FAIRFIELD TOWNSHIP SCHOOL DISTRICT

Computer Science and Design Thinking NJSLS 2020

CURRICULUM GUIDE GRADE 4

BOARD OF EDUCATION APPROVED AUGUST, 2022

RENEE' C. RING, SUPERVISOR OF CURRICULUM AND INSTRUCTION

PURPOSE AND GOALS

The Technology Curriculum was developed and created in order for today's students to compete in tomorrow's world. Students need to create, communicate, collaborate, apply critical thinking, problem solving and decision making skills as they become good digital citizens. To accomplish this, we developed an integrated curriculum across all subject areas while providing a flexible learning environment. We must endeavor to improve and add to the resources as technology in education advances.

Technology in the 21st Century
Technology is uniquely positioned to transform learning, to foster critical thinking, creativity, and innovation, and to prepare students to thrive in the global economy. As engaged digital learners, students are able to acquire and apply content knowledge and skills through active exploration, interaction, and collaboration with others across the globe, challenging them to design the future as envisioned in the statements that follow:

Mission: Technology enables students to solve real world problems, enhance life, and extend human capability as they meet the challenges of a dynamic global society.

Goals: The systematic integration of technology across the curriculum and in the teaching and learning process fosters a population that leverages 21st century resources to:

Goal 1: Apply information-literacy skills to access, manage, and communicate information using a range of emerging technological tools.

Goal 2: Think critically and creatively to solve problems, synthesize and create new knowledge, and make informed decisions that affect individuals, the world community, and the environment.

Goal 3: Gain enhanced understanding of global interdependencies as well as multiple cultural perspectives, differing points of view, and diverse values.

Goal 4: Employ a systemic approach to understand the design process, the designed world, and the interrelationship and impact of technologies.

Goal 5: Model digital citizenship.

THE SPECIAL EDUCATION PROGRAM USES THE FOLLOWING CURRICULUM WITH APPROPRIATE MODIFICATION BEING MADE TO ADDRESS THE NEEDS OF THE INDIVIDUAL STUDENTS.

DIVERSITY AND INCLUSION

In alignment with the New Jersey Student Learning Standards (NJSLS), the technology curriculum materials will:

- Cultivate respect towards minority groups to foster appreciation of their differences as well as recognize their contributions to the advancement of science and technology.
- Evaluate experiences of people of diverse backgrounds and their unique journeys, including challenges and successes, and their significant historic contributions to the economic, political, and social development of New Jersey and the United States.
- Analyze grade-level texts highlighting the technological and scientific contributions of persons of different genders, ethnicities, and abilities.
- Apply the design thinking process to develop empathy, challenging biases, to better understand different perspectives and experiences to creatively problem-solve and innovate solutions for diverse groups of people with specific needs.
- Engage in authentic learning experiences that enable students to acquire and incorporate varied perspectives, and communicate with diverse audiences about the use and effects of computing while applying content knowledge, integrating concepts across disciplines, and developing computational thinking skills.
- Participate in an inclusive and diverse computing culture that appreciates and incorporates perspectives from people of different genders, ethnicities, and abilities.
- Understand how economic, political, social, and cultural aspects of society drive development of new technological products, processes, and systems.
- Reflect on personal experiences and the experiences of others, building empathy and promoting a climate of respect and acceptance of people with different backgrounds and abilities.

Climate
Equity and Inclusion
SEL
Holocaust
Amistad

Career Readiness, Life Literacies, and Key Skills

NJ Student Learning Standard 9: Career Readiness, Life Literacies, and Key Skills (Grades 3-5)

Content Area	**Technology**
Standard	**8.1 Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaboratively and to create and communicate knowledge.**
Strand	**A. Technology Operations and Concepts:** *Students demonstrate a sound understanding of technology concepts, systems and operations.*

Enduring Understandings:	**Essential Questions:**
Digital tools/technologies may have multiple purposes used in creating, communicating, problem solving, and entertaining, among others. Manipulating, navigating, and effectively using digital tools/technology is a developed proficiency that requires practice. Technology is used both personally and professionally to research, analyze, communicate, create, and store information.	What are digital tools? Why are digital tools (computers/apps/programs/etc.) used by people? What can one do with digital tools? How can I use technology both personally and professionally to effectively research, communicate, collaborate, create, and store information?

Grade Level	Content Statement Students will:	Indicator	Indicator	Instructional Guidance
4	Understand and use technology systems.	8.1.5.A.1	Select and use the appropriate digital tools and resources to accomplish a variety of tasks including solving problems.	**<u>Measurements of Understanding</u>** ***To show evidence of meeting this CPI, students may complete the following assessment:*** ● By the end of the year, students will be able to select and use the appropriate digital tools and resources to accomplish a variety of tasks including solving problems. ● By the end of the year, students will be able to format a document using a word processing application to enhance text and include graphics, symbols and/ or pictures. ● By the end of the year, students will be able to use a graphic organizer to organize information about a problem or issue. ● By the end of the year, students will be able to graph data using a spreadsheet, analyze and produce a report that explains the
	Select and use applications effectively and productively.	8.1.5.A.2	Format a document using a word processing application to enhance text and include graphics, symbols and/ or pictures.	
		8.1.5.A.3	Use a graphic organizer to organize information about a problem or issue.	
		8.1.5.A.4	Graph data using a spreadsheet, analyze and produce a report that explains the analysis of the data.	

		8.1.5.A.5	Create and use a database to answer basic questions.	analysis of the data. ● By the end of the year, students will be able to create and use a database to answer basic questions. ● By the end of the year, students will be able to export data from a database into a spreadsheet; analyze and produce a report that explains the analysis of the data.
		8.1.5.A.6	Export data from a database into a spreadsheet; analyze and produce a report that explains the analysis of the data.	

Domain Specific Language: Analyze, copy, database, file, field, format, insert, keyboard shortcuts, paste, query, record, spacing, spreadsheet, sort, filter, undo	**Resources:** Apps within G Suite and other age appropriate Chromebook apps Design Challenge Book List

Career Readiness, Life Literacies, and Key Skills

9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas

9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving

9.4.12.CT.4: Participate in online strategy and planning sessions for course-based, school-based, or other projects and determine the strategies that contribute to effective outcomes.

9.4.12.IML.2: Evaluate digital sources for timeliness, accuracy, perspective, credibility of the source, and relevance of information, in media, data, or other resources.

9.4.12.IML.3: Analyze data using tools and models to make valid and reliable claims, or to determine optimal design solutions

9.4.12.IML.4: Assess and critique the appropriateness and impact of existing data visualizations for an intended audience

Connection to ISTE Standards for Students:

ISTE Standard 1 - Empowered Learner - Students leverage technology to take an active role in choosing, achieving and demonstrating competency in their learning goals, informed by the learning sciences.

ISTE Standard 2 - Digital Citizen - 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.

ISTE Standard 3 - Knowledge Constructor - 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.

ISTE Standard 4 - Innovative Designer - Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions.

ISTE Standard 6 - Creative Communicator - Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.

