

North Caldwell

Computer Science & Design Thinking

In alignment with:
2020 New Jersey Student Learning Standards -
Computer Science and Design Thinking,
and the ISTE Standards.

Rational

The attached curriculum represents the coursework to be completed in one school year for computer technology classes, grades K - 6. Each grade level class meets once a week for a forty minute period. During this time, students will be taught computer science and design thinking skills in a variety of practices. These skills will then be applied in project based learning experiences that include areas such as math, ELA, STEM, SEL, etc. The intent of this curriculum is to enrich concepts addressed in other content areas with 21st Century Skills such as communication, creativity, collaboration, and critical thinking. It is our belief that a curriculum such as this provides students for life beyond the classroom.

Each grade level will experience these standards through a variety of platforms, websites, and applications. In grades Pre-K - 3 students will be exposed to Seesaw, G-Suite for Education, Peardeck, Smart Technologies, and coding platforms such as code.org, Kodable, and Ozobots. As students progress to grades 4 - 6, they will dive deeper into G-Suite for Education, and continue to explore platforms such as Code.org, Ozobots, Canva, Flipgrid, Pixton, and a variety of other education based technologies (ever changing).

Woven into these experiences are the concepts of Digital Citizenship. In an ongoing spiral format ideas such as privacy, digital identity, cyberbullying, media balance, and more will be addressed. These skills will make our students more responsible and ethical users of technology both with their school and globally.

Program Descriptions

In grades **K - 2**, students are formally introduced to the basic features and functions of computers and demonstrate an understanding that technology enables them to communicate beyond the classroom on a variety of topics. K-2 students are also exposed to elements of the design process, design systems, data analysis, computer programming, and a variety of technology resources, while understanding the importance of safety when using technological tools.

In grades **3 - 5**, students understand the purpose of, and are able to use various computer applications. They continue to develop information literacy skills and are increasingly using technology to communicate with others in support of learning, while also recognizing the need for cyber safety and acceptable use policies. Students in grades 3-5 also investigate the impact of technology systems, understand the design process, and use it for problem solving.

In grade **6**, students expand their capacity to use operations and applications, apply information-literacy skills, and select the appropriate tools and resources to accomplish a variety of tasks, as they develop digital citizenship. As students participate in online learning communities, collaborating in the design of products that address local and global issues across the curriculum, they build the perspective of learners from across the globe.

Themes and Key Concepts Across Grade Levels

End of Grade 2	End of Grade 4	End of Grade 6
8.1 Computer Science		
<p>Computing Systems</p> <ul style="list-style-type: none"> - Turning the computer on and off - Using correct care for all technology - Using basic computer vocabulary - Introduction to mouse - Using mouse to point, click, and drag - Using mouse to pull down menus - Finding and opening programs using icons - Highlighting text - Use basic coding vocabulary - Opening and closing the network 	<p>Computing Systems</p> <ul style="list-style-type: none"> - Using correct care for all technology - Opening and closing programs - Use appropriate computer vocabulary - Highlight text in various programs - Follow screen prompts 	<p>Computing Systems</p> <ul style="list-style-type: none"> - Use appropriate computer vocabulary
<p>Creativity/Communication</p> <ul style="list-style-type: none"> - Changing fonts, colors, styles, and size - Choosing graphics and moving them - Drawing and painting with the mouse - Using draw tools to create lines, boxes, and circles - Cut, copy, paste - Creating graphs - Creating signs and cards 	<p>Design/Creation</p> <ul style="list-style-type: none"> - Changing fonts, style, colors, and sizes - Cut, copy, paste - Creating cards and signs - Changing the size of and reshaping graphics - Create charts and graphs - Create multimedia presentation 	<p>Design/Creation</p> <ul style="list-style-type: none"> - Changing the size of and reshaping graphics - Use the alignment, justification tools - Changing margin size, columns, and line spacing - Using the tab key - Cut, copy, paste - Create charts and graphs - Create multimedia presentation - Create a spreadsheet
<p>Digital Citizenship</p> <ul style="list-style-type: none"> - Create strong passwords - Understand privacy - Explain why access needs to be secure 	<p>Digital Citizenship</p> <ul style="list-style-type: none"> - Discuss internet safety - Rephrasing information from the internet - Recognizing the ethical 	<p>Digital Citizenship</p> <ul style="list-style-type: none"> - Discuss Internet Safety - Rephrasing information from the internet - Recognizing the ethical

	implication of plagiarism	implication of plagiarism - Evaluate websites for accuracy and relevance
Impacts of Coding - Understand basic coding vocabulary	Impacts of Coding - Understand basic coding vocabulary - Use basic coding concepts	Impacts of Coding - Understand basic coding vocabulary - Use basic coding concepts - Create simple coding programs
Literacy - Letter recognition - Number recognition - Primary word recognition - Writing words, sentences, and stories - Use spell check - Using the internet for information and images	Literacy - Writing sentences, reports and stories - Using spell check - Using the internet for information and images - Using the Thesaurus and Explore features	Literacy - Write sentences, stories, reports, and poems - Use spell check, thesaurus, and Explore features - Using the internet for information and images - Use keyword searches
Typing - Introduction to the home row - Using the spacebar, return key, delete key, and shift key - Practice proper keyboarding techniques for upper case letters - Demonstrate correct finger placement on the home row - Finding punctuation marks	Typing - Using the spacebar, return, delete, and shift key - Use correct spacing rules - Use correct finger positioning on home row - Use the top and bottom rows of the keyboard - Practice proper keyboarding technique for upper case letters - Use the arrow keys - Use punctuation and special symbol keys - Use correct spacing rules - Use the arrow keys - Using the alignment margins, and justification tools - Using the Tab key - Use the line spacing tool	Typing - Using keyboard skills to improve speed and accuracy. - Use shortcut commands on the keyboard - Use the arrow keys

**North Caldwell Technology Curriculum 2022
Grades K - 2**

Standard: 8.1 Computer Science (CS)														
Core Concept: Computing Systems	Scope: By the end of Grade 2						Timeline							
Core Idea	Performance Expectation						K	1	2	3	4	5	6	
Individuals use computing devices to perform a variety of tasks accurately and quickly. Computing devices interpret and follow the instructions they are given literally.	8.1.2.CS.1: Select and operate computing devices that perform a variety of tasks accurately and quickly based on user needs and preferences						I	R	M					
<p>Essential Question: How do you decide the type of computing device/technology necessary to accomplish your task accurately and quickly?</p> <p>Resources: Common Sense Education Digital Citizenship Curriculum Ed :h R: V l l S Technology Curriculum Computer Programming (Video)</p> <p>Materials: Easy access to computing devices, various media and technology opportunities, teacher modeling, video and audio reference, anchor charts, inside-a-computer-sheet.pdf/TechnologyThemeDigitalPixelArtSTEMChallengesFREEBJE-1.pdf</p> <p>Differentiation: Provide print and digital materials, material to build prior knowledge, speech to text, text to speech, preferential seating, extended time, repeated exposure to materials, kinesthetic learning opportunities, chunking material, provide visual directions, checklist/rubrics, frequent check ins, mini lesson, small groups, student choice, students can add their own audio or video to help communicate their understanding</p> <p>Enrichment: allow students to extend learning at their own pace/preferences, time for presentations with choice, various ways for students to present understanding, extension activities</p> <p>Cross-Curricular Connections: (add as we go)</p> <p>ISTE Standard: 1.1 Empowered learner, 1.5 Computational Thinker</p> <p>Computer Science and Design Thinking Practice: 3. Collaborating around computing and designing</p>														
Core Concept: Computing Systems	Scope: By the end of Grade 2						Timeline							

Core Idea	Performance Expectation	K	1	2	3	4	5	6
A computer system is composed of software and hardware.	8.1.2.CS.2: Explain functions of common software and hardware components	I	R	M				

Essential Question: Name a type of software and hardware in the tech lab, then explain their purpose and how they work.

Resources: Teacher modeling and repeated exposure, student exploration, anchor charts

[Computer Basics Booklets VIDEOS](#) -

Materials: Parts of a [Computer](#),

[Cg\[\[JO!Jlslf\]QCCf□lMa!::liog](#)

[ln\\$!2e-sl-CQn1R!Jlfl\(-heet,RQf,Techaologj\[bemeDjgils!lPixelArtSTEMhsillenge!;iFREEBIE-1,J;!Qf](#)

Desktop, Chromebooks, iPads, Printer, Mouse, grade level appropriate software

Differentiation: Provide print and digital materials, material to build prior knowledge, speech to text, text to speech, preferential seating, extended time, repeated exposure to materials, kinesthetic learning opportunities, chunking material, provide visual directions, checklist/rubrics, frequent check ins, mini lesson, small groups, student choice, students can add their own audio or video to help communicate their understanding

Enrichment: allow students to extend learning at their own pace/preferences, time for presentations with choice, various ways for students to present understanding, extension activities, conduct their own research on how computers work and/or were invented

ISTE Standard: 1.5 Computational Thinker

Computer Science and Design Thinking Practice: Recognize and define computational problems.

Core Concept: <i>Computing Systems</i>	Scope: <i>By the end of Grade 2</i>	Timeline						
Core Idea	Performance Expectation	K	1	2	3	4	5	6
Describing a problem is the first step toward finding a solution when computing systems do not work as expected	8.1.2.CS.3: Describe basic hardware and software problems	I	R	M				

Essential Question: Why might a computer not perform the way you want it to?

Resources: [YQ!.i\(QQtDI2!.!!!:lr lli□'! !:\(Qk n: Qvir:k T i::h Elxgs fQr SM1 □1li I NEA](#)
 Technolog Troubleshooting lli;is & Tricks for Kids, Little Red Hen Builds a Com12uter (Nerd Bab Children's Favorites Book 1) Kindle Edition

Materials: Troubleshooting posters such as: [!lQ!Y IQ Uli le&;hnQIQg la thg Clii!Sli\(QQ!:JJ I Tg&;b□Q!Qg T\[QYQ!;!lihQol.I□g Tigs](#)

Differentiation: Provide print and digital materials, material to build prior knowledge, speech to text, text to speech, preferential seating, extended time, repeated exposure to materials, kinesthetic learning opportunities, chunking material, provide visual directions, checklist/rubrics, frequent check-ins, mini-lesson, small groups, student choice, students can add their own audio or video to help communicate their understanding

Enrichment: allow students to extend learning at their own pace/preferences, time for presentations with choice, various ways for students to present understanding, extension activities, allow students to help and learn from each other.

