Marking Period	Unit Title	Recommended Instructional Days
2/3	**Computer Science Exploration 2**	Approximately 10-12 days **(Meet Twice Per Week)**

Disciplinary Concept:	**Practice:**	**Recommended Activities, Investigations, Interdisciplinary Connections, and/or Student Experiences to Explore NJSLS-CSDT within Unit**
CS IC AP DA	Fostering an Inclusive Computing and Design Culture Collaborating Around Computing and Design Recognizing and Defining Computational Problems Developing and Using Abstractions Testing and Refining Computational Artifacts Communicating About Computing and Design	
Core Idea:	**Performance Expectation/s:**	
The study of human - computer interaction can improve the design of devices and extend the abilities of humans. 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.	8.1.8.CS1: Recommend improvements to computing devices in order to improve the ways users interact with devices. 8.1.8.CS3: Justify design decisions and explain potential system trade-offs. 8.1.8.IC.1: Compare the trade-offs associated with computing technologies that affect an individual's everyday activities and career options. 8.1.8.IC.2 Describe issues of bias and	**Essential Question/s:** Why Artificial Intelligence? What is Artificial Intelligence (AI) and how is it transforming the world around us? What were the developments in history that made AI possible? How do AI systems perceive, represent, and reason with data? How do AI systems represent and reason with data?

Advancements in computing technology can change individuals' behaviors. Society is faced with trade-offs due to the increasing globalization and automation that computing brings. Programmers create variables to store data values of different types and perform appropriate operations on their values. Computer models can be used to simulate events, examine theories and inferences, or make predictions. 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.	accessibility in the design of existing technologies. 8.1.8.AP.2: Create cleary named variables that represent different data types and perform operations on their values. 8.1.8.DA.5: Test analyze, and refine computational models 8.1.8.AP.4: Decompose problems and subproblems into parts to facilitate the design, implementation, and review of programs	How is AI bias? Race / Gender / Age / Sexual Orientation / Religion What is machine learning and how is it used in the real world? What is Generative AI? What is applied AI? **<u>Activity Description</u>**: Students will begin with an overview of topics including the definition of intelligence, the key principles that will be covered in this course, and how to use Scratch. They will then create an AI wishlist to explore their new understanding of artificial intelligence. In this introductory unit, students start exploring what artificial intelligence is and how it is defined Students are introduced to artificial intelligence in more detail as they examine four fields that rely on AI technology every day: robotics, entertainment, social media, and chatbots. Through a mix of real-world examples and coding activities, students will continue to build a strong understanding of artificial intelligence and the technology that it is used to create. Students will "conduct" an AI-driven virtual orchestra using a series of different gestures and learn more about how AI collects data and responds to it. Students will explore the concept of growth mindset as it relates to learning artificial intelligence. Students will explore representations of data structures and how AI technology uses representations and reasoning to make decisions. Students will look at various ways that data can be represented, whether by looking at data represented hierarchically in a decision tree, locations represented in a coordinate graph, or the representation of words and natural language. Students will learn how important data is for AI to work and see how the quality and quantity of data can impact decisions. Students will research ways AI is biased to different minority groups of people. Then they'll complete an activity to brainstorm sensors that could help a vision-impaired classmate. Students will explore machine learning, a hot topic in AI. Recently, faster and more powerful computers as well as easier access to large datasets have made it easier to develop machine learning systems. Students will see that supervised machine learning can be used to create classification
Social and Emotional Learning: ***Competencies***	**Social and Emotional Learning:** ***Sub-Competencies***	
Self Awareness Self-Management Social Awareness Responsible-Decision Making Relationship Skills	● Recognize one's feelings and thoughts ● Recognize the importance of self-confidence in handling daily tasks and challenges. ● Recognize the skills needed to establish and achieve personal and educational goals.	

	• Recognize and identify the thoughts, feelings, and perspectives of others. • Demonstrate an awareness of the differences among individuals, groups, and other' cultural backgrounds • Develop, implement, and model effective problem-solving and critical thinking skills • Evaluate personal, ethical, safety and civic impact of decisions. • 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	models, examine how the size, completeness, and diversity of a dataset affects the performance of a machine learning algorithm, and see that machine learning algorithms may extract features that may be different from the conceptual features that humans find valuable or informative. Students will use an AI tool called Teachable Machine to create, train, and test their own AI algorithm that will classify hand signs from American Sign Language (ASL). Students will explore types of Generative AI technology, including Generative Adversarial Networks (GANs). They will play a discriminator game to see how GANs work, and learn to use some of the tools that help model how AI technology works. Students will also dig into the social implications of generative AI, including deepfakes and style transfer, all while discussing the real world impact of AI technology. Students will complete storytelling using GANs. Students will explore the big idea that intelligent agents require many kinds of knowledge to interact naturally with humans. Building on their explorations of chatbots from Unit 1, students will look deeper at how AI technology mimics natural language and common sense reasoning in order to appear more natural and lifelike. Topics include chatbots, data collection and privacy, and a debate about the future of society as AI technology continues to advance at a faster and faster pace. Students will complete a YouTube redesign project. **Interdisciplinary Connections:** **ELA** **ELA** 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) ***To show evidence of meeting the standard/s, students will successfully engage within:***	**Assessments (Summative)** ***To show evidence of meeting the standard/s, students will successfully complete:***
Formative Assessments: • Exit Slips	**Benchmark:** • Performance Assessment

• Quizzes • Lesson Activity Worksheets • Presentations / videos	• Unit Assessments • Projects **<u>Summative Assessments:</u>** • 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**
• Project STEM (projectstem.org) • YouTube	• Reteaching worksheets • Spanish version of lesson activities	• Dictionary for native language • Google Translate • 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**
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.

	Disciplinary Concept:	
NJSLS CAREER READINESS, LIFE LITERACIES & KEY SKILLS	***Core Ideas:***	• **An individual's strengths, lifestyle goals, choices, and interests affect employment and income** • **An individual's strengths, lifestyle goals, choices, and interests affect employment and income** • **Communication skills and responsible behavior in addition to education, experience, certifications, and skills are all factors that affect employment and income.**

	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 **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 team 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)									
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*