

**ALLOWAY TOWNSHIP SCHOOL - CURRICULUM PLAN**

**Grade and Subject: Technology/STEAM Grades 6-8**

**Updated: October 2022**

**Collaborators: Shari Rupertus**

**BOE Approval Date:**

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## Pacing Guide

Unit Title	Digital Citizenship/ Ethics	Timeframe (# days)	4 days
Unit Summary	<b>Students recognize the rights, responsibilities and opportunities of living, learning and working in an interconnected digital world, and they act and model in ways that are safe, legal and ethical.</b>		
Standards	8.1.8.NI.3  8.1.8.NI.4  8.2.8.EC.1	Content/Skills	Explain how network security depends on a combination of hardware, software, and practices that control access to data and systems.  Explain how new security measures have been created in response to key malware events.  Explain ethical issues that may arise from the use of new technologies.

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<b>Unit Title</b>	<b>Digital Citizenship/ Ethics</b>	<b>Timeframe (# days)</b>	<b>4 days</b>
	8.2.8.EC.2		Examine the effects of ethical and unethical practices in product design and development.
	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.

<b>Unit Title</b>	<b>Networks and Computing Systems</b>	<b>Timeframe (# days)</b>	<b>12 days</b>
<b>Unit Summary</b>	<b>Students interact with a wide variety of computing devices that collect, store, analyze and act upon information in ways that can affect human capabilities both positively and negatively. The physical components (hardware) and instructions (software) that make up a computing system communicate and process information in digital form.</b>		

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<b>Standards</b>		<b>Content/Skills</b>	
	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.

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	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.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 accessibility in the design of existing technologies
	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.

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Unit Title	Google Apps/Research	Timeframe (# days)	7 Days
<b>Unit Summary</b>	<b>Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts and make meaningful learning experiences for themselves and others.</b>		
<b>Standards</b>	8.1.8.DA.1  8.2.8.ITH.2  8.2.8.ITH.3  8.2.8.ITH.4	<b>Content/Skills</b>	Organize and transform data collected using computational tools to make it usable for a specific purpose  Compare how technologies have influenced society over time.  Evaluate the impact of sustainability on the development of a designed product or system.  Identify technologies that have been designed to reduce the negative consequences of other technologies and explain the change in impact.

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	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 in one society but not in another
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Unit Title	Coding and Robotics	Timeframe (# days)	8 Days
<b>Unit Summary</b>	<b>Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.</b>		
<b>Standards</b>	8.1.8.DA.4	<b>Content/Skills</b>	Transform data to remove errors and improve the accuracy of the data for analysis
	8.1.8.DA.5		Test, analyze, and refine computational models.
	8.1.8.DA.6		Analyze climate change computational models and propose refinements

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	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.

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	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

<b>Unit Title</b>	<b>STEAM</b>	<b>Timeframe (# days)</b>	<b>12 Days</b>
<b>Unit Summary</b>	<b>Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions. Students design for enjoyment to solve problems, extend human capabilities, satisfy needs and wants, and</b>		



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Unit Title	STEAM	Timeframe (# days)	12 Days
	<b>improve human condition. Engineering Design, a systematic approach to creating solutions to technological problems and finding ways to meet people’s needs and desires, allows for the effective and efficient development of products and systems.</b>		
<b>Standards</b>	<p>8.2.8.ED.1</p> <p>8.2.8.ED.2</p> <p>8.2.8.ED.3</p> <p>8.2.8.ED.4</p>	<b>Content/Skills</b>	<p>Evaluate the function, value, and aesthetics of a technological product or system, from the perspective of the user and the producer.</p> <p>Identify the steps in the design process that could be used to solve a problem.</p> <p>Develop a proposal for a solution to a real-world problem that includes a model (e.g., physical prototype, graphical/technical sketch).</p> <p>Investigate a malfunctioning system, identify its impact, and explain the step-by-step process used to troubleshoot,</p>