ISTE Standard: 1.5 Computational Thinker

Computer Science and Design Thinking Practice: Recognize and Define Computational Problems.

Core Concept: Network and the Internet	Scope: By the end of Grade 2	Timeline						
Core Idea	Performance Expectation	K	1	2	3	4	5	6
Computer networks can be used to connect individuals to other individuals, places, information, and ideas. The internet enables individuals to connect with others worldwide.	8.1.2. NI.1: Model and describe how individuals use computers to connect to other individuals, places, and information, through a network.	I	R	M				
	8.1.2.NI.2: Describe how the Internet enables individuals to connect with others worldwide.	I	R	M				

Essential Question: How do we use computers to talk with people all over the world?

Resources: [t:12 lbi::l□t r□!;! Qrkliz | What Is lat.er□!jil? | Qc Eli□Q StlQYi | !Si!:lli l. arniag Vid!i!Q | e i::kii!QQQ !Sidi](#)
[Interoet - Kids | Britannica Kids | Homework Helg](#)
<https://brittanymashburn.com/producl/lhe-intemet-bookleV>

Materials: Desktop, Chromebook, Seesaw (Draw a model)

Differentiation: Provide print and digital materials, material to build prior knowledge, speech to text, text to speech, preferential seating, extended time, repeated exposure to materials, kinesthetic learning opportunities, chunking material, provide visual directions, checklist/rubrics, frequent check ins, mini-lesson, small groups, student choice, students can add their own audio or video to help communicate their understanding

Enrichment: allow students to extend learning at their own pace/preferences, time for presentations with choice, various ways for students to present understanding, extension activities, allow students to help and learn from each other.

ISTE Standard: 1.5 Computational Thinker

Computer Science and Design Thinking Practice: Communicate About Computing and Design

Core Concept: Network and the Internet	Scope: By the end of Grade 2	Timeline						
Core Idea	Performance Expectation	K	1	2	3	4	5	6
Connecting devices to a network or the Internet provides great benefits, but care must be taken to use authentication measures, such as strong passwords to protect devices and information from unauthorized access.	8.1.2.NI.3: Create a password that secures access to a device. Explain why it is important to create unique passwords that are not shared with others.	I	R	M				
	8.1.2.NI.3: Explain why access to devices need to be secured.							

Essential Question: How do you create a secure password? Why is it important to do so?

Resources: [Teaching Your Kids About Passwords](#)

bltr.l:rlil;;11uii;ul11□1,cQde Qcgti;;if-l e1c1;a1mii;;/2/

Materials: *Cici's Cellphone Circus* (Book), I Paper-Username-and-Password-Practice-Updated-PDF.pdf

Differentiation: Passwords are recorded by children and checked by the teacher, students can access the password for reference at any time. provide print and digital materials, material to build prior knowledge, speech to text, text to speech, preferential seating, extended time, repeated exposure to materials, kinesthetic learning opportunities, chunking material, provide visual directions, checklist/rubrics, frequent check ins, mini lesson, small groups, student choice

Enrichment: allow students to extend learning at their own pace/preferences, time for presentations with choice, various ways for students to present understanding, extension activities Provide print and digital materials, material to build prior knowledge, speech to text, text to speech, preferential seating, extended time, repeated exposure to materials, kinesthetic learning opportunities, chunking material, provide visual directions, checklist/rubrics, frequent check ins, mini lesson, small groups, student choice, students can add their own audio or video to help communicate their understanding

Enrichment: allow students to extend learning at their own pace/preferences, time for presentations with choice, various ways for students to present understanding, extension activities
ISTE Standard: 1.2 Digital Citizen

Computer Science and Design Thinking Practice: n/a

Core Concept: Impacts of Computing	Scope: By the end of Grade 2	Timeline					
Core Idea	Performance Expectation	K	2	3	4	5	6
Computing technology has positively and negatively changed the way individuals live and work. (e.g., entertainment, communication, productivity tools)	8.1.2.IC.1: Compare how individuals live and work before and after the implementation of new computing technology.		R	M			

Essential Question: How was school different before computers? What was the same?



Resources:

Materials: Collaborative Digital Venn Diagram (i.e Google Slide)

Differentiation: Provide print and digital materials, material to build prior knowledge, speech to text, text to speech, preferential seating, extended time, repeated exposure to materials, kinesthetic learning opportunities, chunking material, provide visual directions, checklist/rubrics.

frequent check-ins, mini-lesson, small groups, student choice, students can add their own audio or video to help communicate their understanding

Enrichment: allow students to extend learning at their own pace/preferences, time for presentations with choice, various ways for students to present understanding, extension activities, Students can extend the activity by picking another new computing technology and creating a venn diagram or another tech platform to display their information, predict what school technology will look like in the future.

ISTE Standard: 1.6 Creative Communicator

Computer Science and Design Thinking Practice: Collaborating Around Computing and Design

Core Concept: <i>Data Analysis</i>	Scope: <i>By the end of Grade 2</i>	Timeline						
Core Idea	Performance Expectation	K	1	2	3	4	5	6
Individuals collect, use, and display data about individuals and the world around them.	8.1.2.DA.1: Collect and present data, including climate change data, in various visual formats.,	I	R	M				

Essential Question: How can you collect data on climate change? Why is it important to present your data in a clear way?

Resources: [bll1.2:riYi bcaiJJQQcQ:1/scie ieactsystem/climatecJa gel, CllDale Cba ge for IS: id: r QLQ9fE | AMM: l Climate Change Indicators in the United States](#), [US EPA. Publications Catalog](#), [ENERGY STAR. NASA Climate Kids](#)

Materials: The Lorax, (Energy Star link above connects to activities)

Differentiation: Provide print and digital materials, material to build prior knowledge, speech to text, text to speech, preferential seating, extended time, repeated exposure to materials, kinesthetic learning opportunities, chunking material, provide visual directions, checklist/rubrics, frequent check ins, mini lesson, small groups, student choice, students can add their own audio or video to help communicate their understanding

Enrichment: allow students to extend learning at their own pace/preferences, time for presentations with choice, various ways for students to present understanding, extension activities, allow students to present data in two ways, use Google Sheets to present data digitally, provide some students with partially completed data set/graphs

ISTE Standard: 1.3 Knowledge Constructor, 1.6 Creative Communicator

Computer Science and Design Thinking Practice: Creating Computational Artifacts,

Core Concept: Data Analysis	<i>Scope: By the end of Grade 2</i>	Timeline						
Core Idea	Performance Expectation	K	1	2	3	4	5	6
Computers store data that can be retrieved later. - Data can be copied, stored in multiple locations, and retrieved.	8.1.2.DA.2: Store, copy, search, retrieve, modify, and delete data using a computer device	I	R	M				
<p>Essential Question: How do you store, search and retrieve data within your device? Why might you want to copy, modify, or delete data?</p> <p>Resources: Student friendly short cuts a Chromebook keyboard shortcuts to impress your teacher , III Chromebook-Shortcuts.pdf</p> <p>Materials: Devices for students to practice with meaningful context (Google projects, coding assignments, Seesaw, etc), teacher modeling, III ChromebookShortcutsGesturesPostersEssentialforEveryClassroom-1.pdf Keyboard Shortcuts Secret Picture Tiles</p> <p>Differentiation: Provide students with copy of shortcuts at desk, color code keyboard, allow students to research and share other shortcuts, provide print and digital materials, material to build prior knowledge, speech to text, text to speech, preferential seating, extended time, repeated exposure to materials, kinesthetic learning opportunities, chunking material, provide visual directions, checklist/rubrics, frequent check ins, mini lesson, small groups, student choice, students can add their own audio or video to help communicate their understanding</p> <p>Enrichment: allow students to extend learning at their own pace/preferences, time to present short cuts they already know, extension activities</p> <p>ISTE Standard: 1.4 Innovative Designer, 1.5 Computational Thinker</p> <p>Computer Science and Design Thinking Practice: 5. Creating Computational Artifacts, 7. Communicating About Computing and Design</p>								
Core Concept: Data Analysis	<i>Scope: By the end of Grade 2</i>	Timeline						
Core Idea	Performance Expectation	K	1	2	3	4	5	6
Data can be used to make predictions about the world.	8.1.2.DA.3: Identify and describe patterns in data visualization	I	R	M				
	8.1.2.DA.4: Make predictions based on data using charts or graphs.	I	R	M				

Essential Question: How can you use data to make predictions?

Resources: Charts and graphs used in math class (pie, bar, line, picto etc), [1st Grade Pata & Graphing - The Brown Bag Teacher](#),
 a Data! | Mini Math Movies | Scratch Garden ,

Materials: Google Forms (teacher created) to have students collect data from the room and visually see the results, rain gauge (collect rain data outside the classroom), show the results in various graphs and make predictions.

Differentiation: Provided pictures and voice in the form, use color to help identify patterns, provide print and digital materials, material to build prior knowledge, speech to text, text to speech, preferential seating, extended time, repeated exposure to materials, kinesthetic learning opportunities, chunking material, provide visual directions, checklist/rubrics, frequent check-ins, mini-lesson, small groups, student choice, students can add their own audio or video to help communicate their understanding

Enrichment: allow students to extend learning at their own pace/preferences, time for presentations with choice, various ways for students to present understanding, extension activities, students can collect their own data from classroom surveys, students can collect rain water at home with a rain [gaug,e](#) they make themselves.