Special Education/504/Students at Risk of Failure Modifications:

Specific collaborative groupings of students per interpersonal skills and observations.

Providing vocabulary and concept resources, diagrams and videos, among other resources to assist with understanding concepts and terms.

Teacher Assistance with hands-on activities/projects and research. Teacher modeling and/or providing (more or less) guidance during the inquiry process with specific projects.

Typing requirements are specifically scaffolded by age/grade level, ensuring an appropriate balance of online/offline work.

Assist with typing tasks, and allow for many activities to be completed through a combination of "offline" and "online" work.

Provide choice of activity, presentation, and groups among appropriate projects.

Sentence starters for student write-ups, reports, research and development and other written and verbal communication tasks.

Student copies of any notes as needed, partial outlines to complete during note-taking tasks.

If notes are needed, trading student's incomplete notes for a copy of complete notes.

Scaffolding the amount of work (decrease or increase) based on skill sets and time allocations, modified time allocations and other constraints.

Multiple check-in opportunities for students, particularly during hands-on activities, projects, and other independent work.

Adapt the amount of personal assistance for specific learners.

Adapt the extent to which learners are actively (hands-on or research) involved in tasks, and construction of models.

G&T/Enrichment Modifications:

Provide choice of activity, presentation, and groups among appropriate projects.

Scaffolding the amount of work (decrease or increase) based on skill sets and time allocations, modified time allocations and other constraints.

Modify the skill-level, problem type, and/or constraints to the projects allowing the learner to approach the work with a high degree of success.

Extend research by offering new and novel resources and texts, based on interest, choice, and Lexile Levels of students.

Apply/offer extensions to projects based on additional constraints or scenarios to projects. Offer additional opportunities for collaboration, presentation, or extension.

Offer additional opportunities for synthesis - Asking questions that encourage students to create new information from existing data.

Unplugged Activities: Shared Unplugged Programming 3-5 w standards

https://teachinglondoncomputing.org/pixel-puzzles/
https://technologyforlearners.com/wp-content/uploads/2015/03/KS1-Crazy-Character-Algorithms-Activity-PDF-Barefoot-Computing2.pdf
https://sites.google.com/sfusd.edu/k-2cs/orange/unit-1-unplugged-cs
https://code.org/curriculum/course1/1/Teacher#Vocab
https://s3.amazonaws.com/assets.flocabulary.com/pdfs/units/coding-events-activities.pdf
https://girlswhocode.com/assets/downloads/craft-prod/downloads/Girls-Who-Code-At-Home-Debug-the-Way.pdf
https://f.hubspotusercontent10.net/hubfs/5592815/At-Home%20Activities%20Assets/Offline/Code%20Break%20Unplugged/Root-Code-Break_2019-L1-Unplugged.pdf

https://www.csunplugged.org/en/

Books in our Library:
Girls Who Code
Real World Math: Coding
Kids Get Coding: Kids Get Coding: Programming Games and Animation
Kids Get Coding: Kids Get Coding: Learn to Program
Rookie Get Ready to CodeTM: Design a Game

Extend Metacognition - Asking questions which prompt students to think about their own thinking process, (successes and challenges).
Increase connections - Asking students questions that ensure the ability to apply new learning to their lives.
(Please see the last page for ESL Modifications.)

Content Area	**Technology**
Standard	**8.1 Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.**
Strand	**B. Creativity and Innovation:** *Students demonstrate creative thinking, construct knowledge and develop innovative products and process using technology.*

Enduring Understandings: Digital tools offer opportunities for new experiences and means of outreach and collaboration that support creative and innovative approaches to problem solving and product development.	**Essential Questions:** How can I use technology to solve problems and create innovate solutions? How can technology help people collaborate and communicate effectively?

Grade Level	Content Statement Students will:	Indicator	Indicator	Instructional Guidance
4	Apply existing knowledge to generate new ideas, products, or processes. Create original works as a means of personal or group expression.	8.1.5.B.1	Collaborative to produce a digital story about a significant local event or issue based on first-person interviews.	**<u>Measurements of Understanding</u>** ***To show evidence of meeting this CPI, students may complete the following assessment:*** ● By the end of the year, students will collaborate to produce a digital story about a significant local event or issue based on first-person interviews.

Domain Specific Language: Collaborate, digital story, interview, primary source, fact-check, research	**Resources:** Apps within G Suite and other age appropriate Chromebook apps Design Challenge Book List

Career Readiness, Life Literacies, and Key Skills

9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas
9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving
9.4.12.CT.4: Participate in online strategy and planning sessions for course-based, school-based, or other projects and determine the strategies that contribute to effective outcomes.
9.4.12.IML.2: Evaluate digital sources for timeliness, accuracy, perspective, credibility of the source, and relevance of information, in media, data, or other resources.
9.4.12.IML.3: Analyze data using tools and models to make valid and reliable claims, or to determine optimal design solutions
9.4.12.IML.4: Assess and critique the appropriateness and impact of existing data visualizations for an intended audience

Connection to ISTE Standards for Students:
ISTE Standard 1 - Empowered Learner - Students leverage technology to take an active role in choosing, achieving and demonstrating competency in their learning goals, informed by the learning sciences.
ISTE Standard 3 - Knowledge Constructor - 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.
ISTE Standard 4 - Innovative Designer - Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions.
ISTE Standard 6 - Creative Communicator - Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.
ISTE Standard 7 - Global Communicator - Students use digital tools to broaden their perspectives and enrich their learning by collaborating with others and working effectively in teams locally and globally.

Special Education/504/Students at Risk of Failure Modifications:
Specific collaborative groupings of students per interpersonal skills and observations.
Providing vocabulary and concept resources, diagrams and videos, among other resources to assist with understanding concepts and terms.
Teacher Assistance with hands-on activities/projects and research. Teacher modeling and/or providing (more or less) guidance during the inquiry process with specific projects.
Typing requirements are specifically scaffolded by age/grade level, ensuring an appropriate balance of online/offline work.
Assist with typing tasks, and allow for many activities to be completed through a combination of "offline" and "online" work.
Provide choice of activity, presentation, and groups among appropriate projects.
Sentence starters for student write-ups, reports, research and development and other written and verbal communication tasks.
Student copies of any notes as needed, partial outlines to complete during note-taking tasks.
If notes are needed, trading student's incomplete notes for a copy of complete notes.
Scaffolding the amount of work (decrease or increase) based on skill sets and time allocations, modified time allocations and other constraints.
Multiple check-in opportunities for students, particularly during hands-on activities, projects, and other independent work.
Adapt the amount of personal assistance for specific learners.
Adapt the extent to which learners are actively (hands-on or research) involved in tasks, and construction of models.
G&T/Enrichment Modifications:
Provide choice of activity, presentation, and groups among appropriate projects.
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Modify the skill-level, problem type, and/or constraints to the projects allowing the learner to approach the work with a high degree of success.
Extend research by offering new and novel resources and texts, based on interest, choice, and Lexile Levels of students.
Apply/offer extensions to projects based on additional constraints or scenarios to projects. Offer additional opportunities for collaboration, presentation, or extension.
Offer additional opportunities for synthesis - Asking questions that encourage students to create new information from existing data.
Extend Metacognition - Asking questions which prompt students to think about their own thinking process, (successes and challenges).
Increase connections - Asking students questions that ensure the ability to apply new learning to their lives.
(Please see the last page for ESL Modifications.)