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Unit Title	STEAM	Timeframe (# days)	12 Days
	8.2.8.ED.5  8.2.8.ED.6  8.2.8.ED.7  8.2.8.ITH.1		evaluate, and test options to repair the product in a collaborative team  Explain the need for optimization in a design process.  Analyze how trade-offs can impact the design of a product.  Design a product to address a real-world problem and document the iterative design process, including decisions made as a result of specific constraints and trade-offs (e.g., annotated sketches)  Explain how the development and use of technology influences economic, political, social, and cultural issues

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Unit Title	STEAM	Timeframe (# days)	12 Days
	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.
	8.2.8.ETW.1		Illustrate how a product is upcycled into a new product and analyze the short- and

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Unit Title	STEAM	Timeframe (# days)	12 Days
	8.2.8.ETW.2		long-term benefits and costs.
	8.2.8.ETW.3		Analyze the impact of modifying resources in a product or system (e.g., materials, energy, information, time, tools, people, capital).
	8.2.8.ETW.4		Analyze the design of a product that negatively impacts the environment or society and develop possible solutions to lessen its impact.
	8.2.5.ETW.2		Compare the environmental effects of two alternative technologies devised to address climate change issues and use data to justify which choice is best
			Describe ways that various technologies are used to reduce improper use of resources.

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Unit Title	STEAM	Timeframe (# days)	12 Days
	8.2.5.ETW.3  8.2.5.ETW.4  8.2.5.ETW.5		<p>Explain why human-designed systems, products, and environments need to be constantly monitored, maintained, and improved.</p> <p>Explain the impact that resources, such as energy and materials used to develop technology, have on the environment.</p> <p>Identify the impact of a specific technology on the environment and determine what can be done to increase positive effects and to reduce any negative effects, such as climate change</p>

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## Curriculum

### Key for Indicating Compliance with Laws/Statutes

These symbols used throughout the curriculum indicate compliance with the following mandates:

@ = Amistad

\* = Holocaust

^ = LGBTQ+/Disabilities History

# = Career Education

\$ = Diversity, Equity and Inclusion

<b>Unit Title: Digital Citizenship/Ethics</b>		<b>Timeframe: 4 days</b>
<b>Unit Summary</b>	<b>Students recognize the rights, responsibilities and opportunities of living, learning and working in an interconnected digital world, and they act and model in ways that are safe, legal and ethical.</b>	
<b>Learning Targets</b>		

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<p><b>Essential Questions</b></p>	<p><b>How can I make the world a better place when I’m online?</b>  <b>How can I make sure that I am not taking and using someone else’s idea?</b>  <b>How can I keep my device safe from viruses and information safe from hackers?</b>  <b>How can I manage my digital reputation?</b></p>
<p><b>What Students Will Be Able to Do By the End of the Unit</b></p>	<ul style="list-style-type: none"> <li>-engage in positive, safe, legal and ethical behavior when using technology, including social interactions online or when using networked devices.</li> <li>-demonstrate an understanding of and respect for the rights and obligations of using and sharing intellectual property.</li> <li>-manage their personal data to maintain digital privacy and security and are aware of data-collection technology used to track their navigation online.</li> <li>-cultivate and manage their digital identity and reputation and are aware of the permanence of their actions in the digital world.</li> </ul>
<p><b>Evidence of Learning</b></p>	
<p><b>Formative Assessments (assessments for learning)</b></p>	<p>Teacher observations                  Skills mastered checkoff sheet                  Rubrics                  Exit Tickets</p>
<p><b>Summative (Assessments of learning)</b></p>	<p>Projects                  Classroom discussions</p>
<p><b>Learning Activities</b></p>	<p>My Social Media Life; Using Images Correctly; Digital Life 101; Digital Drama Unplugged; Trillion Dollar Footprint; Digital Media &amp; Your Brain; Social Media &amp; Digital Footprints; NetsmartzKids content</p>

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<b>Materials/Equipment/ Resources</b>	Internet, Computer, CommonSense Media, NetSmartzKids
<b>New Jersey Student Learning Standards</b>	
<b>Standard</b>	<b>Performance Expectation</b>
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
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.
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.
<b>Modifications and Accommodations</b>	
<p><b><i>Basic Skills, Special Education, ELL, 504, Students at Risk for Failure</i></b></p> <ul style="list-style-type: none"> <li>• Structure lessons around questions that are authentic, relate to students’ interests, social/family background and knowledge of their community.</li> <li>• Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).</li> </ul>	