ISTE Standard: 1.3 Knowledge constructor, 1.5 Computational Thinker,

Computer Science and Design Thinking Practice: 4. Develop and Use Abstractions

Core Concept: Algorithms & Programming	Scope: By the end of Grade 2	Timeline						
Core Idea	Performance Expectation	K	1	2	3	4	5	6
Individuals develop and follow directions as part of daily life. A sequence of steps can be expressed as an algorithm.	8.1.2.AP.1: Model daily processes by creating and following algorithms to complete tasks.	I	R	M				

Essential Question: How do we use algorithms in our daily life?

Resources: [Code.org Course A B C](#), [How to Explain Algorithms to Kids | CodeMonkey](#) a BBC Learning - What Is An Algorithm

Materials: I Rabbit to Carrot (1).pdf II TDSB - Using Picture books for Unplugged Coding Booklist (Seco_Pike).pdf, t:Jol!!! to Qraw a Rai;;;oon

with [an Algorithm Worksheets](#) • [JDaniel4s Mom](#). I Drawing • a • Raccoon • with • an • Algorithm • Coding • Set • 1 • pdf

Differentiation: Provide print and digital materials, material to build prior knowledge, speech to text, text to speech, preferential seating, extended time, repeated exposure to materials, kinesthetic learning opportunities, chunking material, provide picture directions (sequencing cards from ELA), checklist/rubrics, frequent check ins, mini lesson, small groups, student choice, students can add their own audio or video to help communicate their understanding

Enrichment: allow students to extend learning at their own pace/preferences, time for presentations with choice, various ways for students to present understanding, extension activities, allow students to to explain to each other, students can create their own directions, continue to further levels in Code.org

ISTE Standard: 1.3 Knowledge constructor, 1.4 Innovative Designer, 1.5 Computational Thinker, 1.6 Creative Communicator

Computer Science and Design Thinking Practice: 1. Fostering an Inclusive Computing and Design Culture, 2. Collaborating around Computing and Design, 3. Recognizing and Defining Computational Problems, 4. Developing and Using Abstractions, 5. Creating Computational Artifacts, 6. Testing and Refining Computational Artifacts, 7. Communicating About Computing and Design.

Core Concept: Algorithms & Programming	<i>Scope: By the end of Grade 2</i>	Timeline						
Core Idea	Performance Expectation	K	1	2	3	4	5	6
Real world information can be stored and manipulated in programs as data (e.g., numbers, words, colors, images).	8.1.2.AP.2: Model the way programs store and manipulate data by using numbers or other symbols to represent information	I	R	M				

Essential Question: How do programs store and change data?

Resources: [How Do You Explain a Database to a Child? \(5 & 8 Year Olds\)](#), [How to Describe a Database to a Child](#)

Materials: Box with objects that can be organized in a variety of ways, a box of numbers that can be organized in a variety of ways, EDM number cards (for students to create their own "database" on their desk).

Differentiation: Provide print and digital materials, material to build prior knowledge, speech to text, text to speech, preferential seating, extended time, repeated exposure to materials, kinesthetic learning opportunities, chunking material, provide picture directions, checklist/rubrics, frequent check ins, mini lesson, provide scaffolding for students as they organize the number on their desk, allow students to work with a partner, student choice, students can add their own audio or video to help communicate their understanding

Enrichment: allow students to extend learning at their own pace/preferences, time for presentations with choice, various ways for students to present understanding, extension activities, have students create a "database" of toys at home to share with the class, allow students to create their own data set of numbers

ISTE Standard: 1.1 Empowered Learner, 1.3 Knowledge constructor, 1.5 Computational Thinker,

Computer Science and Design Thinking Practice: 3. Recognizing and Defining Computational Problems, 4. Developing and Using Abstractions

Core Concept: Algorithms and Programming	<i>Scope: By the end of Grade 2</i>	Timeline						
Core Idea	Performance Expectation	K	1	2	3	4	5	6
Computers follow precise sequences of steps that automate tasks.	B.1.2.AP.3: Create programs with sequences and simple loops to accomplish tasks.	I	R	M				

Essential Question: Why do correct sequences and simple loops help you accomplish tasks in a program?

Resources: See Standard B.1.2.AP.1, [a Loops | Lesson 5 | Camp Coding Camp 6 Unplugged Coding Activities for Hour of Code \(Feed the Mouse\)](#)

Materials: See Standard 8.1.2.AP.1, deck of cards, mouse toy, plastic treats for mouse

Differentiation: See Standard 8.1.2.AP.1, students will create their mouse maze, work with partners, scaffolds such as right and left reminders,

ISTE Standard: See Standard B.1.2.AP.1

Computer Science and Design Thinking Practice: See Standard 8.1.2.AP.1

Core Concept: Algorithms and Programming	<i>Scope: By the end of Grade 2</i>	Timeline						
Core Idea	Performance Expectation	K	1	2	3	4	5	6
Complex tasks can be broken down into simpler instruction, some of which can be broken down even further.	8.1.2.AP.4: Break down a task into a sequence of steps.	I	R	M				

Essential Question: Why is it helpful to break a task down into a sequence of steps?

Resources: See Standard B.1.2.AP.1

Materials: See Standard 8.1.2.AP.1

Differentiation: See Standard B.1.2.AP.1, encourage students to rewatch the videos in Code.org, provide headphones, and encourage close caption

ISTE Standard: See Standard B.1.2.AP.1

Computer Science and Design Thinking Practice: See Standard 8.1.2.AP.1

Core Concept: Algorithms and Programming	<i>Scope: By the end of Grade 2</i>	Timeline						
Core Idea	Performance Expectation	K	1	2	3	4	5	6
<p>People work together to develop programs for a purpose, such as expressing ideas or addressing problems.</p> <p>The development of a program involves identifying a sequence of events, goals, and expected outcomes, and addressing errors (when necessary).</p>	8.1.2.AP.5: Describe a program's sequence of events, goals, and expected outcomes.	I	R	M				
	8.1.2.AP.6: Debug errors in an algorithm or program that includes sequences and loops?	I	R	M				

Essential Question: How would you describe your program's events, goals, and outcomes? How do you debug your program? Why is this important?

Resources: See Standard 8.1.2.AP.1, [a Brain Pop Jr. Computational Thinking](#) , [a Brain Pop Jr. Computer Programming](#)

Materials: See Standard 8.1.2.AP.1

Differentiation: See Standard 8.1.2.AP.1, Have student share their bugs and how they solved them (public speaking), and pair students up to solve problems together

ISTE Standard: See Standard 8.1.2.AP.1

Computer Science and Design Thinking Practice: See Standard 8.1.2.AP.1

8.2.2.Engineering Design

Cor: Concept: Engineering Design	Performance Expectation	Timeline						
Core Idea	Performance Expectation	K	1	2	3	4	5	6
Engineering design is a creative process for meeting human needs or wants that can result in multiple solutions.	8.2.2.ED.1: Communicate the function of a product or device.	I	R	M				
	8.2.2.ED.2: Collaborate to solve a simple problem, or illustrate how to build a product using the design process.	I	R	M				
	8.2.2.ED.3: Select and use appropriate tools and materials to build a product using the design process.	I	R	M				

Essential Question: How would you describe the function of your product? Why is collaborating with others during the design process helpful? Why is choosing the appropriate tools and materials important when designing a product?

Resources: [Design Thinking in the 1st Grade Classroom](#),

Materials: [What To Do With a Box](#) (Kindergarten), a box from home, [If I Built a School](#) (First Grade), [If I Built a Car](#) (Second Grade) reusable item from home (Green Design Project, any grade).

Differentiation: Provide print and digital materials, material to build prior knowledge, speech to text, text to speech, preferential seating, extended time, repeated exposure to materials, kinesthetic learning opportunities, chunking material, provide picture directions, checklist/rubrics, frequent check ins, mini lesson, provide scaffolding for students as they organize the number on their desk, allow students to work with a partner, student choice, students can add their own audio or video to help communicate their understanding

Enrichment: allow students to extend learning at their own pace/preferences, time for presentations with choice, various ways for students to present understanding, extension activities, design another room in the house, school or another type of transportation. 3D models can be made, and research how to make their design more environmentally friendly

ISTE Standard: 1.4 Innovative Designer, 1.5 Computational Thinker, 1.6 Creative Communicator

Computer Science and Design Thinking Practice: 1. Fostering an Inclusive Computing and Design Culture, 2. Collaborating Around Computing and Design 3. Recognizing and Defining Computational Problems 4. Developing Abstractions 5. Creating Computational Artifacts 6. Testing and Refining Computational Artifacts, 7. Communicating About Computing and Design

Core Concept: Engineering Design	<i>Scope: By the end of Grade 2</i>	Time						
Core Idea	Performance Expectation	K	1	2	3	4	5	6
Limitations (constraints) must be considered when engineering designs	8.2.2.ED.4: Identify constraints and their role in the engineering design process.	I	R	M				

Essential Question: How do constraints affect the engineering design process?

