STEAM Curriculum		
Grades 6 - 8		
Curriculum Overview		

"New approaches necessary for solving the critical challenges that we face as a society will require harnessing the power of technology and computing. Rapidly changing technologies and the proliferation of digital information have permeated and radically transformed learning, working, and everyday life. To be well-educated, global-minded individuals in a computing-intensive world, students must have a clear understanding of the concepts and practices of computer science. As education systems adapt to a vision of students who are not just computer users but also computationally literate creators who are proficient in the concepts and practices of computer science and design thinking, engaging students in computational thinking and human-centered approaches to design through the study of computer science and technology serves to prepare students to ethically produce and critically consume technology."

Reference: New Jersey Department of Education. New Jersey Student Learning Standards, 2020.

Unit Title	Timeframe	New Jersey Student Learning Standards
Advanced Robotics Systems	*3 months (September, October, November)*	*8.1.8.CS.1: Recommend improvements to computing devices in order to improve the ways users interact with the devices.* *8.1.8.CS.2: Design a system that combines hardware and software components to process data.* *8.1.8.CS.3: Justify design decisions and explain potential system trade-offs.* *8.1.8.CS.4: Systematically apply troubleshooting strategies to identify and resolve hardware and software problems in computing systems.* *8.1.8.NI.1: Model how information is broken down into smaller pieces, transmitted as addressed packets through multiple devices over networks and the Internet, and reassembled at the destination.* *8.1.8.NI.2: Model the role of protocols in transmitting data across networks and the Internet and how they enable secure and errorless communication.* *8.1.8.IC.2: Describe issues of bias and accessibility in the design of existing technologies.* *8.1.8.DA.1: Organize and transform data collected using computational tools to make it usable for a specific purpose.* *8.1.8.DA.2: Explain the difference between how the computer stores data as bits and how the data is displayed.* *8.1.8.DA.3: Identify the appropriate tool to access data based on its file format.* *8.1.8.DA.4: Transform data to remove errors and improve the accuracy of the data for analysis.* *8.1.8.AP.1: Design and illustrate algorithms that solve complex problems using flowcharts and/or pseudocode.* *8.1.8.AP.2: Create clearly named variables that represent different data types and perform operations on their values.* *8.1.8.AP.3: Design and iteratively develop programs that combine control structures, including nested loops and compound conditionals.* *8.1.8.AP.4: Decompose problems and sub-problems into parts to facilitate the design, implementation, and review of programs.* *8.1.8.AP.5: Create procedures with parameters to organize code and make it easier to reuse.* *8.1.8.AP.6: Refine a solution that meets users' needs by incorporating feedback from team members and users.* *8.1.8.AP.7: Design programs, 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.* *8.1.8.AP.9: Document programs in order to make them easier to follow, test, and debug.* *8.2.8.NT.1: Examine a malfunctioning tool, product, or system and propose solutions to the problem.* *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.*
Digital Footprint and Cybersecurity	*2 Month (December, January)*	*8.1.8.NI.3: Explain how network security depends on a combination of hardware, software, and practices that control access to data and systems.* *8.1.8.NI.4: Explain how new security measures have been created in response to key malware events.* *9.4.8.DC.1: Analyze the resource citations in online materials for proper use.* *9.4.8.DC.2: Provide appropriate citation and attribution elements when creating media products(e.g., W.6.8).* *9.4.8.DC.3: Describe tradeoffs between allowing information to be public (e.g., within online games) versus keeping information private and secure.* *9.4.8.DC.4: Explain how information shared digitally is public and can be searched, copied, and potentially seen by public audiences* *9.4.8.DC.5: Manage digital identity and practice positive online behavior to avoid inappropriate forms of self-disclosure.* *• 9.4.8.DC.6: Analyze online information to distinguish whether it is helpful or harmful to reputation.* *• 9.4.8.IML.1: Critically curate multiple resources to assess the credibility of sources when searching for information.* *• 9.4.8.IML.2: Identify specific examples of distortion, exaggeration, or misrepresentation of information.* *9.4.8.IML.6: Identify subtle and overt messages based on the method of communication.* *• 9.4.8.IML.9: Distinguish between ethical and unethical uses of information and media (e.g.,1.5.8.CR3b, 8.2.8.EC.2).* *• 9.4.8.IML.10: Examine the consequences of the uses of media (e.g., RI.8.7).* *• 9.4.8.IML.11: Predict the personal and community impact of online and social media activities.*