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- Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences).
- Engage students with a variety of communication practices to provide students with multiple entry points and multiple ways to demonstrate their understandings.
- Structure the learning around explaining or solving a social or community-based issue.
- Provide ELL students with multiple literacy strategies.
- Additional processing time when responding to questions.
- Practice the academic language prior to answering in front of the whole group
- Incorporate effective strategies that build academic language (Turn and Talk, Think/Pair/Share and Small group activities)
- Consistently use dictionaries (picture, bilingual, English, personal) across all levels of proficiency.

*In all instances, activate and/or build background knowledge, key vocabulary and critical language structures connected to the actual tasks, activities and texts that students will need to be successful and emphasize these points throughout the lessons.*

### *Talented and Gifted Students*

- Provide opportunities for students to demonstrate skills in self-directed learning, thinking, research, and communication.
- Expose students to advanced vocabulary which is beyond grade-level.
- Allow students to demonstrate skills in self-directed learning, thinking, research, and communication.
- Utilize advanced, above grade-level texts in reading assignments.
- Have students form and participate in a Socratic Seminar or Literature Circles in groups of 6–10 students to share ideas.
- Intentionally move the cognitive process higher in response to the characteristics of the gifted/advanced learners.
- Add depth and complexity to content and tasks demands.
- Create situations in which students must generate and defend ideas.
- Develop opportunities for students to access and apply information through the generation of ideas.
- To nurture creativity, instruct students on the difference between typical responses and responses that are novel and original.
- Provide regular opportunities for students to respond creatively.

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- Allow students to search the Internet or other sources to write a summary report about a topic.

## END OF UNIT

<b>Unit Title: Computing System &amp; Networks</b>		<b>Timeframe: 12 days</b>
<b>Unit Summary</b>	<b>Students interact with a wide variety of computing devices that collect, store, analyze and act upon information in ways that can affect human capabilities both positively and negatively. The physical components (hardware) and instructions (software) that make up a computing system communicate and process information in digital form.</b>	
<b>Learning Targets</b>		
<b>Essential Questions</b>	<b>What learning environment is best for me and how can I create it? How can I use a brand new technology tool to show what I know? In what ways are all technology devices the same and different?</b>	
<b>What Students Will Be Able to Do By the End of the Unit</b>	-build networks and customize their learning environments in ways that support the learning process. -use technology to seek feedback that informs and improves their practice and to demonstrate their learning in a variety of ways. -understand the fundamental concepts of technology operations, demonstrate the ability to choose, use and troubleshoot current technologies and are able to transfer their knowledge to explore emerging technologies.	

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Evidence of Learning	
<b>Formative Assessments (assessments for learning)</b>	Teacher observations Skills mastered checkoff sheet Rubrics Exit Tickets
<b>Summative (Assessments of learning)</b>	Projects Classroom Discussions
<b>Learning Activities</b>	Makey Makey, Dissect a Computer, Teachable Machine Learning, 3D printing, robotics, Parts of the Computer escape room, File Formats, Network shopping list, Crash Course Computer Science #28-30
<b>Materials/Equipment/ Resources</b>	Internet, Computer, CommonSense Media, NetSmartzKids
New Jersey Student Learning Standards	
Standard	Performance Expectation
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.

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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.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 accessibility in the design of existing technologies
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.

## Modifications and Accommodations

### *Basic Skills, Special Education, ELL, 504, Students at Risk for Failure*

- Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.
- Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).
- Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences).

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- Engage students with a variety of communication practices to provide students with multiple entry points and multiple ways to demonstrate their understandings.
- Structure the learning around explaining or solving a social or community-based issue.
- Provide ELL students with multiple literacy strategies.
- Additional processing time when responding to questions.
- Practice the academic language prior to answering in front of the whole group
- Incorporate effective strategies that build academic language (Turn and Talk, Think/Pair/Share and Small group activities)
- Consistently use dictionaries (picture, bilingual, English, personal) across all levels of proficiency.