Resources Continue project from standards 8.2.2.ED.1,2,3, 25 [econd Grade STEM Challenges TQ H!;IQ Kids Thin Qr!;ativell](#)

Materials: Continue project from standards 8.2.2.ED.1,2,3

Differentiation: Continue project from standards 8.2.2.ED.1,2,3, brainstorm, ways to work around constraints

ISTE Standard: 1.4 Innovative Designer, 1.5 Computational Thinker, 1.6 Creative Communicator

Computer Science and Design Thinking Practice: 2. Collaborating Around Computing and Design 3. Recognizing and Defining Computational Problems 4. Developing Abstractions 5. Creating Computational Artifacts 6. Testing and Refining Computational Artifacts, 7. Communicating About Computing and Design

Core Concept: Interaction of Technology and Humans	<i>Scope: By the end of Grade 2</i>	Time						
Core Idea	Performance Expectation	K	1	2	3	4	5	6

Human needs and desires determine which new tools are developed	8.2.2.ITH.1: Identify products that are designed to meet human wants and needs.	I	R	M					
	8.2.2.ITH.2: Explain the purpose of a product and its value.	I	R	M					
<p>Essential Question: Why is it important to design products that meet human needs and wants? How does one of the products you have in your those meet the needs and wants of your family?</p> <p>Resources: a Economics for Kids: Needs and Wants</p> <p>Materials: Have students tie this into the project from standards 8.2.2.ED.1,2,3. What is the purpose of their creation? How does it meet human wants and needs?</p> <p>Differentiation: Provide print and digital materials, material to build prior knowledge, speech to text, text to speech, preferential seating, extended time, repeated exposure to materials, kinesthetic learning opportunities, chunking material, provide picture directions, checklist/rubrics, frequent check ins, mini lesson, allow students to work with a partner, student choice, students can add their own audio or video to help communicate their understanding, provide examples for student</p> <p>Enrichment: allow students to extend learning at their own pace/preferences, time for presentations with choice, various ways for students to present understanding, extension activities, Wants and Needs T-Chart, newspaper/circulars, scissors, glue, anchor chart, provide examples,</p> <p>ISTE Standard: 1.4 Innovative Designer, 1.5 Computational Thinker, 1.6 Creative Communicator</p> <p>Computer Science and Design Thinking Practice: 1. Fostering an Inclusive Computing and Design Culture</p>									
Core Concept: Interaction of Technology and Humans	<i>Scope: By the end of Grade 2</i>	Timeline							
Core Idea	Performance Expectation	K	1	2	3	4	5	6	
Technology has changed the way people live and work. Various tools can improve daily tasks and quality of life.	8.2.2.ITH.3: Identify how technology impacts or improves life.	I	R	M					

	8.2.2.ITH.4: Identify how various tools reduce work and improve daily tasks.	I	R	M				
	8.2.2.ITH.5: Design a solution to a problem affecting the community in a collaborative team and explain the intended impact of the solution.	I	R	M				
<p>Essential Question: How can different tools improve how we do certain tasks? Why is this considered technology? How can you use technology to fix a problem affecting our community?</p> <p>Resources: Class brainstorm, a What is Technology? , a f:::t 11111 1111 The impact of technology on our lives f:::t • ilB Example of diagram</p> <p>Materials: Collaborative digital drawing platform such as Google Draw or Seesaw to create a diagram of the type of technology they think would have a positive impact on the community</p> <p>Differentiation: Provide print and digital materials, material to build prior knowledge, speech to text, text to speech, preferential seating, extended time, repeated exposure to materials, kinesthetic learning opportunities, chunking material, provide picture directions, checklist/rubrics, frequent check ins, mini lesson, allow students to work with a partner, student choice, students can add their own audio or video to help communicate their understanding, provide examples for student</p> <p>Enrichment: allow students to extend learning at their own pace/preferences, time for presentations with choice, various ways for students to present understanding, extension activities, students can draw with paper and pencil, present and explain their solution on Flipgrid</p> <p>ISTE Standard: 1.4 Innovative Designer, 1.5 Computational Thinker, 1.6 Creative Communicator, 1.7 Global Collaborator</p> <p>Computer Science and Design Thinking Practice: 2. Collaborating Around Computing and Design 3. Recognizing and Defining Computational Problems 4. Developing Abstractions 5. Creating Computational Artifacts 6. Testing and Refining Computational Artifacts, 7. Communicating About Computing and Design</p>								
Core Concept: Nature of Technology	Scope: By the end of Grade 2	Timeline						
Core Idea	Performance Expectation	K	1	2	3	4	5	6
Innovation and the improvement of existing technology involves critical thinking.	8.2.2.NT.1: Model and explain how a product works after taking it apart, identifying the relationship of each part, and	I	R	M				

	putting it back together.								
	8.2.2.NT.2: Brainstorm how to build a product, improve a design product, fix a product that has stopped working, or solve a simple problem.	I	R	M					
<p>Essential Question: How does taking a product apart help you to understand how it works? How would you improve a product by changing the design?</p> <p>Resources: a K’NEX: If you can imagine it, you can BUILD it!</p> <p>Materials: K’nex Lever or Gear build (Assembled by the teacher ahead of time), Hover Cam to demo how the product works, Diagram of completed build to label parts and how they work, Additional diagram students could add to in order to improve the original design.</p> <p>Differentiation: Provide print and digital materials, material to build prior knowledge, speech to text, text to speech, preferential seating, extended time, repeated exposure to materials, kinesthetic learning opportunities, chunking material, provide picture directions, checklist/rubrics, frequent check ins, mini lesson, help students brainstorm way the design could be improved, allow partner work, student choice, students can add their own audio or video to help communicate their understanding, provide examples for student</p> <p>Enrichment: allow students to extend learning at their own pace/preferences, time for presentations with choice, various ways for students to present understanding, extension activities, all students to build their own design with Knex or Legos</p> <p>ISTE Standard: 1.1 Empowered Learner, 1.4 Innovative Designer, 1.5 Computational Thinker</p> <p>Computer Science and Design Thinking Practice: 1. Fostering an Inclusive Computing and Design Culture, 2. Collaborating Around Computing and Design 3. Recognizing and Defining Computational Problems 4. Developing Abstractions 5. Creating Computational Artifacts 6. Testing and Refining Computational Artifacts, 7. Communicating About Computing and Design</p>									
Core Concept: Effects of Technology on the World.	<i>Scope: By the end of Grade 2</i>	Timeline							
Core Idea	Performance Expectation	K	1	2	3	4	5	6	
The use of technology developed for the human designed world can <i>affect</i> the environment, including land, water, air, plants, and animals.	8.2.2.ETW.1: Classify products as resulting from nature or produced as a result of technology	I	R	M					

<p>Technologies that use natural resources can have negative effects on the environment, its quality, and its inhabitants.</p> <p>Reusing and recycling materials can save money while preserving natural resources and avoiding damage to the environment.</p>								
	B.2.2.ETW.2: Identify the natural resources needed to create a products	I	R	M				
	B.2.2.ETW.3: Describe or model the system used for recycling technology.	I	R	M				
	B.2.2.ETW.4: Explain how the disposal of or reusing of a product affects the local and global environment.	I	R	M				
<p>Essential Question: How can developing new technologies negatively affect the environment? Why do we need to conserve our natural resources? How can we recycle technology? Why is it important to reuse products?</p> <p>Resources: THE CHALLENGE: Green Design - Lesson Plans, https://cleanriver.com/recycling-projects-kids-schools/, Repurpose FOUR Everyday Objects, Design Squad Videos PBS KIDS, Negative Impact of Technology on the Environment Kids Go Green: Reducing Air Pollution PBS LearningMedia</p> <p>Materials: Object from around the house they can repurpose, STEM Materials, PBS Air Pollution Lesson (Link above, with video, worksheet, and procedures)</p> <p>Differentiation: Provide print and digital materials, material to build prior knowledge, speech to text, text to speech, preferential seating, extended time, repeated exposure to materials, kinesthetic learning opportunities, chunking material, provide picture directions, checklist/rubrics, frequent check ins, mini lesson, allow students to work with a partner, student choice, students can add their own audio or video to help communicate their understanding, provide examples for student</p> <p>Enrichment: allow students to extend learning at their own pace/preferences, time for presentations with choice, various ways for students to present understanding, extension activities, add on to an object from the Clean River link provided, create advertisements or packaging for their designs</p>								

ISTE Standard: 1.4 Innovative Designer, 1.5 Computational Thinker, 1.6 Creative Communicator, 1.7 Global Collaborator

Computer Science and Design Thinking Practice: 1. Fostering an Inclusive Computing and Design Culture, 5. Creating computational Artifacts, 6. Testing and Refining Computational Artifacts, 7. Communicating About Computing and Design

Core Concept: Ethics and Culture	Scope: <i>By (the emi.) of Grade 2</i>	Timeline						
Core Idea	Performance Expectation	K	1	2	3	4	5	6
The availability of technology for essential tasks varies in different parts of the world.	8.2.2.EC.1: Identify and compare technology used in different schools, communities, regions, and parts of the world.	I	R	M				

Essential Question: How are the technologies you use in your classroom different from other communities, regions, and parts of the world?

Resources: Photographs of a variety of classrooms having a varying amount of technology

Materials: Brainstorm of technology available in our school. Compare it to what might be available in different areas

Differentiation: Provide print and digital materials, material to build prior knowledge, speech to text, text to speech, preferential seating, extended time, repeated exposure to materials, kinesthetic learning opportunities, chunking material, provide picture directions, checklist/rubrics, frequent check ins, mini lesson, allow students to work with a partner, student choice, students can add their own audio or video to help communicate their understanding, provide examples for student

Enrichment: allow students to extend learning at their own pace/preferences, time for presentations with choice, various ways for students to present understanding, extension activities, distance learning opportunity

ISTE Standard: 1.7 Global Collaborator

Computer Science and Design Thinking Practice: 1. Fostering an Inclusive Computing and Design Culture 2. Collaborating Around Computing a Design

Header Row										
Section 1			Section 2				Section 3			
Row 1, Col 1-3			Row 1, Col 4-7				Row 1, Col 8	Row 1, Col 9	Row 1, Col 10	Row 1, Col 11
Row 2, Col 1-3			Row 2, Col 4-7				Row 2, Col 8	Row 2, Col 9	Row 2, Col 10	Row 2, Col 11
Summary Row										