	6th Grade Only (February, March, April, May, June)	*8.1.8.DA.5: Test, analyze, and refine computational models. • 8.1.8.DA.6: Analyze climate change computational models and propose refinements.* *8.2.8.ED.2: Identify the steps in the design process that could be used to solve a problem.* *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).* *8.2.8.ED.4: Investigate a malfunctioning system, identify its impact, and explain the step-by-step process used to troubleshoot, evaluate, and test option.* *8.2.8.ITH.1: Explain how the development and use of technology influences economic, political, social, and cultural issues.* *8.2.8.ITH.2: Compare how technologies have influenced society over time.* *8.2.8.ITH.3: Evaluate the impact of sustainability on the development of a designed product or system.* *8.2.8.ITH.4: Identify technologies that have been designed to reduce the negative consequences of other technologies and explain the change in impact.* *• 8.2.8.ITH.5: Compare the impacts of a given technology on different societies, noting factors that may make a technology appropriate and sustainable.* *8.2.8.ETW.1: Illustrate how a product is upcycled into a new product and analyze the short- and long-term benefits and costs.* *8.2.8.ETW.2: Analyze the impact of modifying resources in a product or system (e.g., materials, energy, information, time, tools, people, capital).* *8.2.8.ETW.3: Analyze the design of a product that negatively impacts the environment or society and develop possible solutions to lessen its impact.* *8.2.8.ETW.4: Compare the environmental effects of two alternative technologies devised to address climate change issues and use data to justify which.* *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.* *9.4.8.CI.1: Assess data gathered on varying perspectives on causes of climate change (e.g., crosscultural, gender-specific, generational), and determine h* *9.4.8.CI.2: Repurpose an existing resource in an innovative way (e.g., 8.2.8.NT.3).* *9.4.8.CI.3: Examine challenges that may exist in the adoption of new ideas (e.g., 2.1.8.SSH, 6.1.8.CivicsPD.2).* *9.4.8.CI.4: Explore the role of creativity and innovation in career pathways and industries.* *9.4.8.CT.1: Evaluate diverse solutions proposed by a variety of individuals, organizations, and/or agencies to a local or global problem, such as climate* *9.4.8.CT.2: Develop multiple solutions to a problem and evaluate short- and long-term effects to determine the most plausible option (e.g., MS-ETS1-4, 6* *9.4.8.CT.3: Compare past problem-solving solutions to local, national, or global issues and analyze the factors that led to a positive or negative outcome* *9.4.8.DC.7: Collaborate within a digital community to create a digital artifact using strategies such as crowdsourcing or digital surveys. Digital technolo* *9.4.8.DC.8: Explain how communities use data and technology to develop measures to respond to effects of climate change (e.g., smart cities).* *9.4.8.IML.7: Use information from a variety of sources, contexts, disciplines, and cultures for a specific purpose (e.g., 1.2.8.C2a, 1.4.8.CR2a, 2.1.8.CHSS/* *9.4.8.IML.8: Apply deliberate and thoughtful search strategies to access high-quality information on climate change (e.g., 1.1.8.C1b).* *9.4.8.TL.1: Construct a spreadsheet in order to analyze multiple data sets, identify relationships,and facilitate data-based decision-making.* *9.4.8.TL.2: Gather data and digitally represent information to communicate a real-world problem (e.g., MS-ESS3-4, 6.1.8.EconET.1, 6.1.8.CivicsPR.4).* *9.4.8.TL.3: Select appropriate tools to organize and present information digitally.* *9.4.8.TL.4: Synthesize and publish information about a local or global issue or event (e.g., MSLS4-5, 6.1.8.CivicsPI.3).*
Global Water Crisis and Polution *micro sub-unit: Innovations and Upcycling*		

		9.1.8.CR.1: Compare and contrast the role of philanthropy, volunteer service, and charities in community development and the quality of life in a variety
		9.1.8.CR.2: Compare various ways to give back through strengths, passions, goals, and other personal factors.