Content Area	**Technology**
Standard	**8.1 Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.**
Strand	**C. Communication and Collaboration:** *Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.*

Enduring Understandings: A person's ability to communicate and collaborate both locally and globally is enhanced by the use of digital tools/technology.	**Essential Questions:** How can technology help people collaborate and communicate effectively? How does technology help people communicate globally?

Grade	Content Statement	Indicator	Indicator	Instructional Guidance

Level	Students will:			
4	Interact, collaborate, and publish with peers, experts, or others by employing a variety of digital environments and media. Communicate information and ideas to multiple audiences using a variety of media and formats. Develop cultural understanding and global awareness by engaging with learners of other cultures. Contribute to project teams to produce original works or solve problems.	8.1.5.C.1	Engage in online discussions with learners of other cultures to investigate a worldwide issue from multiple perspectives and sources, evaluate findings and present possible solutions, using digital tools and online resources for all steps.	**Measurements of Understanding** ***To show evidence of meeting this CPI, students may complete the following assessment:*** ● By the end of the year, students will engage in online discussions with learners of other cultures to investigate a worldwide issue from multiple perspectives and sources, evaluate findings and present possible solutions, using digital tools and online resources for all steps.
Domain Specific Language: Culture, economics, global awareness, global citizens, video/audio podcasting				**Resources:** ● Apps within G Suite and other age appropriate Chromebook apps ● Design Challenge Book List
Connection to ISTE Standards for Students: ISTE Standard 1 - Empowered Learner - Students leverage technology to take an active role in choosing, achieving and demonstrating competency in their learning goals, informed by the learning sciences. ISTE Standard 2 - Digital Citizen - 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. ISTE Standard 3 - Knowledge Constructor - 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. ISTE Standard 4 - Innovative Designer - Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions. ISTE Standard 6 - Creative Communicator - Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals. ISTE Standard 7 - Global Communicator - Students use digital tools to broaden their perspectives and enrich their learning by collaborating with others and working effectively in teams locally and globally.				
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Extend research by offering new and novel resources and texts, based on interest, choice, and Lexile Levels of students.
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Increase connections - Asking students questions that ensure the ability to apply new learning to their lives.

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Content Area	**Technology**
Standard	**8.1 Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.**
Strand	**D. Digital Citizenship:** *Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.*

Enduring Understandings:	**Essential Questions:**
Students must practice digital citizenship which includes taking responsibility for their online activities and understanding the impacts of their actions.	What is personal property and content created by an individual and how is it protected? How can I model digital citizenship? How should I engage in online/digital platforms and take responsibility for my online activities?

<table>
<tr><th>Grade Level</th><th>Content Statement Students will:</th><th>Indicator</th><th>Indicator</th><th>Instructional Guidance</th></tr>
<tr><td rowspan="4">4</td><td rowspan="2">Advocate and practice safe, legal, and responsible use of information and technology.</td><td>8.1.5.D.1</td><td>Understand the need for and use of copyrights.</td><td rowspan="4"><u>Measurement of Understanding</u>
To show evidence of meeting this CPI, students may complete the following assessment:
● By the end of the year, students will understand the need for and use of copyrights.
● By the end of the year, students will analyze the resource citations in online materials for proper use.
● By the end of the year, students will demonstrate an understanding of the need to practice cyber safety, cyber security, and cyber ethics when using technologies and social media.
● By the end of the year, students will understand digital citizenship and demonstrate an understanding of the personal consequences of inappropriate use of technology and social media.</td></tr>
<tr><td>8.1.5.D.2</td><td>Analyze the resource citations in online materials for proper use.</td></tr>
<tr><td>Demonstrate personal responsibility for lifelong learning.</td><td>8.1.5.D.3</td><td>Demonstrate an understanding of the need to practice cyber safety, cyber security, and cyber ethics when using technologies and social media.</td></tr>
<tr><td>Exhibit leadership for digital citizenship.</td><td>8.1.5.D.4</td><td>Understand digital citizenship and demonstrate an understanding of the personal consequences of inappropriate use of technology and social media.</td></tr>
<tr><td colspan="4">Domain Specific Language:
Citation, copyright, cyber ethics, digital citizenship, digital etiquette, social media</td><td>Resources:
● Apps within G Suite and other age appropriate Chromebook apps
● Design Challenge Book List</td></tr>
<tr><td colspan="5">Career Readiness, Life Literacies, and Key Skills
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9.4.12.IML.4: Assess and critique the appropriateness and impact of existing data visualizations for an intended audience
Connection to ISTE Standards for Students:
ISTE Standard 2 - Digital Citizen - 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.</td></tr>
</table>

Special Education/504/Students at Risk of Failure Modifications:

Specific collaborative groupings of students per interpersonal skills and observations.
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Scaffolding the amount of work (decrease or increase) based on skill sets and time allocations, modified time allocations and other constraints.
Multiple check-in opportunities for students, particularly during hands-on activities, projects, and other independent work.
Adapt the amount of personal assistance for specific learners.

Adapt the extent to which learners are actively (hands-on or research) involved in tasks, and construction of models.

G&T/Enrichment Modifications:

Provide choice of activity, presentation, and groups among appropriate projects.

Scaffolding the amount of work (decrease or increase) based on skill sets and time allocations, modified time allocations and other constraints.

Modify the skill-level, problem type, and/or constraints to the projects allowing the learner to approach the work with a high degree of success.

Extend research by offering new and novel resources and texts, based on interest, choice, and Lexile Levels of students.

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Strand	**E. Research and Information Fluency:** *Students apply digital tools to gather, evaluate, and use information.*

Enduring Understandings:	**Essential Questions:**
Information spreads worldwide within seconds due to technological advancements and has an immediate impact. The ability to find, evaluate and use accurate information is more important than ever in the technological age	How can I use technology to solve problems? How does technology help people make decisions? How can I find, evaluate, and use accurate digital information to make informed decisions and solve problems?

Grade Level	Content Statement Students will:	Indicator	Indicator	Instructional Guidance
4	Plan strategies to guide inquiry. Locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media. Evaluate and select information sources and digital tools based on the appropriateness for specific tasks.	8.1.5.E.1	Use digital tools to research and evaluate the accuracy of, relevance to, and appropriateness of using print and non-print electronic information sources to complete a variety of tasks.	**<u>Measurements of Understanding</u>** ***To show evidence of meeting this CPI, students may complete any of the following assessments:*** ● By the end of the year, students will use digital tools to research and evaluate the accuracy of, relevance to, and appropriateness of using print and non-print electronic information sources to complete a variety of tasks.