**North Caldwell Technology Curriculum 2022
Grades 3- 5**

Standard: 8.1 Computer Science (CS)								
Core Concept: Computing Systems	<i>Scope: By the end of Grade 5</i>	Timeline						
Core Idea	Performance Expectation	K	1	2	3	4	5	6
Computing devices may be connected to other devices to form a system as a way to extend their capabilities.	B.1.5.CS.1: Model how computing devices connect to other components to form a system.				I	R	M	
<p>Essential Question: How do computing devices connect to other components to form a system?</p> <p>Resources: Computer Science and Coding - BrainPOP, Computer Basics for Kids: Parts of a Computer - CodaKid, 5 Parts of a Computer! Differgnt Main & Basi£; CQmgonents j Names & lrjfo, ht12§./lwww,khf!na siggmi'.org/comgl!,!tng/ ogg-Qrg/com12uters-and-the-Internet,</p> <p>Materials: Old computer to take apart, diagrams to identify parts, Kahoot or other gaming platform to review information</p> <p>Differentiation: Provide print and digital materials, material to build prior knowledge, speech to text, text to speech, preferential seating, extended time, repeated exposure to materials, kinesthetic learning opportunities, chunking material, provide visual directions, checklisVrubrics, frequent check ins, mini lesson, small groups, student choice, students can add their own audio or video to help communicate their understanding</p> <p>Enrichment: allow students to extend learning at their own pace/preferences, time for presentations with choice, various ways for students to present understanding, extension activities</p> <p>ISTE Standard: 1.1 Empowered Learner, 1.5 Computational Thinker</p> <p>Computer Science and Design Thinking Practice: 3. Collaborating around computing and designing</p>								
Core Concept: Computing Systems	<i>Scope: By the end of Grade 5</i>	Timeline						
Core Idea	Performance Expectation	K	1	2	3	4	5	6
Software and hardware work together as a system to accomplish tasks (e.g., sending,	8.1.5.CS.2 Model how computer software and hardware work together as a system to accomplish tasks.				I	R	M	

receiving, processing, and storing units of information)											
<p>Essential Question: How do computer hardware and software work together to accomplish tasks?</p> <p>Resources: Computers and the Internet Code.org (Hardware and Software). How computers work Hardware vs. software for kids - Scratch Garden. Inside-a-computer-sheet.pdf. Brainpop - Computers</p> <p>Materials: Quiz and printables provided in BrainPop. Students create a comic on Pixton explaining hardware works together with their favorite piece of software.</p> <p>Differentiation: Provide print and digital materials, material to build prior knowledge, speech to text, text to speech, preferential seating, extended time, repeated exposure to materials, kinesthetic learning opportunities, chunking material, provide visual directions, checklist/rubrics, frequent check-ins, mini-lesson, small groups, student choice, students can add their own audio or video to help communicate their understanding</p> <p>Enrichment: allow students to extend learning at their own pace/preferences, time for presentations with choice, various ways for students to present understanding, extension activities,</p> <p>ISTE Standard: 1.3 Knowledge Constructor, 1.4 Innovative Designer, 1.6 Creative Communicator</p> <p>Computer Science and Design Thinking Practice: 3. Recognize and define computational problems. 4. Developing and Using Abstractions, 5. Creating Computational Artifacts</p>											
Core Concept: Computing Systems		<i>Scope: By the end of Grade 5</i>			Timeline						
Core Idea		Performance Expectation			K	1	2	3	4	5	6
Shared features allow for common troubleshooting strategies that can be effective for many systems.		8.1.5.CS.3: Identify potential solutions for simple hardware and software programs using common troubleshooting strategies.						I	R	M	
<p>Essential Question: How can you use common troubleshooting strategies to identify potential solutions for hardware and software problems?</p> <p>Resources: https://curriculum.code.org/lcsd-18/unl1rt Egtech Troubleshooting 10j !;;dp!;!ZZ!!!Blog</p>											

!JQW IQ t!!!i:1 K-12 S!IJQ ots Trguglei;ilJQQt Tei;;hnQIQg Ergbl tn\$; I E .MQgi£!

Materials: U1L02 Activity Guide - The Problem Solving Process , Google Slides to create an animated book on how to problem solve tech issues

Differentiation: Provide print and digital materials, material to build prior knowledge, speech to text, text to speech, preferential seating, extended lime, repeated exposure to materials, kinesthetic learning opportunities, chunking material, provide visual directions, checklist/rubrics, frequent check-ins, mini-lesson, small groups, student choice, students can add their own audio or video to help communicate their understanding

Enrichment: allow students to extend learning at their own pace/preferences, time for presentations with choice, various ways for students to present understanding, extension activities

ISTE Standard: 1.1 Empowered Learner, 1.3 Knowledge Constructor, 1.4 Innovative Designer, 1.6 Creative Communicator

Computer Science and Design Thinking Practice: 3. Recognize and define computational problems. 4. Developing and Using Abstractions.

Core Concept: Network and the Internet	Scope: By the end of Grade 5	Timeline						
Core Idea	Performance Expectation	K	1	2	3	4	5	6
Information needs a physical or wireless path to travel to be sent and received.	8.1.5.NI.1: Develop models that successfully transmit and receive information using both wired and wireless methods				I	R	M	

Essential Question: How is building a model that transmits information using wires different from those that do not?

Resources: [Browse K-12 STEM Curriculum -TeachEngineering](#)

Materials: Provided in individual lessons listed in the link above

Differentiation: Provide print and digital materials, material to build prior knowledge, speech to text, text to speech, preferential seating, extended time, repeated exposure to materials, kinesthetic learning opportunities, chunking material, provide visual directions, checklist/rubrics, frequent check-ins, mini-lesson, small groups, student choice

Enrichment: allow students to extend learning at their own pace/preferences, time for presentations with choice, various ways for students to

present understanding, extension activities

ISTE Standard: 1.1 Empowered Learner, 1.3 Knowledge Constructor, 1.5 Computational Thinker

Computer Science and Design Thinking Practice: 2. Collaborating Around Computing and Design, 3. Recognizing and Defining Computational Problems, 7. Communicating About Computing and Design

Core Concept: Network and the Internet	<i>Scope: By the end of Grade 5</i>	Timeline						
Core Idea	Performance Expectation	K	1	2	3	4	5	6
Distinguishing between public and private information is important for safe and secure online interactions. Information can be protected using various security measures. (i.e., physical and digital)	8.1.5.NI.2: Describe physical and digital security measures for protecting sensitive personal information.				I	R	M	

Essential Question: How can you protect your personal information when you are online?

Resources: Common Sense Media, https://studio.code.org/slcourse-2022?section_id=4024419 (Digital Citizenship Lesson 1 and 2), [Internet8Y!esome, Quic Dlgiti! Clii:en!ihiC8! !.!bLilies fQr /S- Qi:it □ce L!mmlng I Common Se□□□□!;dui.i!!io□, _____](#)

a Private and Personal Information

Materials: I privacy-pursuit-activity-book-for-kids_ipc.pdf [Digital Citizenship Super Hero](#)

Differentiation: Provide print and digital materials, material to build prior knowledge, speech to text, text to speech, preferential seating, extended time, repeated exposure to materials, kinesthetic learning opportunities, chunking material, provide visual directions, checklist/rubrics, frequent check-ins, mini-lesson, small groups, student choice

Enrichment: allow students to extend learning at their own pace/preferences, time for presentations with choice, various ways for students to present understanding, extension activities

ISTE Standard: 1.2 Digital Citizen, 1.4 Innovative Designer

Computer Science and Design Thinking Practice: 1. Fostering an Inclusive Computing and Design Culture, 5. Creating Computational

Artifacts										
Core Concept: Impacts of Computing	Scope: By the end of Grade 5			Timeline						
Core Idea	Performance Expectation			K	1	2	3	4	5	6
The development and modification of computing technology is driven by an individual's needs and wants and can affect individuals differently.	8.1.5.IC.1: Identify computing technologies that have impacted how individuals live and work and describe the factors that influence changes.						I	R	M	
	8.1.5.IC.2: Identify possible ways to improve the accessibility and usability of computing technologies to address the diverse needs and wants of users.						I	R	M	
<p>Essential Question: Why are developments in computer technology driven by human wants and needs? How have some technologies impacted how we live and work? How can we make technologies available to everyone, especially those who would benefit from their advancements?</p> <p>Resources: Tl] lm12sic! of liil.bnQIQg Qn Th Wa We ill[Qrk imQ Uv . a Past and Present Technology Then and Now</p> <p>a How Technology Has Increased Human Development World101</p> <p>Materials: Smart Notepad for Brainstorm, KWL Chart, Tech Over Time Timeline, Matching past technology to what has replaced it today, What Can We Do? writing prompt</p> <p>Differentiation: Provide print and digital materials, material to build prior knowledge, speech to text, text to speech, preferential seating, extended time, repeated exposure to materials, kinesthetic learning opportunities, chunking material, provide visual directions, checklis/rubrics, frequent check-ins, mini-lesson, small groups, student choice</p> <p>Enrichment: allow students to extend learning at their own pace/preferences, time for presentations with choice, various ways for students to present understanding, extension activities, Google Sheets, Math curriculum extensions, research an antiquated technology, research school setting across the globe, distance learning, digital penpal</p> <p>ISTE Standard: 1.5 Computational Thinker, 1.7 Global Collaborator</p> <p>Computer Science and Design Thinking Practice: 1. Fostering an Inclusive Computing and Design Culture 3. Recognize and define computational problems, 4. Developing and Using Abstractions</p>										

Core Concept: Data Analysis	Scope: By the end of Grade 5	Timeline						
Core Idea	Performance Expectation	K	1	2	3	4	5	6
Data can be organized, displayed, and presented to highlight relationships.	8.1.5.DA.1: Collect, organize, and display data in order to highlight relationships or support a claim.				I	R	M	
<p>Essential Question: How can you collect, organize, and display data as evidence of a relationship or claim? Why is it important to do this?</p> <p>Resources: a Graphs BrainPOP 3-5 grade math textbook (graphing/data units), Klds + Pata 2 Activitjies to lotroduce the Fun World of Pata</p> <p>Materials: Google Forms (for student created surveys to collect data), Graph paper, small bag of candy, Google Forms, Drawing paper, Colored pencils, Google Draw</p> <p>Differentiation: Provide print and digital materials, material to build prior knowledge, speech to text, text to speech, preferential seating, extended lime, repeated exposure to materials, kinesthetic learning opportunities, chunking material, provide visual directions, checklist/rubrics, frequent check-ins, mini-lesson, small groups, student choice</p> <p>Enrichment: allow students to extend learning at their own pace/preferences, time for presentations with choice, various ways for students to present understanding, extension activities, Google Sheets, Math curriculum extensions</p> <p>ISTE Standard: 1.3 Knowledge Constructor, 1.5 Computational Thinker</p> <p>Computer Science and Design Thinking Practice: 5. Creating Computational Artifacts 7. Communicating About Computing and Design</p>								
Core Concept: Data Analysis	Scope: By the end of Grade 5	Timeline						
Core Idea	Performance Expectation	K	1	2	3	4	5	6
The type of data being stored affects the storage requirements.	8.1.5.DA.2: Compare the amount of storage space required for different types of data.				I	R	M	
<p>Essential Question: Why is it important to compare the amount of storage required for different types of data?</p> <p>Resources: I Binary Coding 1.0.pdf World BackuQDaL£: How To Teach Students About Safe Data Storage - iKee11Safe, BulletingBoard,</p>								

