

Unit	Unit Title	Recommended Instructional Days
2	Computer Science: Artificial Intelligence & Machine Learning	Trimester 2
<p>Disciplinary Concept:</p> <p>CS IC AP DA ED NT</p>	<p>Practice:</p> <p>Fostering an Inclusive Computing and Design Culture</p> <p>Collaborating Around Computing and Design</p> <p>Recognizing and Defining Computational Problems</p> <p>Testing and Refining Computational Artifacts</p> <p>Communicating About Computing and Design</p>	<p>Recommended Activities, Investigations, Interdisciplinary Connections, and/or Student Experiences to Explore NJSLC-CSDT within Unit</p>
<p>Core Idea:</p>	<p>Performance Expectation/s:</p>	
<p>Software and hardware determine a computing system’s capability to store and process information. The design or selection of a computing system involves multiple considerations and potential trade-offs.</p> <p>The purpose of cleaning data is to remove errors and make it easier for computers to process.</p> <p>Programs use procedures to organize code and hide implementation details. Procedures can be repurposed</p>	<p>8.1.8.CS.2: Design a system that combines hardware and software components to process data.</p> <p>8.1.8.DA.4: Transform data to remove errors and improve the accuracy of the data for analysis.</p> <p>8.1.8.AP.5: Create procedures with parameters to organize code and make it easier to reuse</p> <p>8.1.8.AP.4: Decompose problems and subproblems into parts to facilitate the design, implementation, and review of</p>	<p>Essential Question/s:</p> <p>11. How do computers learn to make predictions with numerical data?</p> <p>12. How can we use AI Lab to predict numerical data?</p> <p>13. How can I customize the code for a machine learning app?</p> <p>14. What are the guidelines we can use to create ethical machine learning apps?</p> <p>15. Can I use real-world data to create an app that uses machine learning?</p> <p>16. How can machine learning be used to address an issue in your community?</p>

<p>in new programs. Defining parameters for procedures can generalize behavior and increase reusability.</p> <p>Computer models can be used to simulate events, examine theories and inferences, or make predictions.</p> <p>Individuals design and test solutions to identify problems taking into consideration the diverse needs of the users and the community.</p> <p>Technological disparities have consequences for public health and prosperity.</p> <p>Programs use procedures to organize code and hide implementation details. Procedures can be repurposed in new programs. Defining parameters for procedures can generalize behavior and increase reusability.</p> <p>Engineering design is a systematic and creative process of communicating and collaborating to meet a design challenge. Often, several design solutions exist, each better in some way than the others.</p> <p>Sometimes a technology developed for one purpose is adapted to serve other purposes.</p>	<p>programs</p> <p>8.1.12.IC.1: Evaluate the ways computing impacts personal, ethical, social, economic, and cultural practices</p> <p>8.1.8.DA.5: Test, analyze, and refine computational models</p> <p>8.1.8.AP.6: Refine a solution that meets users' needs by incorporating feedback from team members and users</p> <p>8.1.8.AP.4: Decompose problems and sub-problems into parts to facilitate the design, implementation, and review of programs.</p> <p>8.2.8.EC.2: Examine the effects of ethical and unethical practices in product design and development.</p> <p>8.2.5.ED.2: Collaborate with peers to collect information, brainstorm to solve a problem, and evaluate all possible solutions to provide the best results with supporting sketches or models.</p> <p>8.2.8.ED.3: Develop a proposal for a solution to a real-world problem that includes a model (e.g., physical prototype, graphical/technical sketch).</p> <p>8.2.8.NT.3: Examine a system, consider how each part relates to other parts, and redesign it for another purpose.</p>	<p>17. How can I create a survey to gather data for a machine learning app?</p> <p>18. How can I import data into AI Lab to train a machine learning model?</p> <p>19. What are strategies to make sure our data generates an accurate model?</p> <p>20. How can I create a friendly, easy-to-use machine learning app?</p> <p>21. How can I design an app that solves a problem in my community?</p> <p><u>Activity Description:</u></p> <p>11. Students will use degrees of similarity and averages to make predictions about the number of zombies at a particular location.</p> <p>12. Students will be introduced to numerical data, which represents a range of values.</p> <p>13. Students will explore how to customize the code of their app to make additional changes to the design of their app.</p> <p>14. Students conduct research using articles and videos that expose ethical pitfalls in an area of Artificial Intelligence (AI) of their choice.</p> <p>15. Students will apply their skills and create a machine learning app using real-world data.</p> <p>16. Students will create a solution using machine learning to address an issue in their community</p>
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Social and Emotional Learning: <i>Competencies</i>	Social and Emotional Learning: <i>Sub-Competencies</i>	
Self Awareness Self-Management Social Awareness Responsible-Decision Making Relationship Skills	<ul style="list-style-type: none"> ● Recognize one’s feelings and thoughts ● Recognize the impact of one’s feelings and thoughts on one’s own behavior ● Recognize the importance of self-confidence in handling daily tasks and challenges ● 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 ● Recognize and identify the thoughts, feelings, and perspectives of others ● Demonstrate an understanding of the need for mutual respect when viewpoints differ ● 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 ● Evaluate personal, ethical, safety, and civic impact of decisions 	<p>17. Students learn that the community would like them to create a club recommender app based on the clubs at their school.</p> <p>18. Students learn how to view survey data and examine the results to form a model.</p> <p>19. Students examine survey data from other members of the student team and analyze why their models are not working correctly.</p> <p>20. Students will design an app to help solve a problem in their community.</p> <p>Interdisciplinary Connections: Content: CCSS.Math.Content.2.MD.A.1, CCSS.Math.Content.3.MD.D.8, CCSS.Math.Content.4.MD.A.3 NGSS: 3-PS2-2, K-2-ETS1-2</p>