Domain Specific Language: Global issues, multiple perspectives, culture, print/non-print electronic information, humanity, humanitarian	**Resources:** ● Apps within G Suite and other age appropriate Chromebook apps ● Design Challenge Book List

Career Readiness, Life Literacies, and Key Skills

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Adapt the amount of personal assistance for specific learners.

Adapt the extent to which learners are actively (hands-on or research) involved in tasks, and construction of models.

G&T/Enrichment Modifications:

Provide choice of activity, presentation, and groups among appropriate projects.

Scaffolding the amount of work (decrease or increase) based on skill sets and time allocations, modified time allocations and other constraints.

Modify the skill-level, problem type, and/or constraints to the projects allowing the learner to approach the work with a high degree of success.

Extend research by offering new and novel resources and texts, based on interest, choice, and Lexile Levels of students.

Apply/offer extensions to projects based on additional constraints or scenarios to projects. Offer additional opportunities for collaboration, presentation, or extension.

Offer additional opportunities for synthesis - Asking questions that encourage students to create new information from existing data.

Extend Metacognition - Asking questions which prompt students to think about their own thinking process, (successes and challenges).
Increase connections - Asking students questions that ensure the ability to apply new learning to their lives.
(Please see the last page for ESL Modifications.)

Content Area	**Technology**
Standard	**8.1 Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.**
Strand	**F. Critical thinking, problem solving, and decision making:** *Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.*

Enduring Understandings:	**Essential Questions:**
Each of us can have a global impact in today's world, so filtering information and applying critical thinking to solve problems and make decisions is a foundational skill.	How do digital tools help people make decisions? How do digital tools/technology help manage projects?

Grade Level	**Content Statement Students will:**	**Indicator**	**Indicator**	**Instructional Guidance**
4	Identify and define authentic problems and significant questions for investigation. Plan and manage activities to develop a solution or complete a project. Collect and analyze data to identify solutions and/or make informed decisions. Use multiple processes and diverse perspectives to explore alternative solutions	8.1.5.F.1	Apply digital tools to collect, organize, and analyze data that support a scientific finding.	**<u>Measurements of Understanding</u>** ***To show evidence of meeting this CPI, students may complete any of the following assessments:*** ● By the end of the year, students will apply digital tools to collect, organize, and analyze data that support a scientific finding.

Domain Specific Language:	**Resources:**
Analyze, data, filter, line graph, sort, trend	● Apps within G Suite and other age appropriate Chromebook apps ● Design Challenge Book List ● Create a Graph

Career Readiness, Life Literacies, and Key Skills
9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas
9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving

9.4.12.CT.4: Participate in online strategy and planning sessions for course-based, school-based, or other projects and determine the strategies that contribute to effective outcomes.
9.4.12.IML.2: Evaluate digital sources for timeliness, accuracy, perspective, credibility of the source, and relevance of information, in media, data, or other resources.
9.4.12.IML.3: Analyze data using tools and models to make valid and reliable claims, or to determine optimal design solutions
9.4.12.IML.4: Assess and critique the appropriateness and impact of existing data visualizations for an intended audience

Connection to ISTE Standards for Students:

ISTE Standard 1 - Empowered Learner - Students leverage technology to take an active role in choosing, achieving and demonstrating competency in their learning goals, informed by the learning sciences.

ISTE Standard 3 - Knowledge Constructor - 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.
ISTE Standard 4 - Innovative Designer - Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions.
ISTE Standard 6 - Creative Communicator - Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.
ISTE Standard 7 - Global Communicator - Students use digital tools to broaden their perspectives and enrich their learning by collaborating with others and working effectively in teams locally and globally.

Special Education/504/Students at Risk of Failure Modifications:
Specific collaborative groupings of students per interpersonal skills and observations.
Providing vocabulary and concept resources, diagrams and videos, among other resources to assist with understanding concepts and terms.
Teacher Assistance with hands-on activities/projects and research. Teacher modeling and/or providing (more or less) guidance during the inquiry process with specific projects.
Typing requirements are specifically scaffolded by age/grade level, ensuring appropriate balance of online/offline work.
Assist with typing tasks, and allow for many activities to be completed through a combination of “offline” and “online” work.
Provide choice of activity, presentation, and groups among appropriate projects.
Sentence starters for student write-ups, reports, research and development and other written and verbal communication tasks.
Student copies of any notes as needed, partial outlines to complete during note taking tasks.
If notes are needed, trading student’s incomplete notes for a copy of complete notes.
Scaffolding the amount of work (decrease or increase) based on skill sets and time allocations, modified time allocations and other constraints.
Multiple check-in opportunities for students, particularly during hands-on activities, projects, and other independent work.
Adapt the amount of personal assistance for specific learners.
Adapt the extent to which learners are actively (hands-on or research) involved in tasks, and construction of models.

G&T/Enrichment Modifications:
Provide choice of activity, presentation, and groups among appropriate projects.
Scaffolding the amount of work (decrease or increase) based on skill sets and time allocations, modified time allocations and other constraints.
Modify the skill-level, problem type, and/or constraints to the projects allowing the learner to approach the work with a high degree of success.
Extend research by offering new and novel resources and texts, based on interest, choice, and Lexile Levels of students.
Apply/offer extensions to projects based on additional constraints or scenarios to projects. Offer additional opportunities for collaboration, presentation, or extension.
Offer additional opportunities for synthesis - Asking questions that encourage students to create new information from existing data.
Extend Metacognition - Asking questions which prompt students to think about their own thinking process, (successes and challenges).
Increase connections - Asking students questions that ensure the ability to apply new learning to their lives.

(Please see the last page for ESL Modifications.)

Content Area	Technology			
Standard	**8.2 Technology Education, Engineering, Design, and Computational Thinking - Programming:** **All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.**			
Strand	**A. The Nature of Technology: Creativity and Innovation** *Technology systems impact every aspect of the world in which we live.*			
Enduring Understandings: Digital tools/technologies are often products/systems that are designed to help people solve problems, create, communicate, and/or increase efficiency. Technology systems impact every aspect of the world in which we live.				**Essential Questions:** Why do we use technology tools? How does technology impact our world and the ways in which we live and communicate?
Grade Level	**Content Statement** **Students will be able to understand:**	**Indicator**	**Indicator**	**Instructional Guidance**
4	The characteristics and scope of technology.	8.2.5.A.1	Compare and contrast how products made in nature differ from products that are human made in how they are produced and used.	**<u>Measures of Understanding</u>** ***To show evidence of meeting this CPI, students may complete the following assessment:*** ● By the end of the year, students will compare and contrast how products made in nature differ from products that are human made in how they are produced and used. ● By the end of the year, students will investigate and present factors that influence the development and function of a product and a system. ● By the end of the year, students will investigate and present factors that influence the development and function of products and systems, e.g., resources, criteria and constraints. ● By the end of the year, students will compare and contrast how technologies have changed over time due to human needs and economic, political and/or cultural influences. ● By the end of the year, students will identify how improvement in the understanding of materials science impacts technologies.
		8.2.5.A.2	Investigate and present factors that influence the development and function of a product and a system.	
	The core concepts of technology.	8.2.5.A.3	Investigate and present factors that influence the development and function of products and systems, e.g., resources, criteria and constraints.	
	The relationships among technologies and the connections between technology and other fields of study.	8.2.5.A.4	Compare and contrast how technologies have changed over time due to human needs and economic, political and/or cultural influences.	
		8.2.5.A.5	Identify how improvement in the understanding of materials science impacts technologies.	
<u>Domain Specific Language</u> Hybrid, solar/wind power, alternative energy, materials science, technology, design, constraints, resources				**<u>Resources:</u>** ● Alternative Powered Car STEAM Challenge Lesson Plan ● Windmill/Pinwheel STEAM Challenge Lesson Plan ● Apps within G Suite and other age appropriate Chromebook apps ● Design Challenge Book List