Materials: I Binary Coding 1.0.pdf . [Units of Data - teachComputing.Bits.Bytes](#) and [Units of Storage Flashcards | Quizlet](#)

Differentiation: Provide print and digital materials, material to build prior knowledge, speech to text, text to speech, preferential seating, extended time, repeated exposure to materials, kinesthetic learning opportunities, chunking material, provide visual directions, checklisUrubrics, frequent check-ins, mini-lesson, small groups, student choice

Enrichment: allow students to extend learning at their own pace/preferences, time for presentations with choice, various ways for students to present understanding, extension activities, Google Sheets, Math curriculum extensions

ISTE Standard: 1.1 Empowered learner, 1.2 Digital Citizen, 1.5 Computational Thinker

Computer Science and Design Thinking Practice: 3. Recognizing and Defining Computational Problems, 4. Developing and Using Abstraction

Core Concept: Data Analysis	Scope: By the end of Grade 5	Timeline						
Core Idea	Performance Expectation	K	1	2	3	4	5	6
Individuals can select, organize, and transform data into different visual representations and communicate insights gained from the data.	8.1.5.DA.3: Organize and present collected data visually to communicate insights gained from different views of the data.				I	R	M	
	8.1.5.DA.4: Organize and present climate change data visually to highlight relationships or support a claim.				I	R	M	

Essential Question: How can the way data is visually organized and presented lead to different insights or viewpoints?
How would you use a visual representation of climate change data to prove your viewpoint?

Resources: [NOAA Data In the Classroom](#). [Data Nuggets](#).

Materials: Materials Provided in links above

Differentiation: Provide print and digital materials, material to build prior knowledge, speech to text, text to speech, preferential seating, extended time, repeated exposure to materials, kinesthetic learning opportunities, chunking material, provide visual directions, checklisUrubrics, frequent check-ins, mini-lesson, small groups, student choice

Enrichment: allow students to extend learning at their own pace/preferences, time for presentations with choice, various ways for students to

present understanding, extension activities, Google Sheets, Math curriculum extensions												
ISTE Standard: 1.1 Empowered Learner, 1.3 Knowledge Constructor, 1.5 Computational Thinker, 1.7 Global Collaborator												
Computer Science and Design Thinking Practice: 3 Recognizing and Defining Computational Problems, 4. Developing and Using Abstraction												
Core Concept: Data Analysis	<i>Scope. By the end of Grade 5</i>					Timeline						
Core Idea	Performance Expectation					K	1	2	3	4	5	6
Many factors influence the accuracy of inferences and predictions.	8.1.5.0A.5: Propose cause and effect relationships, predict outcomes, or communicate ideas using data.								I	R	M	
<p>Essential Question: How do you create inferences and predictions when reviewing data?</p> <p>Resources: https://www.urban.org/data-stories (Band 1 grades 3-5)</p> <p>Materials: Use a different story for each grade level, Slideshow, and other materials provided in the link above.</p> <p>Differentiation: Provide print and digital materials, material to build prior knowledge, speech to text, text to speech, preferential seating, extended time, repeated exposure to materials, kinesthetic learning opportunities, chunking material, provide visual directions, checklist/rubrics, frequent check-ins, mini-lesson, small groups, student choice</p> <p>Enrichment: allow students to extend learning at their own pace/preferences, time for presentations with choice, various ways for students to present understanding, extension activities</p> <p>ISTE Standard: 1.1 Empowered Learner, 1.3 Knowledge Constructor, 1.5 Computational Thinker, 1.7 Global Collaborator</p> <p>Computer Science and Design Thinking Practice: 1. Fostering an Inclusive Computing and Design Culture, 3. Recognizing and Defining Computational Problems, 4. Developing and Using Abstraction</p>												
Core Concept: Algorithms & Programming	<i>Scope. By the end of Grade 5</i>					Timeline						
Core Idea	Performance Expectation					K	1	2	3	4	5	6
Different algorithms can achieve the same result.	8.1.5.AP.1: Compare and refine multiple algorithms for the								I	R	M	

Some algorithms are more appropriate for a specific use than others.	the same task and determine which is the more appropriate.							
<p>Essential Question: Why might one algorithm be more appropriate for a given task than another?</p> <p>Resources: Code.erg (Course DEF), Ozobots, Microsoft MakeCode, QCratch</p> <p>Materials: Resources Provided in Code.erg and other links mentioned above, Ozobots, markers, plain paper, unplugged activities</p> <p>Differentiation: Provide print and digital materials, material to build prior knowledge, speech to text, text to speech, preferential seating, extended time, repeated exposure to materials, kinesthetic learning opportunities, chunking material, provide visual directions, checklist/rubrics, frequent check-ins, growth mindset mini-lesson, small groups</p> <p>Enrichment: allow students to extend learning at their own pace/preferences, time for presentations with choice, various ways for students to present understanding, extension activities (Hour of Code, student (preferred coding platform)</p> <p>ISTE Standard: 1.3 Knowledge constructor, 1.4 Innovative Designer, 1.5 Computational Thinker, 1.6 Creative Communicator</p> <p>Computer Science and Design Thinking Practice: 1. Fostering an Inclusive Computing and Design Culture, 2. Collaborating around Computing and Design, 3. Recognizing and Defining Computational Problems, 4. Developing and Using Abstractions, 5. Creating Computational Artifacts, 6. Testing and Refining Computational Artifacts, 7. Communicating About Computing and Design.</p>								
Core Concept: Algorithms and Programming	Scope: <i>By the end of Grade 5</i>	Timeline						
Core Idea	Performance Expectation	K	1	2	3	4	5	6
Programming languages provide variables, which are used to store and modify data.	8.1.5.AP.2: Create programs that use clearly named variables to store and modify data.				I	R	M	
<p>Essential Question: Why is it important to use clearly named variables when creating a program to store and modify data.</p> <p>Resources: Continued from standard 8.1.5.AP.1</p> <p>Materials: Continued from standard 8.1.5.AP.1</p>								

<p>Differentiation: Continued from standard 8.1.5.AP.1</p> <p>ISTE Standard: Continued from standard 8.1.5.AP.1</p> <p>Computer Science and Design Thinking Practice: Continued from standard 8.1.5.AP.1</p>										
Core Concept: Algorithms and Programming		Scope: By the end of Grade 5			Timeline					
Core Idea	Performance Expectation			K	1	2	3	4	5	6
A variety of control structures are used to change the flow of program execution (e.g., sequences, events, loops, and conditionals)	8.1.5.AP.3: Create a program that includes sequences, events, loops, and conditionals.						I	R	M	
<p>Essential Question: How can loops and conditionals positively change the structure of your program?</p> <p>Resources: Continued from standard 8.1.5.AP.1</p> <p>Materials: Continued from standard 8.1.5.AP.1</p> <p>Differentiation: Continued from standard 8.1.5.AP.1</p> <p>ISTE Standard: Continued from standard 8.1.5.AP.1</p> <p>Computer Science and Design Thinking Practice: Continued from standard 8.1.5.AP.1</p>										
Core Concept: Algorithms and Programming		Scope: By the end of Grade 5			Timeline					
Core Idea	Performance Expectation			K	1	2	3	4	5	6
Programs can be broken down into smaller parts to facilitate their design, implementation, and review. Programs can also be created by incorporating smaller portions of programs that already exist.	8.1.5.AP.4: Break down problems into smaller, manageable sub-problems to facilitate program development.						I	R	M	

	8.1.5.AP.5: Modify, remix, or incorporate pieces of existing programs into one's own work to add additional features or create a new program.				I	R	M	
<p>Essential Question: How can you identify smaller subproblems within a larger problem in a program or algorithm? Describe how you might modify a program by incorporating your own features?</p> <p>Resources: Continued from standard 8.1.5.AP.1</p> <p>Materials: Continued from standard 8.1.5.AP.1</p> <p>Differentiation: Continued from standard 8.1.5.AP.1</p> <p>ISTE Standard: Continued from standard 8.1.5.AP.1</p> <p>Computer Science and Design Thinking Practice: Continued from standard 8.1.5.AP.1</p>								
Core Concept: Algorithms and Programming	<i>Scope: By the end of Grade 5</i>	Timeline						
Core Idea	Performance Expectation	K	1	2	3	4	5	6
Individuals develop programs using an iterative process involving design, implementation, testing, and review.	8.1.5.AP.6: Develop programs using an iterative process, implement the program design, and test the program to ensure it works as intended.				I	R	M	
<p>Essential Question: Why is it important to have perseverance and learn from your mistakes when designing a program?</p> <p>Resources: Best practices: Use of the iterative process to improve students' writing Engaging Students Through the Iterative Process Mindset in Coding</p> <p>Materials: Continued from standard 8.1.5.AP.1</p> <p>Differentiation: Continued from standard 8.1.5.AP.1</p> <p>ISTE Standard: Continued from standard 8.1.5.AP.1</p>								

Computer Science and Design Thinking Practice: Continued from standard 8.1.5.AP.1

Engineering Design

Core Concept: Engineering Design	Scope: By the end of Grade 5	Performance Expectation					
		K	1	2	3	4	5
<p>Engineering design is a systemic and creative process of communicating and collaborating to meet a design challenge</p> <p>Often several design solutions exist, each better in some way than the others.</p>	8.2.5.ED.1: Explain the functions of a system and its subsystems.				I	R	M
	8.2.5.ED.2: Collaborate with peers to collect information, brainstorm to solve a problem, and evaluate all possible solutions to provide the best results with supporting sketches.				I	R	M
	8.2.5.ED.3: Follow step-by-step directions to assemble a product or solve a problem, using appropriate tools to accomplish that task.				I	R	M

Essential Question: How do the system and its subsystems work? Why is it important to collaborate with peers when trying to solve problems? Why should you evaluate all the possible solutions, not just the ones you came up with? Why is it important to follow directions step by step when assembling a product? How do you determine which tools are appropriate to use?