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- Intentionally move the cognitive process higher in response to the characteristics of the gifted/advanced learners.
- Add depth and complexity to content and tasks demands.
- Create situations in which students must generate and defend ideas.
- Develop opportunities for students to access and apply information through the generation of ideas.
- To nurture creativity, instruct students on the difference between typical responses and responses that are novel and original.
- Provide regular opportunities for students to respond creatively.
- Allow students to search the Internet or other sources to write a summary report about a topic.

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## END OF UNIT

<b>Unit Title: Google Apps &amp; Research</b>		<b>Timeframe: 7 days</b>
<b>Unit Summary</b>	<b>Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts and make meaningful learning experiences for themselves and others.</b>	
<b>Learning Targets</b>		
<b>Essential Questions</b>	<b>How can I find the information I need quickly? How do I know the information I found is good and reliable? How do I organize the information I find when I search online? What is the best digital tool to use to help me solve a problem? How does a computer function to solve problems?</b>	
<b>What Students Will Be Able to Do By the End of the Unit</b>	-plan and employ effective research strategies to locate information and other resources for their intellectual or creative pursuits. -evaluate the accuracy, perspective, credibility and relevance of information, media, data or other resources -curate information from digital resources using a variety of tools and methods to create collections of artifacts that demonstrate meaningful connections or conclusions -select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.	
<b>Evidence of Learning</b>		

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<b>Formative Assessments (assessments for learning)</b>	Teacher observations Skills mastered checkoff sheet Rubrics Exit Tickets
<b>Summative (Assessments of learning)</b>	Project Classroom Discussions
<b>Learning Activities</b>	Docs, Slides, Drawings and Sheets - data organization, charts, formatting, inserting pictures, copy and paste Guided research projects Visualizefree.com; Price comparison; Dream Car/Candy Store; Network Shopping List; Budget Calculator; Dream Room, Career Unit; Future Smart; Resume, Paycheck; check writing
<b>Materials/Equipment/ Resources</b>	Internet, Computer, Google Applications
<b>New Jersey Student Learning Standards</b>	
<b>Standard</b>	<b>Performance Expectation</b>
8.1.8.DA.1: Organize and transform data collected using computational tools to make it usable for a specific purpose	
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.	

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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 in one society but not in another

**# CAREER EDUCATION**

**21st Century Skills and Themes**

**Interdisciplinary Connections**

**Career Practices**

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, lines of credit) and compare and calculate the interest rates associated with each.

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.CP.1

Compare prices for the same goods or services.



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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.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.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.FP.1	Describe the impact of personal values on various financial scenarios.
9.1.8.FP.2	Evaluate the role of emotions, attitudes, and

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<p>9.1.8.FP.3</p> <p>9.1.8.FP.4</p> <p>9.1.8.FP.5</p> <p>9.1.8.PB.1</p> <p>9.1.8.PB.2</p> <p>9.1.8.PB.5</p>	<p>behavior (rational and irrational) in making financial decisions.</p> <p>Explain how self-regulation is important to managing money (e.g., delayed gratification, impulse buying, peer pressure, etc.).</p> <p>Analyze how familial and cultural values influence savings rates, spending, and other financial decisions.</p> <p>Determine how spending, investing, and using credit wisely contributes to financial well-being</p> <p>Predict future expenses or opportunities that should be included in the budget planning process.</p> <p>Explain how different circumstances can affect one's personal budget.</p> <p>Identify factors that affect one's goals, including peers, culture, location, and past experiences</p>
<p style="text-align: center;"><b>Modifications and Accommodations</b></p>	
<p><b><i>Basic Skills, Special Education, ELL, 504, Students at Risk for Failure</i></b></p> <ul style="list-style-type: none"><li>• Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.</li></ul>	

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- Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).
- Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences).
- Engage students with a variety of communication practices to provide students with multiple entry points and multiple ways to demonstrate their understandings.
- Structure the learning around explaining or solving a social or community-based issue.
- Provide ELL students with multiple literacy strategies.
- Additional processing time when responding to questions.
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### *Talented and Gifted Students*