Career Readiness, Life Literacies, and Key Skills

9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas
9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving
9.4.12.CT.4: Participate in online strategy and planning sessions for course-based, school-based, or other projects and determine the strategies that contribute to effective outcomes.
9.4.12.IML.2: Evaluate digital sources for timeliness, accuracy, perspective, credibility of the source, and relevance of information, in media, data, or other resources.
9.4.12.IML.3: Analyze data using tools and models to make valid and reliable claims, or to determine optimal design solutions
9.4.12.IML.4: Assess and critique the appropriateness and impact of existing data visualizations for an intended audience

Connection to ISTE Standards for Students:

ISTE Standard 1 - Empowered Learner - Students leverage technology to take an active role in choosing, achieving and demonstrating competency in their learning goals, informed by the learning sciences.

ISTE Standard 3 - Knowledge Constructor - 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.
ISTE Standard 4 - Innovative Designer - Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions.
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ISTE Standard 7 - Global Communicator - Students use digital tools to broaden their perspectives and enrich their learning by collaborating with others and working effectively in teams locally and globally.

Special Education/504/Students at Risk of Failure Modifications:

Specific collaborative groupings of students per interpersonal skills and observations.
Providing vocabulary and concept resources, diagrams and videos, among other resources to assist with understanding concepts and terms.
Teacher Assistance with hands-on activities/projects and research. Teacher modeling and/or providing (more or less) guidance during the inquiry process with specific projects.
Typing requirements are specifically scaffolded by age/grade level, ensuring an appropriate balance of online/offline work.
Assist with typing tasks, and allow for many activities to be completed through a combination of “offline” and “online” work.
Provide choice of activity, presentation, and groups among appropriate projects.
Sentence starters for student write-ups, reports, research and development and other written and verbal communication tasks.
Student copies of any notes as needed, partial outlines to complete during note-taking tasks.
If notes are needed, trading student’s incomplete notes for a copy of complete notes.
Scaffolding the amount of work (decrease or increase) based on skill sets and time allocations, modified time allocations and other constraints.
Multiple check-in opportunities for students, particularly during hands-on activities, projects, and other independent work.
Adapt the amount of personal assistance for specific learners.
Adapt the extent to which learners are actively (hands-on or research) involved in tasks, and construction of models.

G&T/Enrichment Modifications:

Provide choice of activity, presentation, and groups among appropriate projects.
Scaffolding the amount of work (decrease or increase) based on skill sets and time allocations, modified time allocations and other constraints.
Modify the skill-level, problem type, and/or constraints to the projects allowing the learner to approach the work with a high degree of success.

Extend research by offering new and novel resources and texts, based on interest, choice, and Lexile Levels of students.
Apply/offer extensions to projects based on additional constraints or scenarios to projects. Offer additional opportunities for collaboration, presentation, or extension.
Offer additional opportunities for synthesis - Asking questions that encourage students to create new information from existing data.
Extend Metacognition - Asking questions which prompt students to think about their own thinking process, (successes and challenges).
Increase connections - Asking students questions that ensure the ability to apply new learning to their lives.

(Please see the last page for ESL Modifications.)

Content Area	**Technology**
Standard	**8.2 Technology Education, Engineering, Design, and Computational Thinking - Programming:** **All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.**
Strand	**B. Technology and Society:** *Knowledge and understanding of human, cultural and societal values are fundamental when designing technological systems and products in the global society.*

Enduring Understandings:
Knowledge and understanding of human, cultural and societal values are fundamental when designing technology systems and products in the global society.
Technology has the ability to impact and improve the lives of individuals and societies.

Essential Questions:
Why do we use technology tools?

Grade Level	Content Statement **Students will be able to understand:**	Indicator	Indicator	Instructional Guidance
4	The cultural, social, economic and political effects of technology.	8.2.5.B.1	Examine ethical considerations in the development and production of a product through its life cycle.	**<u>Measures of Understanding</u>** ***To show evidence of meeting this CPI, students may complete the following assessment:*** ● By the end of the year, students will be able to examine ethical considerations in the development and production of a product through its life cycle. ● By the end of the year, students will be able to examine systems used for recycling and recommend simplification of the systems and share with product developers. ● By the end of the year, students will be able to investigate ways that various technologies are being developed and used to reduce improper use of resources. ● By the end of the year, students will be able to research technologies that have changed due to society's changing needs and wants. ● By the end of the year, students will be able to explain the purpose of intellectual property law. ● By the end of the year, students will be able to compare and discuss how technologies have influenced history in the past century.
	The effects of technology on the environment.	8.2.5.B.2	Examine systems used for recycling and recommend simplification of the systems and share with product developers.	
		8.2.5.B.3	Investigate ways that various technologies are being developed and used to reduce improper use of resources.	
	The role of society in the development and use of technology.	8.2.5.B.4	Research technologies that have changed due to society's changing needs and wants.	
		8.2.5.B.5	Explain the purpose of intellectual property law.	
	The influence of technology on history.	8.2.5.B.6	Compare and discuss how technologies have influenced history in the past century.	

Domain Specific Language:
Alternative energy, green technology, marketing, patent, copyright, trademark, design, systems

Resources:
- Apps within G Suite and other age appropriate Chromebook apps
- Design Challenge Book List

Career Readiness, Life Literacies, and Key Skills

9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas
9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving
9.4.12.CT.4: Participate in online strategy and planning sessions for course-based, school-based, or other projects and determine the strategies that contribute to effective outcomes.
9.4.12.IML.2: Evaluate digital sources for timeliness, accuracy, perspective, credibility of the source, and relevance of information, in media, data, or other resources.
9.4.12.IML.3: Analyze data using tools and models to make valid and reliable claims, or to determine optimal design solutions

9.4.12.IML.4: Assess and critique the appropriateness and impact of existing data visualizations for an intended audience

~~Connection to ISTE Standards for Students:~~

ISTE Standard 1 - Empowered Learner - Students leverage technology to take an active role in choosing, achieving and demonstrating competency in their learning goals, informed by the learning sciences.
ISTE Standard 3 - Knowledge Constructor - 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.
ISTE Standard 4 - Innovative Designer - Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions.
ISTE Standard 6 - Creative Communicator - Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.