Resources: Grades 3-5 Science Curriculum, [Design | bioKiNG: Lessons for the Classroom | Edutopia](#) [5 Fun Activities To Get Your Students](#)
[Stand With Design Thinking](#)

Materials: [Extreme By Design | PBS LearningMedia Engineering toE Good - Student Notebook 12 Engineering Challenges for Elementary School](#)
[Science Buddies Blog](#)

Differentiation: Provide print and digital materials, material to build prior knowledge, speech to text, text to speech, preferential seating, extended time, repeated exposure to materials, kinesthetic learning opportunities, chunking material, provide visual directions, checklist/rubrics,

frequent check-ins, sentence starters, graphic organizer for research, frequent check-ins,

Enrichment: allow students to extend learning at their own pace/preferences, time for presentations with choice, various ways for students to present understanding, extension activities, Kinex, Lego

ISTE Standard: 1.1 Empowered Learner, 1.4 Innovative Designer, 1.5 Computational thinker, 1.6 Creative Communicator, 1.7 Global Collaborator

Computer Science and Design Thinking Practice: 1. Fostering an Inclusive Computing and Design Culture, 2. Collaborating around Computing and Design, 3. Recognizing and Defining Computational Problems, 4. Developing and Using Abstractions, 5. Creating Computational Artifacts, 6. Testing and Refining Computational Artifacts, 7. Communicating About Computing and Design

Core Concept: Engineering Design	<i>Se.ope! By the en'd of Grade 5</i>	Timeline						
Core Idea	Performance Expectation	K	1	2	3	4	5	6
Engineering design requirements include desired features and limitations that need to be considered.	8.2.5.ED.4: Explain factors that influence the development and function of products and systems (e.g., resources, criteria, desired features, constraints.)				I	R	M	
	8.2.5.ED.5: Describe how specifications and limitations impact the engineering design process.				I	R	M	
	8.2.5.ED.6: Evaluate and test alternative solutions to a problem using the constraints and trade-offs identified in the design process.				I	R	M	

Essential Question: How do factors such as resources, constraints, and criteria influence the development of your design? How do specifications and limitations impact the design process? How can you use constraints and trade-offs from the design process to test alternative solutions to a problem?

Resources: Continued from 8.2.5.ED.1,2,3

Materials: Continued from 8.2.5.ED.1,2,3

Differentiation: Continued from 8.2.5.ED.1,2,3 ISTE Standard: Continued from 8.2.5.ED.1,2,3 Computer Science and Design Thinking Practice: Continued from 8.2.5.ED.1,2,3												
<i>C. Grade 5: 1.1 Empowered Learner, 1.2 Collaborative Problem Solver, 1.3 Creative Communicator, 1.4 Digital Citizen</i>			<i>Scope: By the end of Grade 5</i>			Timeline						
			Performance Expectation			K	1	2	3	4	5	6
Societal Needs and wants determine which new tools are developed to address real-world problems.			8.2.5.ITH.1: Explain how societal needs and wants to influence the development and function of a product and a system.						I	R	M	
Essential Question: How did the wants and needs of people influence the inventions of morse code, electricity, and airplanes? Why was a product you like invented?												
Resources: American Inventors for Kids Inventors Who Changed the World Kids Academy												
Materials: Reflection sheet for video, class brainstorm sheet for current products many students use												
Differentiation: Provide print and digital materials, material to build prior knowledge, speech to text, text to speech, preferential seating, extended time, repeated exposure to materials, kinesthetic learning opportunities, chunking material, provide visual directions, checklist/rubrics, frequent check-ins, sentence starters, list of suggested resources and websites, graphic organizer for research, frequent check-ins,												
Enrichment: allow students to extend learning at their own pace/preferences, time for presentations with choice, various ways for students to present understanding, extension activities												
ISTE Standard: 1.1 Empowered Learner												
Computer Science and Design Thinking Practice: 7. Communicating About Computing and Design												
Core Concept, Interaction of Technology and Humans			<i>Scope: By the end of Grade 5</i>			Timeline						

	Performance Expectation	K	1	2	3	4	5	6
A new tool may have favorable or unfavorable results as well as both positive and negative effects on society. Technology spurs new businesses and careers.	8.2.5.ITH.2: Evaluate how well a new tool has met its intended purpose and identify any shortcomings it might have.				I	R	M	
	B.2.5.ITH.3: Analyze the effectiveness of a new product or system and identify the positive and/one negative consequences resulting from its use.				I	R	M	
	B.2.5.ITH.4: Describe a technology/tool that has made the way people live easier or has led to a new business or career.				I	R	M	
<p>Essential Question: How well has the product you chose met its intended purpose? Why does it have shortcomings? How effective is this product? Why has this product made the way people live easier?</p> <p>Resources: https://www.timeforkids.com/q56/best-inventions-2021/ 15 Awesome Invention Videos for Kids From The Henry Ford's inHub</p> <p>Materials: Anchor chart, brainstorming paper, I Inventors-and-Inventions-Research-Project-y6yw42-1-2dubksj.pdf, invention research project. Google Slides or Canva to present information</p> <p>Differentiation: Provide print and digital materials, material to build prior knowledge, speech to text, text to speech, preferential seating, extended time, repeated exposure to materials, kinesthetic learning opportunities, chunking material, provide visual directions, checklist/rubrics, frequent check-ins, sentence starters, listed of suggested resources and websites, graphic organizer, frequent check-ins,</p> <p>Enrichment: allow students to extend learning at their own pace/preferences, time for presentations with choice, various ways for students to present understanding, extension activities</p> <p>ISTE Standard: 1.1 Empowered Learner 1.2 Digital Citizen 1.3 Knowledge Constructor, 1.6 Creative Communicator</p> <p>Computer Science and Design Thinking Practice: 1. Fostering an Inclusive Computing and Design Culture, 5. Creating Computational Artifacts, 6. Testing and Refining Computational Artifacts, 7. Communicating About Computing and Design</p>								
Core Concept: Nature of Technology		Scope: By the end of Grade 5			Timeline			

Core Idea	Performance Expectation	K	1	2	3	4	5	6
Technology innovation and improvement may be influenced by a variety of factors. Engineers create and modify technologies to meet people's needs and wants; scientists ask questions about the natural world.	8.2.5.NT.1: Troubleshoot a product that has stopped working and brainstorm ideas to correct the problem.				I	R	M	
	8.2.5.NT.2: Identify new technologies resulting from the demands, values, and interests of individuals, businesses, industries, and societies. (Covered with standards 8.2.5.IH.2,3,4)				I	R	M	
	8.2.5.NT.3: Redesign an existing product for a different purpose in a collaborative team.				I	R	M	
	8.2.5.NT.4: Identify how improvement in the understanding of materials science impacts technologies				I	R	M	
<p>Essential Question: Why has your product or design stopped working? How can you redesign an existing product and give it an entirely different purpose? How are new products developed from our values and interests? How does working with a team help you come up with original ideas? Why do improvements in our understanding of materials impact technologies?</p> <p>Resources: Creative Linking Lesson Plans For Teachers, Reinvent 11.e Shopping Cart Tinkercad, Helpful Designs.pdf, materials</p>								
<p>Materials: New uses for a paper clip, brainstorming sheet, design thinking planning sheet, recycled material, K'nex (gear/pulley build)</p> <p>Differentiation: Provide print and digital materials, material to build prior knowledge, speech to text, text to speech, preferential seating, extended time, repeated exposure to materials, kinesthetic learning opportunities, chunking material, provide visual directions, checklists, frequent check ins, sentence starters, list of suggested resources and websites, graphic organizer for research, frequent check ins,</p> <p>Enrichment: allow students to extend learning at their own pace/preferences, time for presentations with choice, various ways for students to present understanding, extension activities</p>								

ISTE Standard: 1.1 Empowered Learner, 1.4 Innovative Designer, 1.5 Computational Thinker

Computer Science and Design Thinking Practice: 1. Fostering an Inclusive Computing and Design Culture, 2. Collaborating around Computing and Design, 3. Recognizing and Defining Computational Problems, 4. Developing and Using Abstractions, 5. Creating Computational Artifacts, 6. Testing and Refining Computational Artifacts, 7. Communicating About Computing and Design

Core Concept: Effects of Technology on the Natural World.	<i>Scope: By the end of Grade 5</i>	Timeline						
Core Idea	Performance Expectation	K	1	2	3	4	5	6
<p>The technology developed for the human-designed world can have unintended consequences for the environment.</p> <p>Technology must be continually developed and made more efficient to reduce the need for non-renewable resources.</p>	8.2.5.ETW.1: Describe how resources such as material, energy, information, time, tools, people, and capital are used in products or systems.				I	R	M	
	8.2.5.ETW.2: Describe ways various technologies are used to reduce improper use of resources.				I	R	M	
	8.2.5.ETW.3: Explain why human-designed systems, products, and environments need to be constantly monitored, maintained, and improved.				I	R	M	
	8.2.5.ETW.4: Explain the impact that resources, such as energy and materials used to develop technology, have on the environment.				I	R	M	
	8.2.5.ETW.5: 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.				I	R	M	

Essential Question: How do we consume resources in products and systems? Why do systems, products, and environments need to be

maintained and improved? How does the use of energy to create types of technology affect our environment? How can we reduce the negative effects of technology like cars, cell phones, and video games?