	<ul style="list-style-type: none"> • Establish and maintain healthy relationships • Utilize positive communication and social skills to interact effectively with others • Identify ways to resist inappropriate social pressure • Demonstrate the ability to prevent and resolve interpersonal conflicts in constructive ways • Identify who, when, where, or how to seek help for oneself or others when needed 		
<p align="center">Assessments (Formative) <i>To show evidence of meeting the standard/s, students will successfully engage within:</i></p>		<p align="center">Assessments (Summative) <i>To show evidence of meeting the standard/s, students will successfully complete:</i></p>	
<p>Formative Assessments:</p> <ul style="list-style-type: none"> • Exit Slips • Quizzes • Self-Assessments/Reflection • Lesson Activity Worksheets 		<p>Benchmarks:</p> <ul style="list-style-type: none"> • Performance Assessment • Unit Assessments <p>Summative Assessments:</p> <ul style="list-style-type: none"> • District/Department Assessments 	
<p align="center">Differentiated Student Access to Content: Teaching and Learning Resources/Materials</p>			
<p align="center">Core Resources</p>	<p align="center">Alternate Core Resources <i>IEP/504/At-Risk/ESL</i></p>	<p align="center">ELL Core Resources</p>	<p align="center">Gifted & Talented Core Resources</p>
<p>https://projectstem.org/ http://youtube.com</p>	<p>Reteaching worksheets Spanish version of lesson activities</p>	<p>Dictionary for native language</p>	<p>Enrichment/Extension activities</p>
<p align="center">Supplemental Resources</p>			
<p>Technology:</p> <ul style="list-style-type: none"> • Chromebooks, MacBook 			

- Projector
- Smartboard
- Pens, Pencils, Paper

Other:

- Google Classroom
- Project STEM Platform
- GAPE (Docs, Sheets, Slides, Drawings, Sites)
- Youtube

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

Core Resources	Alternate Core Resources <i>IEP/504/At-Risk/ESL</i>	ELL Core Resources	Gifted & Talented Core
<ul style="list-style-type: none"> ● 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. 	<ul style="list-style-type: none"> ● Special Education: Adhere to IEP/504s. 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. 	<ul style="list-style-type: none"> ● 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 dictionary, and modified assessment and/or rubric. 	<ul style="list-style-type: none"> ● 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.

NJSLS CAREER READINESS, LIFE LITERACIES & KEY SKILLS	Disciplinary Concept: Career Awareness and Planning (CAP), Creativity and Innovation (CI), Critical Thinking and Problem-Solving (CT), Technology Literacy (TL)	
	<i>Core Ideas:</i>	<ul style="list-style-type: none"> Collaboration with individuals with diverse perspectives can result in new ways of thinking and/or innovative solutions. Curiosity and a willingness to try new ideas (intellectual risk-taking) contributes to the development of creativity and innovation skills. The ability to solve problems effectively begins with gathering data, seeking resources, and applying critical thinking skills. Different digital tools have different purposes. Collaborating digitally as a team can often develop a better artifact than an individual working alone.
	<i>Performance Expectation/s:</i>	<ul style="list-style-type: none"> 9.4.5.CI.1, 9.4.5.CI.2, 9.4.5.CI.3, 9.4.5.CI.4, 9.4.5.CT.1, 9.4.5.CT.2, 9.4.5.CT.3, 9.4.5.CT.4, 9.4.5.TL.1, 9.4.5.TL.2, 9.4.5.TL.3, 9.4.5.TL.4.
	Career Readiness, Life Literacies, & Key Skills Practices	
	<ul style="list-style-type: none"> Demonstrate creativity and innovation Utilize critical thinking to make sense of problems and persevere in solving them: Use technology to enhance productivity, increase collaboration and communicate effectively Work productively in teams while using cultural/global competence 	

New Jersey Legislative Statutes and Administrative Code
(place an "X" before each law/statute if/when present within the curriculum map)

	Amistad Law: <i>N.J.S.A. 18A 52:16A-88</i>		Holocaust Law: <i>N.J.S.A. 18A:35-28</i>		LGBT and Disabilities Law: <i>N.J.S.A. 18A:35-4.35</i>	X	Diversity & Inclusion: <i>N.J.S.A. 18A:35-4.36a</i>	X	Standards in Action: <i>Climate Change</i>
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