Special Education/504/Students at Risk of Failure Modifications:

Specific collaborative groupings of students per interpersonal skills and observations.
Providing vocabulary and concept resources, diagrams and videos, among other resources to assist with understanding concepts and terms.
Teacher Assistance with hands-on activities/projects and research. Teacher modeling and/or providing (more or less) guidance during the inquiry process with specific projects.
Typing requirements are specifically scaffolded by age/grade level, ensuring an appropriate balance of online/offline work.
Assist with typing tasks, and allow for many activities to be completed through a combination of “offline” and “online” work.
Provide choice of activity, presentation, and groups among appropriate projects.
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If notes are needed, trading student’s incomplete notes for a copy of complete notes.
Scaffolding the amount of work (decrease or increase) based on skill sets and time allocations, modified time allocations and other constraints.
Multiple check-in opportunities for students, particularly during hands-on activities, projects, and other independent work.
Adapt the amount of personal assistance for specific learners.
Adapt the extent to which learners are actively (hands-on or research) involved in tasks, and construction of models.

G&T/Enrichment Modifications:

Provide choice of activity, presentation, and groups among appropriate projects.
Scaffolding the amount of work (decrease or increase) based on skill sets and time allocations, modified time allocations and other constraints.
Modify the skill-level, problem type, and/or constraints to the projects allowing the learner to approach the work with a high degree of success.

Extend research by offering new and novel resources and texts, based on interest, choice, and Lexile Levels of students.
Apply/offer extensions to projects based on additional constraints or scenarios to projects. Offer additional opportunities for collaboration, presentation, or extension.
Offer additional opportunities for synthesis - Asking questions that encourage students to create new information from existing data.
Extend Metacognition - Asking questions which prompt students to think about their own thinking process, (successes and challenges).
Increase connections - Asking students questions that ensure the ability to apply new learning to their lives.

(Please see the last page for ESL Modifications.)

Content Area	Technology			
Standard	**8.2 Technology Education, Engineering, Design, and Computational Thinking - Programming:** **All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.**			
Strand	**C. Design:** *The design process is a systematic approach to solving problems.*			
Enduring Understandings: The design process is a systematic approach to solving problems.				**Essential Questions:** How can one develop a solution for a problem using the design process? How can one improve a product/process through the reflection/iteration process? Why is asking questions about the world an important characteristic/component of the design process?
Grade Level	**Content Statement** **Students will be able to understand:**	**Indicator**	**Indicator**	**Instructional Guidance**
4	The attributes of design.	8.2.5.C.1	Collaborate with peers to illustrate components of a designed system.	**<u>Measures of Understanding</u>** ***To show evidence of meeting this CPI, students may complete the following assessment:*** ● By the end of the year, students will be able to collaborate with peers to illustrate components of a designed system. ● By the end of the year, students will be able to explain how specifications and limitations can be used to direct a product's development. ● By the end of the year, students will be able to research how design modifications have led to new products. ● By the end of the year, students will be able to collaborate and brainstorm with peers to solve a problem evaluating all solutions to provide the best results with supporting sketches or models. ● By the end of the year, students will be able to explain the functions of a system and subsystems. ● By the end of the year, students will be able to examine a malfunctioning tool and identify the process to troubleshoot and present options to repair the tool. ● By the end of the year, students will be able to work with peers to redesign an existing product for a different
		8.2.5.C.2	Explain how specifications and limitations can be used to direct a product's development.	
		8.2.5.C.3	Research how design modifications have led to new products.	
	The application of engineering design.	8.2.5.C.4	Collaborate and brainstorm with peers to solve a problem evaluating all solutions to provide the best results with supporting sketches or models.	
		8.2.5.C.5	Explain the functions of a system and subsystems.	
	The role of troubleshooting, research and development, invention and innovation and experimentation in problem solving.	8.2.5.C.6	Examine a malfunctioning tool and identify the process to troubleshoot and present options to repair the tool.	
		8.2.5.C.7	Work with peers to redesign an existing product for a different purpose.	

				purpose.

Domain Specific Language: System, subsystem, research and development, design, sketch, model, prototype, experiment, analyze, iterate (redesign), engineer	**Resources:** ● Apps within G Suite and other age appropriate Chromebook apps ● Design Challenge Book List

Career Readiness, Life Literacies, and Key Skills

9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas
9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving
9.4.12.CT.4: Participate in online strategy and planning sessions for course-based, school-based, or other projects and determine the strategies that contribute to effective outcomes.
9.4.12.IML.2: Evaluate digital sources for timeliness, accuracy, perspective, credibility of the source, and relevance of information, in media, data, or other resources.
9.4.12.IML.3: Analyze data using tools and models to make valid and reliable claims, or to determine optimal design solutions
9.4.12.IML.4: Assess and critique the appropriateness and impact of existing data visualizations for an intended audience

Connection to ISTE Standards for Students:
ISTE Standard 1 - Empowered Learner - Students leverage technology to take an active role in choosing, achieving and demonstrating competency in their learning goals, informed by the learning sciences.
ISTE Standard 3 - Knowledge Constructor - 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.
ISTE Standard 4 - Innovative Designer - Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions.
ISTE Standard 6 - Creative Communicator - Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.

Special Education/504/Students at Risk of Failure Modifications:

Specific collaborative groupings of students per interpersonal skills and observations.

Providing vocabulary and concept resources, diagrams and videos, among other resources to assist with understanding concepts and terms.

Teacher Assistance with hands-on activities/projects and research. Teacher modeling and/or providing (more or less) guidance during the inquiry process with specific projects.

Typing requirements are specifically scaffolded by age/grade level, ensuring appropriate balance of online/offline work.

Assist with typing tasks, and allow for many activities to be completed through a combination of "offline" and "online" work.

Provide choice of activity, presentation, and groups among appropriate projects.

Sentence starters for student write-ups, reports, research and development and other written and verbal communication tasks.

Student copies of any notes as needed, partial outlines to complete during note taking tasks.

If notes are needed, trading student's incomplete notes for a copy of complete notes.

Scaffolding the amount of work (decrease or increase) based on skill sets and time allocations, modified time allocations and other constraints.

Multiple check-in opportunities for students, particularly during hands-on activities, projects, and other independent work.

Adapt the amount of personal assistance for specific learners.

Adapt the extent to which learners are actively (hands-on or research) involved in tasks, and construction of models.

G&T/Enrichment Modifications:

Provide choice of activity, presentation, and groups among appropriate projects.

Scaffolding the amount of work (decrease or increase) based on skill sets and time allocations, modified time allocations and other constraints.

Modify the skill-level, problem type, and/or constraints to the projects allowing the learner to approach the work with a high degree of success.

Extend research by offering new and novel resources and texts, based on interest, choice, and Lexile Levels of students.

Apply/offer extensions to projects based on additional constraints or scenarios to projects. Offer additional opportunities for collaboration, presentation, or extension.

Offer additional opportunities for synthesis - Asking questions that encourage students to create new information from existing data.

Extend Metacognition - Asking questions which prompt students to think about their own thinking process, (successes and challenges).

Increase connections - Asking students questions that ensure the ability to apply new learning to their lives.
(Please see the last page for ESL Modifications.)

