> ● Recognize one’s personal traits, strengths, and limitations. ● Recognize the importance of self-confidence in handling daily tasks and challenges.
Self-Management

Hillsborough Township Public Schools Curriculum Map
Course Title: AP Computer Science Principles

- Recognize the skills needed to establish and achieve personal and educational goals.
- Identify and apply ways to persevere or overcome barriers through alternative methods to achieve one's goals.

Social Awareness

- Demonstrate an awareness of the expectations for social interactions in a variety of settings.

Relationship Skills

- Utilize positive communication and social skills to interact effectively with others.
- Identify who, when, where, or how to seek help for oneself or others when needed.

Responsible Decision-Making

- Develop, implement, and model effective problem-solving and critical thinking skills.

MODIFICATIONS/ACCOMMODATIONS - ELL, Special Education, Gifted, At Risk of Failure, 504

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RESOURCES – *Cited print and electronic sources*

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Student Resources

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Parent Resources

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Hillsborough Township Public Schools Curriculum Map
Course Title: AP Computer Science Principles

UNIT OF STUDY	Unit 7: Connections & Extensions of Computer Science Topics
PACING	38 days
ESSENTIAL QUESTIONS	
<ul style="list-style-type: none"> ● How can I prepare myself for the AP CSP Exam? 	
ENDURING UNDERSTANDINGS	
<ul style="list-style-type: none"> ● CRD-1 Incorporating multiple perspectives through collaboration improves computing innovations as they are developed. ● DAT-1 The way a computer represents data internally is different from the way the data are interpreted and displayed for the user. Programs are used to translate data into a representation more easily understood by people. ● AAP-1 To find specific solutions to generalizable problems, programmers represent and organize data in multiple ways. ● AAP-2 The way statements are sequenced and combined in a program determines the computed result. Programs incorporate iteration and selection constructs to represent repetition and make decisions to handle varied input values. ● AAP-3 Programmers break down problems into smaller and more manageable pieces. By creating procedures and leveraging parameters, programmers generalize processes that can be reused. Procedures allow programmers to draw upon existing code that has already been tested, allowing them to write programs more quickly and with more confidence. ● CSN-1 Computer systems and networks facilitate the transfer of data. ● IOC-1 While computing innovations are typically designed to achieve a specific purpose, they may have unintended consequences. 	
LEARNING TARGETS	
<ul style="list-style-type: none"> ● CRD-2.E.4 Students will understand that a development process that is iterative requires refinement and revision based on feedback, testing, or reflection throughout the process. This may require revisiting earlier phases of the process. ● Students will remember that some programming languages provide types to represent data, which are referenced using variables. These types include numbers, Booleans, lists, and strings. ● Students will review how procedural abstraction allows a solution to a large problem to be based on the solutions of smaller subproblems. This is accomplished by creating procedures to solve each of the subproblems. ● Students will examine how the internet is a computer network consisting of interconnected networks that use standardized, open (nonproprietary) communication protocols. ● Students will understand that ease of access and distribution of digitized information raises intellectual property concerns regarding ownership, value, and use. 	

Hillsborough Township Public Schools Curriculum Map
Course Title: AP Computer Science Principles

ASSESSMENTS	
Pre-Assessment(s)	<ul style="list-style-type: none"> ● None
Formative	<ul style="list-style-type: none"> ● Practice AP Exams
Summative	<ul style="list-style-type: none"> ● None
Benchmark / Common	<ul style="list-style-type: none"> ● AP Exam ● Final Exam
NEW JERSEY STUDENT LEARNING STANDARDS (NJSL)	
<i>Must include the standard # & verbiage</i>	
<ul style="list-style-type: none"> ● 8.1.12.CS.4: Develop guidelines that convey systematic troubleshooting strategies that others can use to identify and fix errors. ● 8.1.12.AP.1: Design algorithms to solve computational problems using a combination of original and existing algorithms. ● 8.1.12.AP.4: Design and iteratively develop computational artifacts for practical intent, personal expression, or to address a societal issue. ● 8.1.12.AP.7: Collaboratively design and develop programs and artifacts for broad audiences by incorporating feedback from users. ● 8.1.12.AP.8: Evaluate and refine computational artifacts to make them more usable and accessible. ● 8.2.12.NT.1: Explain how different groups can contribute to the overall design of a product. ● 8.1.12.DA.4: Explain the relationship between binary numbers and the storage and use of data in a computing device. ● 8.1.12.AP.3: Select and combine control structures for a specific application based upon performance and readability, and identify trade-offs to justify the choice. ● 8.2.12.ED.4: Design a product or system that addresses a global problem and document decisions made based on research, constraints, trade-offs, and aesthetic and ethical considerations and share this information with an appropriate audience. ● 8.1.12.DA.2 Describe the trade-offs in how and where data is organized and stored. ● 8.1.12.DA.3 Translate between decimal numbers and binary numbers. ● 8.1.12.DA.5 Create data visualizations from large data sets to summarize, communicate, and support different interpretations of real-world phenomena. ● 8.1.12.AP.2: Create generalized computational solutions using collections instead of repeatedly using simple variables. ● 8.1.12.AP.3: Select and combine control structures for a specific application based upon performance and readability, and identify trade-offs to justify the choice. ● 8.1.12.AP.4: Design and iteratively develop computational artifacts for practical intent, personal expression, or to address a societal issue. ● 8.1.12.AP.5: Decompose problems into smaller components through systematic analysis, using constructs such as procedures, modules, and/or objects. ● 8.2.12.NT.2: Redesign an existing product to improve form or function. 	

