| Marking Period | Unit Title | Recommended Instructional Days |
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| **2** | **Computer Science Exploration 3 - App Design** | Approximately 20-24 days **(Meet Twice Per Week)** |

| **Disciplinary Concept:** | **Practice:** | **Recommended Activities, Investigations, Interdisciplinary Connections, and/or Student Experiences to Explore NJSLS-CSDT within Unit** |
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| AP<br>NT<br>ETW<br>DA | Fostering an Inclusive Computing and Design Culture<br><br>Collaborating Around Computing and Design<br><br>Recognizing and Defining Computational Problems<br><br>Developing and Using Abstractions<br><br>Testing and Refining Computational Artifacts<br><br>Communicating About Computing and Design | |
| **Core Idea:** | **Performance Expectation/s:** | |
| Individuals design algorithms that are reusable in many situations.<br>Algorithms that are readable are easier to follow, test, and debug.<br>Control structures are selected and combined in programs to solve more complex problems.<br>Individuals design and test solutions to identify problems taking into consideration the diverse needs of the users and the community. | 8.1.8.AP.1: Design and illustrate algorithms that solve complex problems using flowcharts and/or pseudocode.<br>8.1.8.AP.3: Design and iteratively develop programs that combine control structures, including nested loops and compound conditionals.<br>8.1.8.AP.6: Refine a solution that meets users' needs by incorporating feedback from team members and users. •<br>8.1.8.AP.7: Design programs, | **Essential Question/s:**<br>What is Computer Science?<br><br>Who is Computer Science For?<br><br>How can we use storytelling to help define problems we want to solve?<br><br>What are computers?<br><br>How do computers use programs and algorithms? |

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| Technology advances through the processes of innovation and invention which relies upon the imaginative and inventive nature of people. Sometimes a technology developed for one purpose is adapted to serve other purposes. Engineers use a systematic process of creating or modifying technologies that is fueled and constrained by physical laws, cultural norms, and economic resources. Scientists use systematic investigation to understand the natural world.<br>Computer models can be used to simulate events, examine theories and inferences, or make predictions.<br>Some technological decisions involve tradeoffs between environmental and economic needs, while others have positive effects for both the economy and environment.<br>Technological disparities have consequences for public health and prosperity. | incorporating existing code, media, and libraries, and give attribution. • 8.1.8.AP.8: Systematically test and refine programs using a range of test cases and users.<br>8.1.8.DA.5: Test, analyze, and refine computational models.<br>8.2.8.NT.2: Analyze an existing technological product that has been repurposed for a different function. • 8.2.8.NT.3: Examine a system, consider how each part relates to other parts, and redesign it for another purpose. • 8.2.8.NT.4: Explain how a product designed for a specific demand was modified to meet a new demand and led to a new product.<br>8.2.8.ETW.3: Analyze the design of a product that neg<br>8.2.8.EC.1: Explain ethical issues that may arise from the use of new technologies. • 8.2.8.EC.2: Examine the effects of ethical and unethical practices in product design and development. | How are programming languages different from normal languages?<br>What is an App and how can we make our app more engaging?<br>How do users interact with apps?<br>How do you anticipate and manage risks in apps?<br>How can app designers use empathy to create meaningful user experiences?<br>How can data help us understand others and improve app design?<br>How can apps use preference data to create personalized user experiences?<br>**Activity Description**:<br>Students will begin their investigation of computer science by exploring how computing technologies are all around us and affect everything we do. Students explore CS as a creative means of expressing themselves and impacting the world around them.<br>Students will build identities as computer scientists and affirm how all parts of their experiences, strengths, interests and passions can be enhanced and connected by the CS they will learn. Students explore how computer science at its best needs to represent as many voices, experiences and points of view as possible to reflect and meet the diverse needs of our world.<br>Students will be introduced to a four-part problem solving process and aims to demonstrate that problems and problem solving are a part of everyday life. Students are introduced to storytelling as a strategy they can use to better define problems for themselves, since this is often a critical step in problem solving.<br>Students will explore the nature of intelligence in humans and our ability to reason, perceive the world, make meaning, adapt and develop a common sense understanding of our world. Students will learn the characteristics that make certain tasks easy or difficult for computers, and how these differ from those that humans characteristically find easy or difficult. They learn that while computers can perform calculations and analyze data with accuracy and speed, computers need to be programmed or trained by humans to do their tasks.<br>Students will explore algorithms. They will identify what they are and how they are used to make programs work. By looking at examples of algorithms |
| **Social and Emotional Learning:** ***Competencies*** | **Social and Emotional Learning:** ***Sub-Competencies*** | |
| Self Awareness<br><br>Self-Management<br><br>Social Awareness | • Recognize one's feelings and thoughts<br>• Recognize the importance of self-confidence in handling daily tasks and challenges. | |