		9.1.8.CR.3: Relate the importance of consumer, business, and government responsibility to the economy and personal finance.
		9.1.8.CR.4: Examine the implications of legal and ethical behaviors when making financial decisions.
		9.1.8.CDM.1: Compare and contrast the use of credit cards and debit cards for specific purchases and the advantages and disadvantages of using each.
		9.1.8.CDM.2: Demonstrate an understanding of the terminology associated with different types of credit (e.g., credit cards, installment loans, mortgages
		9.1.8.CDM.3: Compare and contrast loan management strategies, including interest charges and total principal repayment costs.
		9.1.8.CDM.4: Evaluate the application process for different types of loans (e.g., credit card, mortgage, student loans).
		9.1.8.EG.1: Explain how taxes affect disposable income and the difference between net and gross income
		9.1.8.EG.2: Explain why various sources of income are taxed differently..
		9.1.8.EG.3: Explain the concept and forms of taxation and evaluate how local, state and federal governments use taxes to fund public activities and initia
		9.1.8.EG.4: Identify and explain the consequences of breaking federal and/or state employment or financial laws.
		9.1.8.EG.5: Interpret how changing economic and societal needs influence employment trends and future education.
		9.1.8.EG.6: Explain the economic principle of the circular flow of money in different situations regarding buying products or services from a local or nat
		9.1.8.EG.7: Explain the effect of the economy (e.g., inflation, unemployment) on personal income, individual and family security, and consumer decisions
		9.1.8.EG.8: Analyze the impact of currency rates over a period of time and the impact on trade, employment, and income.
		9.1.8.EG.9: Identify types of consumer fraud, the procedures for reporting fraud, the specific consumer protection laws, and the issues they address.
		9.1.8.FP.1: Describe the impact of personal values on various financial scenarios.
		9.1.8.FP.2: Evaluate the role of emotions, attitudes, and behavior (rational and irrational) in making financial decisions.
		9.1.8.FP.3: Explain how self-regulation is important to managing money (e.g., delayed gratification, impulse buying, peer pressure, etc.).
		9.1.8.FP.4: Analyze how familial and cultural values influence savings rates, spending, and other financial decisions.
		9.1.8.FP.5: Determine how spending, investing, and using credit wisely contributes to financial well-being.
		9.1.8.PB.1: Predict future expenses or opportunities that should be included in the budget planning process.
		9.1.8.PB.2: Explain how different circumstances can affect one's personal budget.
		9.1.8.PB.3: Explain how to create budget that aligns with financial goals.
	8th Grade Only (February, March, April, May, June)	9.1.8.PB.4: Construct a simple personal savings and spending plan based on various sources of income and different stages of life (e.g. teenager, young a
		9.1.8.PB.5: Identify factors that affect one's goals, including peers, culture, location, and past experiences.
		9.1.8.PB.6: Construct a budget to save for short-term, long term, and charitable goals.
		9.1.8.RM.1: Determine criteria for deciding the amount of insurance protection needed.
		9.1.8.RM.2: Analyze the need for and value of different types of insurance and the impact of deductibles in protecting assets against loss.
		9.1.8.RM.3: Evaluate the need for different types of warranties. Insurance can protect your personal finances. 9.1.8.RM.4: Explain the purpose of insura
		9.2.8.CAP.1: Identify offerings such as high school and county career and technical school courses, apprenticeships, military programs, and dual enrollment courses that support career or occupational areas of interest.
		9.2.8.CAP.2: Develop a plan that includes information about career areas of interest.
		9.2.8.CAP.3: Explain how career choices, educational choices, skills, economic conditions, and personal behavior affect income.
		9.2.8.CAP.4: Explain how an individual's online behavior (e.g., social networking, photo exchanges, video postings) may impact opportunities for emplo
		9.2.8.CAP.5: Develop a personal plan with the assistance of an adult mentor that includes information about career areas of interest, goals and an educa
		9.2.8.CAP.6: Compare the costs of postsecondary education with thepotential increase in income from a career of choice.
		9.2.8.CAP.7: Devise a strategy to minimize costs of postsecondary education.
		9.2.8.CAP.8: Compare education and training requirements, income potential, and primary duties of at least two jobs of interest.