Content Area	**Technology**
Standard	**8.2 Technology Education, Engineering, Design, and Computational Thinking - Programming:** **All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.**
Strand	**D. Abilities for a Technological World:** *The designed world is the product of a design process that provides the means to convert resources into products and systems.*

Enduring Understandings: The designed world is the product of a design process that provides the means to convert resources into products and systems. The design process is a systematic approach to solving problems.	**Essential Questions:** How can one develop a solution for a problem using the design process? How can one improve a product/process through the reflection/iteration process? Why is asking questions about the world an important characteristic/component of the design process? How does one communicate/collaborate as a part of a team to implement the design process?

Grade Level	Content Statement Students will understand how to:	Indicator	Indicator	Instructional Guidance
4	Apply the design process.	8.2.5.D.1	Identify and collect information about a problem that can be solved by technology, generate ideas to solve the problem, and identify constraints and trade-offs to be considered.	**<u>Measures of Understanding</u>** ***To show evidence of meeting this CPI, students may complete the following assessment:*** ● By the end of the year, students will be able to identify and collect information about a problem that can be solved by technology, generate ideas to solve the problem, and identify constraints and tradeoffs to be considered. ● By the end of the year, students will be able to evaluate and test alternative solutions to a problem using the constraints and trade-offs identified in the design process to evaluate potential solutions. ● By the end of the year, students will be able to follow step by step directions to assemble a product or solve a problem.
		8.2.5.D.2	Evaluate and test alternative solutions to a problem using the constraints and trade-offs identified in the design process to evaluate potential solutions.	
	Use and maintain technological products and systems.	8.2.5.D.3	Follow step by step directions to assemble a product or solve a problem.	

		8.2.5.D.4	Explain why human-designed systems, products, and environments need to be constantly monitored, maintained, and improved.	• By the end of the year, students will be able to explain why human-designed systems, products, and environments need to be constantly monitored, maintained, and improved. • By the end of the year, students will be able to describe how resources such as material, energy, information, time, tools, people and capital are used in products or systems • By the end of the year, students will be able to explain the positive and negative effect of products and systems on humans, other species and the environment, and when the product or system should be used. • By the end of the year, students will be able to explain the impact that resources such as energy and materials used in a process to produce products or systems have on the environment.
		8.2.5.D.5	Describe how resources such as material, energy, information, time, tools, people and capital are used in products or systems.	
	Assess the impact of products and systems.	8.2.5.D.6	Explain the positive and negative effect of products and systems on humans, other species and the environment, and when the product or system should be used.	
		8.2.5.D.7	Explain the impact that resources such as energy and materials used in a process to produce products or systems have on the environment.	

Domain Specific Language

Achievement, engineer, human-designed systems/products, prototypes, manufacture, produce, alternative energy, positive/negative impacts, production, pollution, economy, energy, system, subsystem, materials science

Resources:

- Pixel Art STEAM Challenge Lesson Plan
- Apps within G Suite and other age appropriate Chromebook apps
- Design Challenge Book List

Cyber bullying:
https://www.commonsense.org/education/digital-citizenship/lesson/the-power-of-words

Tech & feelings:
https://www.commonsense.org/education/digital-citizenship/lesson/this-is-me

Climate/Responsibility:
https://www.commonsense.org/education/digital-citizenship/lesson/your-rings-of-responsibility

Minorities in technology:
https://www.readworks.org/article/Important-African-American-Figures/c46412b6-57bc-4027-90a5-d038d30ff3c2#!articleTab:content/contentSection:2

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Career Readiness, Life Literacies, and Key Skills

9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas
9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving
9.4.12.CT.4: Participate in online strategy and planning sessions for course-based, school-based, or other projects and determine the strategies that contribute to effective outcomes.
9.4.12.IML.2: Evaluate digital sources for timeliness, accuracy, perspective, credibility of the source, and relevance of information, in media, data, or other resources.
9.4.12.IML.3: Analyze data using tools and models to make valid and reliable claims, or to determine optimal design solutions
9.4.12.IML.4: Assess and critique the appropriateness and impact of existing data visualizations for an intended audience

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ISTE Standard 6 - Creative Communicator - Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.

Special Education/504/Students at Risk of Failure Modifications:
Specific collaborative groupings of students per interpersonal skills and observations.
Providing vocabulary and concept resources, diagrams and videos, among other resources to assist with understanding concepts and terms.
Teacher Assistance with hands-on activities/projects and research. Teacher modeling and/or providing (more or less) guidance during the inquiry process with specific projects.

Typing requirements are specifically scaffolded by age/grade level, ensuring appropriate balance of online/offline work.
Assist with typing tasks, and allow for many activities to be completed through a combination of "offline" and "online" work.
Provide choice of activity, presentation, and groups among appropriate projects.
Sentence starters for student write-ups, reports, research and development and other written and verbal communication tasks.
Student copies of any notes as needed, partial outlines to complete during note taking tasks.
If notes are needed, trading student's incomplete notes for a copy of complete notes.
Scaffolding the amount of work (decrease or increase) based on skill sets and time allocations, modified time allocations and other constraints.
Multiple check-in opportunities for students, particularly during hands-on activities, projects, and other independent work.
Adapt the amount of personal assistance for specific learners.
Adapt the extent to which learners are actively (hands-on or research) involved in tasks, and construction of models.

G&T/Enrichment Modifications:

Provide choice of activity, presentation, and groups among appropriate projects.
Scaffolding the amount of work (decrease or increase) based on skill sets and time allocations, modified time allocations and other constraints.
Modify the skill-level, problem type, and/or constraints to the projects allowing the learner to approach the work with a high degree of success.
Extend research by offering new and novel resources and texts, based on interest, choice, and Lexile Levels of students.
Apply/offer extensions to projects based on additional constraints or scenarios to projects. Offer additional opportunities for collaboration, presentation, or extension.
Offer additional opportunities for synthesis - Asking questions that encourage students to create new information from existing data.
Extend Metacognition - Asking questions which prompt students to think about their own thinking process, (successes and challenges).
Increase connections - Asking students questions that ensure the ability to apply new learning to their lives.

(Please see the last page for ESL Modifications.)

Content Area	**Technology**
Standard	**8.2 Technology Education, Engineering, Design, and Computational Thinking - Programming:** **All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.**
Strand	**E. Computational Thinking: Programming:** *Computational thinking builds and enhances problem solving, allowing students to move beyond using knowledge to creating knowledge.*

Enduring Understandings: Computational thinking builds and enhances problem solving, allowing students to move beyond using knowledge to creating knowledge. Computational thinking (coding/computer programming and the logic involved) is a digital tool in which all of today's Internet technology is based on.	**Essential Questions:** How can one develop a solution for a problem using the design process and computational thinking (computer programming/coding and logic)?