Hillsborough Township Public Schools Curriculum Map
Course Title: AP Computer Science Principles

- 8.2.12.EC.3: Synthesize data, analyze trends, and draw conclusions regarding the effect of a technology on the individual, culture, society, and environment and share this information with the appropriate audience.
- 8.2.12.ETW.2: Synthesize and analyze data collected to monitor the effects of a technological product or system on the environment.
- 8.1.12.CS.2: Model interactions between application software, system software, and hardware.
- 8.1.12.NI.1: Evaluate the scalability and reliability of networks, by describing the relationship between routers, switches, servers, topology, and addressing.
- 8.1.12.NI.2: Evaluate security measures to address various common security threats.
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- 8.2.12.ITH.3: Analyze the impact that globalization, social media, and access to open source technologies has had on innovation and on a society's economy, politics, and culture.
- 8.2.12.ETW.3: Identify a complex, global environmental or climate change issue, develop a systematic plan of investigation, and propose an innovative sustainable solution.
- 8.2.12.EC.1: Analyze controversial technological issues and determine the degree to which individuals, businesses, and governments have an ethical role in decisions that are made.

INTERDISCIPLINARY CONNECTIONS

Must include the standard # & verbiage

Comprehensive Health & Physical Education

- None.

English Language Arts

- RST.11-12.4 - Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context.
- RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.

Hillsborough Township Public Schools Curriculum Map

Course Title: AP Computer Science Principles

- SL.11-12.5 Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.

Mathematics

- A-SSE-A.1 Interpret expressions that represent a quantity in terms of its context.
- HSN-Q.A.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Science

- HS-ETS1-4 Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.

Visual & Performing Arts

- None.

World Languages

- None.

CAREER READINESS, LIFE LITERACIES, & KEY SKILLS CONNECTIONS

Must include the standard # & verbiage

9.1-Personal Financial Literacy

- None.

9.2-Career Awareness, Exploration, Preparation, and Training

- 9.4.5.DC.4: Model safe, legal, and ethical behavior when using online or offline technology.

9.4-Life Literacies & Key Skills

- 8.2.2.ED.2: Collaborate to solve a simple problem, or to illustrate how to build a product using the design process.

CAREERS ASSOCIATED WITH THIS UNIT

- Software developer, web developer, information security analyst, mobile app developer, computer engineer, system architect, IT project engineer

DIVERSITY, EQUITY, & INCLUSION CONNECTIONS

Required in grades K-12 per [N.J.S.A. 18A:35-4:36a](#) & the Amistad Law [N.J.S.A. 18A 52:16A-88](#)

Required in grades 7-12 per [N.J.S.A. 18A:35-4.35](#)

Hillsborough Township Public Schools Curriculum Map
Course Title: AP Computer Science Principles

- None.

SOCIAL EMOTIONAL LEARNING CONNECTIONS

NJ SEL sub-competencies are listed that are addressed in this unit

Self-Awareness

- Recognize one’s personal traits, strengths, and limitations.
- Recognize the importance of self-confidence in handling daily tasks and challenges.

Self-Management

- Recognize the skills needed to establish and achieve personal and educational goals.
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Responsible Decision-Making

- Develop, implement, and model effective problem-solving and critical thinking skills.

MODIFICATIONS/ACCOMMODATIONS - ELL, Special Education, Gifted, At Risk of Failure, 504

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