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| Responsible-Decision Making<br><br>Relationship Skills | • Recognize the skills needed to establish and achieve personal and educational goals.<br><br>• Recognize and identify the thoughts, feelings, and perspectives of others.<br>• Demonstrate an awareness of the differences among individuals, groups, and other' cultural backgrounds<br>• Develop, implement, and model effective problem-solving and critical thinking skills<br>• Evaluate personal, ethical, safety and civic impact of decisions.<br>• Utilize positive communication and social skills to interact effectively with others<br>• Identify who, when, where, or how to seek help for oneself or others when needed | they may be familiar with, students will gain an understanding of what it takes to write an algorithm.<br>Students will explore the concept of programming languages and their significance in computer science. They will compare natural language to programming language in order to understand why it helps us be less ambiguous with our instructions to the computer.<br>Students will get introduced to the idea of app design as they highlight the prevalence of apps in everyday life. The lesson introduces AppLab as a block-based programming tool for app design and has students go through part of a tutorial on how to use AppLab.<br>Students will be introduced to app design through the lens of GOAT, a leading sneaker marketplace app. Students explore sample apps and discuss what user needs they address, and then are introduced to innovation as recognizing a problem that needs to be solved and using technology to solve it. Students are then introduced to GOAT and hear from Eddy Lu, their co-founder and CEO who shares his experience as an entrepreneur and innovator. Students then occupy the role of app designers and program their own GOAT product screen.<br>Students will explore and investigate how apps meet user needs through interactions.<br>Students will shift thinking about how new apps or app features are developed and the more visible parts of apps, to exploring the back-end infrastructure that helps ensure an app is able to scale to many users and runs smoothly.<br>Students will explore the concept of empathy in app design. They will learn how empathy allows designers to understand users' perspectives, needs, and emotions.<br>Students will learn about different types of data and how data can provide valuable insights into people's behavior. The lesson will introduce the concept of user profiles and how large-scale apps like GOAT use data to personalize the user experience. Students will also discover the role of data scientists in app design teams and their focus on collecting, analyzing, and interpreting data to improve app performance.<br>Students will design a Personalized Homepage feature for the GOAT app. They learn about preference data and its role in understanding users and providing a personalized user experience. The lesson focuses on designing screens for the app, including homepages, results screens, and quiz question screens. Students are guided through the process of editing text, adding images, and customizing the appearance of various app elements. |

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| | | **Interdisciplinary Connections:**<br>**ELA**<br>**ELA**<br>W7, W.8.7., W.8.2. ELA RI.8.7., NJSLSA.SL2., NJSLSA.SL5., NJSLA SL.8.2., NJSLA SL.8.5, NJSLSA.R7, NJSLSA.SL2, SL.8.2., NJSLSA.SL4., NJSLSA.SL5., NJSLSA.SL6., SL.8.5. |

| **Assessments (Formative)**<br>***To show evidence of meeting the standard/s, students will successfully engage within:*** | **Assessments (Summative)**<br>***To show evidence of meeting the standard/s, students will successfully complete:*** |
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| **Formative Assessments:**<br>● Exit Slips<br>● Quizzes<br>● Lesson Activity Worksheets<br>● Presentations / videos | **Benchmark:**<br>● Performance Assessment<br>● Unit Assessments<br>● Projects<br><br>**Summative Assessments:**<br>● District/Department Assessments |