		9.2.8.CAP.9: Analyze how a variety of activities related to career preparation (e.g., volunteering, apprenticeships, structured learning experiences, dual
		9.2.8.CAP.10: Evaluate how careers have evolved regionally, nationally, and globally.
		9.2.8.CAP.11: Analyze potential career opportunities by considering different types of resources, including occupation databases, and state and national
		9.2.8.CAP.12: Assess personal strengths, talents, values, and interests to appropriate jobs and careers to maximize career potential.
		9.2.8.CAP.14: Evaluate sources of income and alternative resources to accurately compare employment options.
		9.2.8.CAP.15: Present how the demand for certain skills, the job market, and credentials can determine an individual's earning power.
		9.2.8.CAP.16: Research different ways workers/ employees improve their earning power through education and the acquisition of new knowledge and s
		9.2.8.CAP.17: Prepare a sample resume and cover letter as part of an application process.
		9.2.8.CAP.18: Explain how personal behavior, appearance, attitudes, and other choices may impact the job application process.
Financial and Technological Literacy		9.2.8.CAP.19: Relate academic achievement, as represented by high school diplomas, college degrees, and industry credentials, to employability and to p

Shark Tank Experience	*7th Grade Only (February, March, April, May, June)*	• *8.1.8.IC.1: Compare the trade-offs associated with computing technologies that affect individual's everyday activities and career options.* • *8.2.8.ED.1: Evaluate the function, value, and aesthetics of a technological product or system, from the perspective of the user and the producer.* • *8.2.8.ED.5: Explain the need for optimization in a design process.* • *8.2.8.ED.6: Analyze how trade-offs can impact the design of a product.* • *8.2.8.ED.7: Design a product to address a real-world problem and document the iterative design process, including decisions made as a result of specif* • *9.1.8.CP.1: Compare prices for the same goods or services.* • *9.1.8.CP.2: Analyze how spending habits affect one's ability to save.* • *9.1.8.CP.3: Explain the purpose of a credit score and credit record, the factors and impact of credit scores.* • *9.1.8.CP.4: Summarize borrower's credit report rights.* *9.1.8.CP.5: Compare the financial products and services available to borrowers relative to their credit worthiness.* *9.1.8.FI.1: Identify the factors to consider when selecting various financial service providers.* • *9.1.8.FI.2: Determine the most appropriate use of various financial* *products and services to borrow and access money for making purchases (e.g., ATM, debit cards, credit cards, check books, online/mobile banking).* • *9.1.8.FI.3: Evaluate the most appropriate financial institutions to assist* *with meeting various personal financial needs and goals.* • *9.1.8.FI.4: Analyze the interest rates and fees associated with financial products* *9.1.8.FP.6: Compare and contrast advertising messages to understand what they are trying to accomplish.* • *9.1.8.FP.7: Identify the techniques and effects of deceptive advertising.* *9.1.8.PB.7: Brainstorm techniques that will help decrease expenses including comparison shopping, negotiating, and day-to-day expense management.* *9.2.8.CAP.20: Identify the items to consider when estimating the cost of funding a business.* • *9.4.8.GCA.1: Model how to navigate cultural differences with sensitivity and respect (e.g., 1.5.8.C1a).* • *9.4.8.GCA.2: Demonstrate openness to diverse ideas and perspectives through active discussions to achieve a group goal.* *9.4.8.IML.3: Create a digital visualization that effectively communicates a data set using formatting techniques such as form, position, size, color, mover* *9.4.8.IML.4: Ask insightful questions to organize different types of data and create meaningful visualizations.* *9.4.8.IML.5: Analyze and interpret local or public data sets to summarize and effectively communicate the data.* • *9.4.8.IML.12: Use relevant tools to produce, publish, and deliver information supported with evidence for an authentic audience.* • *9.4.8.IML.13: Identify the impact of the creator on the content, production, and delivery of information (e.g., 8.2.8.ED.1).* • *9.4.8.IML.14: Analyze the role of media in delivering cultural, political, and other societal messages.* • *9.4.8.IML.15: Explain ways that individuals may experience the same media message differently.* • *9.4.8.TL.5: Compare the process and effectiveness of synchronous collaboration and asynchronous collaboration.* • *9.4.8.TL.6: Collaborate to develop and publish work that provides perspectives on a real-world problem.*