- Provide opportunities for students to demonstrate skills in self-directed learning, thinking, research, and communication.
- Expose students to advanced vocabulary which is beyond grade-level.
- Allow students to demonstrate skills in self-directed learning, thinking, research, and communication.
- Utilize advanced, above grade-level texts in reading assignments.
- Have students form and participate in a Socratic Seminar or Literature Circles in groups of 6–10 students to share ideas.
- Intentionally move the cognitive process higher in response to the characteristics of the gifted/advanced learners.
- Add depth and complexity to content and tasks demands.
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- To nurture creativity, instruct students on the difference between typical responses and responses that are novel and original.
- Provide regular opportunities for students to respond creatively.
- Allow students to search the Internet or other sources to write a summary report about a topic.

## END OF UNIT

<b>Unit Title: Coding &amp; Robotics</b>		<b>Timeframe: 8 days</b>
<b>Unit Summary</b>	<b>Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.</b>	
<b>Learning Targets</b>		
<b>Essential Questions</b>	<b>How does a computer function to solve problems? How can I use technology to save myself time when I am learning something new?</b>	
<b>What Students Will Be Able to Do By the End of the Unit</b>	- understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions -formulate problem definitions suited for technology assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.	
<b>Evidence of Learning</b>		
<b>Formative Assessments (assessments for learning)</b>	Teacher observations Skills mastered checkoff sheet Rubrics	

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	Exit Tickets
<b>Summative (Assessments of learning)</b>	Projects Classroom Discussions
<b>Learning Activities</b>	Code.org, Scratch, Sphero robots
<b>Materials/Equipment/Resources</b>	Tablets, Computers, code.org, Scratch, CS First, robots, apps to code robots
<b>New Jersey Student Learning Standards</b>	
<b>Standard</b>	<b>Performance Expectation</b>
8.1.8.DA.4	Transform data to remove errors and improve the accuracy of the data for analysis.
8.1.8.DA.5	Test, analyze, and refine computational models.
8.1.8.DA.6	Analyze climate change computational models and propose refinements.
8.1.8.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.

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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.
<b>Modifications and Accommodations</b>	
<p><b><i>Basic Skills, Special Education, ELL, 504, Students at Risk for Failure</i></b></p> <ul style="list-style-type: none"><li>• Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.</li><li>• Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).</li><li>• Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences).</li><li>• Engage students with a variety of communication practices to provide students with multiple entry points and multiple ways to demonstrate their understandings.</li></ul>	

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- Structure the learning around explaining or solving a social or community-based issue.
- Provide ELL students with multiple literacy strategies.
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**END OF UNIT**

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<b>Unit Title: STEAM</b>		<b>Timeframe: 12 days</b>
<b>Unit Summary</b>	<b>Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions.</b>	
<b>Learning Targets</b>		
<b>Essential Questions</b>	<b>How do I solve problems? What steps can I take to solve a complex problem that seems to have many solutions? What do I do when I am having trouble finding the solution to a problem?</b>	
<b>What Students Will Be Able to Do By the End of the Unit</b>	-know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts, solving authentic problems. -develop, test and refine prototypes as part of a cyclical design process -exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems	
<b>Evidence of Learning</b>		
<b>Formative Assessments (assessments for learning)</b>	Teacher observations Skills mastered checkoff sheet Rubrics	
<b>Summative (Assessments of learning)</b>	Projects Classroom Discussion	



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<b>Learning Activities</b>	Green Screen, video editing, 3D printing, Technology: Past, Present & Future; Amusement Park; LittleBits; Harmless Holder challenge; One Plastic Bag; Wind Turbine; Makey Makey
<b>Materials/Equipment/Resources</b>	
<b>New Jersey Student Learning Standards</b>	
<b>Standard</b>	<b>Performance Expectation</b>
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.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 options to repair the product in a collaborative team.
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 specific constraints and trade-offs (e.g., annotated sketches)

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8.2.8.ITH.1	Explain how the development and use of technology influences economic, political, social, and cultural issues.
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.
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 choice is best.

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## Modifications and Accommodations

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