**Differentiated Student Access to Content:**
**Teaching and Learning *Resources/Materials***

| **Core Resources** | **Alternate Core Resources** ***IEP/504/At-Risk/ESL*** | **ELL Core Resources** | **Gifted & Talented Core Resources** |
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| ● Project STEM (projectstem.org)<br>● YouTube | ● Reteaching worksheets<br>● Spanish version of lesson activities | ● Dictionary for native language<br>● Google Translate<br>● Translation by classroom Paraprofessional | ● Enrichment/Extension activities |

**Supplemental Resources**

**Technology:**
- Chromebooks, MacBook
- Projector
- Smartboard

- projectstem.org
- semiconductor.withgoogle.com
- ABCya! Games
- https://mitmedialab.github.io/
- Scratch
- https://contours2classification.herokuapp.com/student
- https://teachablemachine.withgoogle.com/

**Other:**

- Schoology
- Google Meet Conferencing Tool
- GAFE (Docs, Sheets, Slides, Drawings, Sites)
- YouTube
- Pens, Pencils, Paper, Markers, Crayons, chart paper, envelopes

**Differentiated Student Access to Content:**
**Recommended *Strategies & Techniques***

| **Core Resources** | **Alternate Core Resources *IEP/504/At-Risk/ESL*** | **ELL Core Resources** | **Gifted & Talented Core** |
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| Deliver instruction utilizing varied learning styles including audio, visual, and tactile/kinesthetic, provide individual instruction as needed, modify assessments and/or rubrics, repeat instructions as needed. | Utilize a multi-sensory (VAKT) approach during instruction, provide alternate presentations of skills by varying the method (repetition, simple explanations, additional examples, modeling, etc.), modify test content and/or format, allow students to retake test for additional credit, provide additional times and preferential seating as needed, review, restate and repeat directions, provide study guides, and/or break assignments into segments of shorter tasks. | Extend time requirements, preferred seating, positive reinforcement, check often for understanding/review, oral/visual directions/prompts when necessary, supplemental materials including use of online or paper bilingual dictionaries, and modified assessment and/or rubric. | Provide extension activities related to the topic being discussed. Create an enhanced set of introductory activities, integrate active teaching/learning opportunities, incorporate authentic components, propose interest-based extension activities, and connect students to related talent development opportunities. |

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| **NJSLS CAREER READINESS, LIFE LITERACIES & KEY SKILLS** | **Disciplinary Concept:** | |
| | ***Core Ideas:*** | • **Collaboration with individuals with diverse perspectives can result in new ways of thinking and/or innovative solutions.**<br>• **Curiosity and a willingness to try new ideas contributes to the development of creativity and innovation skills.**<br>• **The ability to solve problems effectively begins with gathering data, seeking resources, and applying critical thinking skills.**<br>• **Sending and receiving copies of media on the internet creates the opportunity for unauthorized use of data, such as personally owned video, photos, and music.**<br>• **Culture and geography can shape an individual's experiences and perspectives.**<br>• **Digital tools can be used to modify and display data in various ways that can be organized to communicate ideas.**<br>• **Different digital tools have different purposes.**<br>• **Collaborating digitally as a team can often develop a better artifact than an individual working alone.** |
| | ***Performance Expectation/s:*** | 9.1.8.PB.5, 9.2.8.CAP.2, 9.2.8.CAP.4:, 9.2.8.CAP.18, |
| | **Career Readiness, Life Literacies, & Key Skills Practices** | |
| | **Consider the environmental, social, and economic impacts of decisions**<br><br>**Demonstrate creativity and innovation**<br>**Utilize critical thinking to make sense of problems and persevere in solving them**<br><br>**Use technology to enhance productivity, increase collaboration and communicate effectively**<br><br>**Work productively in team while using cultural/global competence** | |

| New Jersey Legislative Statutes and Administrative Code<br>(place an "X" before each law/statute if/when present within the curriculum map) | | | | | | | | | |
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| X | Amistad Law: *N.J.S.A. 18A 52:16A-88* | X | Holocaust Law: *N.J.S.A. 18A:35-28* | X | LGBT and Disabilities Law: *N.J.S.A. 18A:35-4.35* | X | Diversity & Inclusion: *N.J.S.A. 18A:35-4.36a* | | Standards in Action: *Climate Change* |