Grade Level	**Content Statement** **Students will be able to understand:**	**Indicator**	**Indicator**	**Instructional Guidance**

<table>
<tr><td rowspan="4">4</td><td rowspan="4">Computational thinking and computer programming as tools used in design and engineering.</td><td>8.2.5.E.1</td><td>Identify how computer programming impacts our everyday lives.</td><td rowspan="4"><u>Measures of Understanding</u>
To show evidence of meeting this CPI, students may complete the following assessment:
● By the end of the year, students will be able to identify how computer programming impacts our everyday lives.
● By the end of the year, students will be able to demonstrate an understanding of how a computer takes input of data, processes and stores the data through a series of commands, and outputs information.
● By the end of the year, students will be able to create a program using loops, events and procedures to generate specific output using a simple, visual programming language.
● By the end of the year, students will be able to use appropriate terms in conversation (e.g., algorithm, program, debug, loop, events, procedures, memory, storage, processing, software, coding, procedure, and data).</td></tr>
<tr><td>8.2.5.E.2</td><td>Demonstrate an understanding of how a computer takes input of data, processes and stores the data through a series of commands, and outputs information.</td></tr>
<tr><td>8.2.5.E.3</td><td>Using a simple, visual programming language, create a program using loops, events and procedures to generate specific output.</td></tr>
<tr><td>8.2.5.E.4</td><td>Use appropriate terms in conversation (e.g., algorithm, program, debug, loop, events, procedures, memory, storage, processing, software, coding, procedure, and data).</td></tr>
<tr><td colspan="4">Domain Specific Language:
Algorithm, computer programming, programming language, code/coding, debug, loop, event, input/output, function, action, point/click, keyboard, troubleshoot, paired-programming, Internet, the cloud, binary, conditionals, software/hardware</td><td>Resources:
● Apps within G Suite and other age appropriate Chromebook apps
● Coding Resources found in Code.org: Course 2:
○ Relay Programming, page 126
○ Bee: Debugging, page 136
○ Conditionals with Cards, page 140
○ Bee: Conditionals, page 149
○ Binary Bracelets, page 151
○ Flappy, page 165
● Design Challenge Book List</td></tr>
<tr><td colspan="5">Career Readiness, Life Literacies, and Key Skills
9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas
9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving
9.4.12.CT.4: Participate in online strategy and planning sessions for course-based, school-based, or other projects and determine the strategies that contribute to effective outcomes.
9.4.12.IML.2: Evaluate digital sources for timeliness, accuracy, perspective, credibility of the source, and relevance of information, in media, data, or other resources.
9.4.12.IML.3: Analyze data using tools and models to make valid and reliable claims, or to determine optimal design solutions
9.4.12.IML.4: Assess and critique the appropriateness and impact of existing data visualizations for an intended audience</td></tr>
</table>

Connection to ISTE Standards for Students:

ISTE Standard 3 - Knowledge Constructor - 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.

ISTE Standard 4 - Innovative Designer - Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions.

ISTE Standard 5 - Computational Thinking - Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.

ISTE Standard 6 - Creative Communicator - Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.

Special Education/504/Students at Risk of Failure Modifications:

Specific collaborative groupings of students per interpersonal skills and observations.
Providing vocabulary and concept resources, diagrams and videos, among other resources to assist with understanding concepts and terms.
Teacher Assistance with hands-on activities/projects and research. Teacher modeling and/or providing (more or less) guidance during the inquiry process with specific projects.
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(Please see the last page for ESL Modifications.)

Additional Resources

Common Sense Education Digital Literacy and Citizenship ISTE Alignment and Curriculum resource for grades 3-5 - https://www.commonsensemedia.org/sites/default/files/uploads/pdfs/iste_standards_grades_3-5_d3.pdf

Common Sense Education Instructional Resources - https://www.commonsense.org/education/scope-and-sequence

Glossary

Basic technology terms for kindergarten and grade 1: For example, digital camera, battery, screen, computer, Internet, mouse, keyboard, and printer.

Controversial issue: For example, global warming, scarcity of water, alternative energy sources, election campaigns.

Current and emerging technology resources: For example, hand-helds, GPS, online communities using wikis, blogs, vlogs, and/or Nings.

Data-collection technology: For example, probes, handheld devices, and geographic mapping systems.

Developmentally appropriate: Students' developmental levels prescribe the learning environment and activities that are used.

Digital tools for kindergarten through grade 2: For example, computers, digital cameras, software, laptops.

Digital tools for grades three through 8: For example, computers, digital cameras, flip/video cam, probing devices, software, cell phones, GPS, online communities, VOIP, and virtual conferences.

Electronic authoring tools: Software that facilitates online book development (e.g., multimedia electronic book).

Mapping tools: For example, Google earth, Yahoo maps, and Google maps.

Media-rich: Multiple forms of digital applications in one product (e.g., graphic design, word processing, and spreadsheet).

Multimedia presentation: For example, movie, podcast, vlog.

Online discussion: Online discussion is a relatively new form of communication, facilitated usually by computer networks. For example, Oracle, i-Earn, blogs, wikis.

Online learning community: An online learning community is a common place on the Internet that addresses the learning needs of its members through proactive and collaborative partnerships. Through social networking and computer-mediated communication, people work as a community to achieve a shared learning objective. For example, i-Earn, Ning, blogs, wikis, Second Life.

Operations and related applications: For example, saving a word processing file to a network drive, printing a spreadsheet.

Reverse engineer: To isolate the components of a completed system.

Shared hosted services: Refers to a web hosting service where many websites reside on one web server connected to the Internet. For example, podcasts, videos, or vlogs.

Technologies: Medical, agricultural, and related biotechnologies, energy and power technologies, information and communications technologies, transportation technologies, manufacturing technologies, and construction technologies.

Virtual environments: For example, games, simulations, websites, blogs.

Web-based publication: includes the digital publication of e-books, EPUBs, and electronic articles, and the development of digital libraries and catalogues. For example, web pages, wikis, blogs, ezines.

ESL Modifications:

This list includes the accommodations and modifications commonly used to address the needs of ELL students.

Content/Material Accommodations/Modifications Allow extra time for task completion	Organizational Accommodations Use a consistent daily routine Break down tasks into manageable units
Instructional Accommodations Frequently check for understanding Emphasize use of visual aids Simplify task directions Provide hands-on learning activities Provide modeling Assign peer buddies Modify pace of instruction to allow additional processing time Provide small group instruction Demonstrate directions and provide a model or example of completed task Emphasize multi-sensory presentation of data Allow for repetition and/or clarification of directions, as needed Directions repeated, clarified or reworded Provide multi-sensory instruction Allow wait time for processing before calling on student for response Provide visual models of completed tasks	Accommodations for Attention/Focus Seat student near front of room Preferential seating Monitor on-task performance Establish and maintain eye contact when giving oral directions Provide short breaks when refocusing is needed Refocusing and redirection Supplemental Services 1:1 Assistant Prompting, cueing and redirecting student participation Reinforcing of personal, social, behavioral and academic learning goals
Social/Behavioral Accommodations Provide opportunities for peer interactions Encourage student to self-advocate Present alternatives to negative behavior Monitor for overload, excess stimuli Maintain communication with home Provide positive reinforcement Provide consistent praise to elevate self esteem Model and role play problem solving	