Resources: Newsela, [Humans and Jlle Environment](#) - [BrainPOP. How Do Mobile Phones A/feet the Ecosystem?](#) | [Wonderopolis](#)

Materials: Make a Movie (in Brain pop), Brainstorming sheet for video guided by essential questions, [Transportation and the Environment](#) Eoecgy, Fuels and EmissionsE-SSO□-TeilchEngineering, Cilrs [From the Future](#) |er!;lsenting Youc Eco-Friendly Qesign Ideas -Activity- TeachEngineering, Green Trans12ortation for Kids Lesson Plan | Wo0! Jr. Kids Activities | Children's Publishing,

I 3-5_Science_TechnologyItsBenefitsAndNegativeEffects.pdf

Differentiation: Provide print and digital materials, material to build prior knowledge, speech to text, text to speech, preferential seating, extended time, repeated exposure to materials, kinesthetic learning opportunities, chunking material, provide visual directions, checklist/rubrics, frequent check ins

Enrichment: allow students to extend learning at their own pace/preferences, time for presentations with choice, various ways for students to present understanding, extension activities

ISTE Standard: 1.1 Empowered Learner, 1.2 Digital Citizen, 1.4 Innovative Designer, 1.5 Computational thinkers, 1.6 Creative Communicator,

Computer Science and Design Thinking Practice: 1. Fostering an Inclusive Computing and Design Culture, 2. Collaborating around Computing and Design, 3. Recognizing and Defining Computational Problems, 4. Developing and Using Abstractions, 5. Creating Computational Artifacts, 6. Testing and Refining Computational Artifacts, 7. Communicating About Computing and Design

Core Concept: Ethics and Culture	Scope: By the end of Grade 5	Timeline						
Core Idea	Performance Expectation	K	1	2	3	4	5	6
Technological choices and opportunities vary due to factors such as differences in economic resources, location, and cultural values.	8.2.5.EC.1: Analyze how technology has contributed to or reduced inequities in local and global communities and determine its short- and long-term effects.				I	R	M	

Essential Question: How has technology both helped and hurt communities across the globe? Why are there both short-term and long-term effects?

Resources: Newsela, BrainPop, [Technology and Ine;11,ialities, ll1cteen I;;d Qolim](#) - [Qigital Dlyidli.!](#) (brought down to 5th grade level),

Materials: Internet for research, discussion questions within groups based on essential questions, large white paper to write/draw thoughts and answers to questions

Differentiation: Provide print and digital materials, material to build prior knowledge, speech to text, text to speech, preferential seating, extended time, repeated exposure to materials, kinesthetic learning opportunities, chunking material, provide visual directions, checklist/rubrics, frequent check-ins

Enrichment: allow students to extend learning at their own pace/preferences, time for presentations with choice, various ways for students to present understanding, extension activities

ISTE Standard: 1.1 Empowered Learner 1.2 Digital Citizen 1.3 Knowledge Constructor, 1.6 Creative Communicator

Computer Science and Design Thinking Practice: 1. Fostering an Inclusive Computing and Design Culture, 2. Collaborating around Computing and Design, 3. Recognizing and Defining Computational Problems, 7. Communicating About Computing and Design

North Caldwell Technology Curriculum 2022
Grades 6

Standard: 8.1 Computer Science (CS)								
Core Concept: Computing Systems	<i>Scope: By the end of Grade 8</i>	Timeline						
Core Idea	Performance Expectation	K	1	2	3	4	5	6
The study of human computer interaction can improve the design of devices and extend the ability of humans.	8.1.8.CS.1: Recommend improvements to computing devices in order to improve the ways users interact with the devices.							I
<p>Essential Question: How can you improve computing devices to help users interact with them?</p> <p>Resources: CommJter Basil,s; Using Acc§ssibilit F alures,</p> <p>Materials: Observation sheet, Group brainstorm sheet, Digital Proposal (Google Slide/Draw, Canva)</p> <p>Differentiation: Provide print and digital materials, material to build prior knowledge, speech to text, text to speech, preferential seating, extended time, repeated exposure to materials, kinesthetic learning opportunities, chunking material, provide visual directions, checklisUrubrics, frequent check ins, mini lesson, small groups, student choice, students can add their own audio or video to help communicate their understanding</p> <p>Enrichment: allow students to extend learning at their own pace/preferences, time for presentations with choice, various ways for students to present understanding, extension activities (Build a model, design a website, create a proposal to investor, create an Instagram Ad</p> <p>ISTE Standard: 1.4 Innovative Designer, 1.5 Computational Thinker, 1.7 Global Collaborator</p> <p>Computer Science and Design Thinking Practice: 1. Fostering an Inclusive Computing and Design Culture</p>								
Core Concept: Computing Systems	<i>Scope: By the end of Grade B</i>	Timeline						
Core Idea	Performance Expectation	K	1	2	3	4	5	6
Software and hardware determine a computing systems capability to store and process	8.1.8.CS.2: Design a system that combines hardware and software components to process data.							I

information. The design or selection of a computing system involves multiple considerations and potential trade-offs.									
	8.1.8.CS.3: Justify design decisions and explain potential system trade-offs.								I
<p>Essential Question: How do hardware and software components work together to process data? Why were certain design decisions made and how did they affect the overall system?</p> <p>Resources: a How Computers Work: Hardware and Software Eil CS Discoveries Curriculum Guide 2021 - 2022 (Unit 5 Data and Society)</p> <p>Materials: Materials with in Code.org, Google Forms, Google Sheets</p> <p>Differentiation: Provide print and digital materials, material to build prior knowledge, speech to text, text to speech, preferential seating, extended time, repeated exposure to materials, kinesthetic learning opportunities, chunking material, provide visual directions, checklist/rubrics, frequent check ins, mini lesson, small groups, student choice, students can add their own audio or video to help communicate their understanding</p> <p>Enrichment: allow students to extend learning at their own pace/preferences, time for presentations with choice, various ways for students to present understanding, extension activities</p> <p>ISTE Standard: 1.3 Knowledge Constructor, 1.5 Computational Thinker, 1.6 Creative Communicator</p> <p>Computer Science and Design Thinking Practice: 3. Recognizing and Defining Computational Problems, Developing and Using Abstractions, Creating Computational Artifacts, 6. Testing and Refining Computational Artifacts</p>									
Core Concept: Computing Systems	<i>Scope: By the end of Grade B</i>	Timeline							
Core Idea	Performance Expectation	K	1	2	3	4	5	6	
Troubleshooting a problem is more effective when knowledge of the specific device along with a systematic process is used to identify the source of a problem.	8.1.8.CS4: Systematically apply troubleshooting strategies to identify and resolve hardware and software problems in computing systems.								I
<p>Essential Question: How can you apply troubleshooting strategies to identify and resolve Hardware or software problems within your Computing</p>									

system?

Resources: <https://curriculum.ode.state.or.us/csd-18/unit11/>

[Edmentum Troubleshooting 1Q1 | Edmentum Blog](#)

[How to Help 12 K-12 Students Troubleshoot Technology Problems | Edmentum](#)

Materials: U1L02 Activity Guide - The Problem Solving Process ,

Differentiation: Provide print and digital materials, material to build prior knowledge, speech to text, text to speech, preferential seating, extended time, repeated exposure to materials, kinesthetic learning opportunities, chunking material, provide visual directions, checklists/rubrics, frequent check ins, mini lesson, small groups, student choice, students can add their own audio or video to help communicate their understanding

Enrichment: allow students to extend learning at their own pace/preferences, time for presentations with choice, various ways for students to present understanding, extension activities, students can teach other students

ISTE Standard: 1.1 Empowered Learner, 1.2 Digital Citizen, 1.5 Computational Thinker

Computer Science and Design Thinking Practice: 3. Recognizing and Defining Computational Problems, Developing and Using Abstractions
7. Communicating About Computing and Design

Core Concept: Networks and the Internet	Scope: By the end of Grade 8	Timeline						
Core Idea	Performance Expectation	K	1	2	3	4	5	6
Protocols, packets, and addressing are the key components for reliable delivery of information across Networks.	8.1.8.IN.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.							I
	8.1.8.NI.2: Model the role of protocols in transmitting data across networks and the internet and how they are unable to secure errorless communication.							I

Essential Question: How is information broken down into smaller pieces and then transmitted over networks and the internet? How do protocols transmit data across networks and the internet? Why can't protocols transmit errorless communication? Why can't protocols secure errorless communication?

Resources: [Eil CS Discoveries Curriculum Guide 2021 - 2022 \(Unit 5 Data and Society\)](#), [Binary Coding 1.0](#) [Binary Coding 2.0](#)
 I [BinaryCodeReferenceSheetandActivityideas-1.pdf](#)

Materials: [Binary Cards - CS Unplugged](#), [Binary Cards - CS Unplugged](#)

Differentiation: Provide print and digital materials, material to build prior knowledge, speech to text, text to speech, preferential seating, extended time, repeated exposure to materials, kinesthetic learning opportunities, chunking material, provide visual directions, checklist/rubrics, frequent check ins, mini lesson, small groups, student choice, students can add their own audio or video to help communicate their understanding

Enrichment: allow students to extend learning at their own pace/preferences, time for presentations with choice, various ways for students to present understanding, extension activities (name bracelets, secret message, [Binary Online Games](#))

ISTE Standard: 1.3 Knowledge Creator, 1.4 Innovative Designer, 1.5 Computational Thinker

Computer Science and Design Thinking Practice: 3. Recognizing and Defining Computational Problems, 4. Developing and Using Abstractions 5. Creating Computational Artifacts, 6. Testing and Refining Computational Artifacts 7. Communicating About Computing and Design

Core Concept: Networks and the Internet	<i>Scope: By the end of Grade 8</i>	Timeline						
Core Idea	Performance Expectation	K	1	2	3	4	5	6
The information sent and received across networks can be protected from unauthorized access and modification in a variety of ways. The evolution of malware leads to understanding the key security measures and best practices needed to proactively address the threat to Digital Data.	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.							I
	8.1.8.NI.4: Explain how new security measures have been created in response to key malware events.							

Essential Question: Why does network security depend on a combination of hardware software and practices to control access to data and systems? Why have new security measures been created in response to malware events?

Resources: Privacy & Security | Common Sense Education, Understanding Cybersecurity; 3 ways to teach students about Cybersecurity | K-12, Essential Cybersecurity Lesson Plan | The Cybersecurity and Infrastructure Security Agency

Materials: Encryption Cybercrime, Need a Sphere or adapt to Ozobot: How the Internet Works' Tile Big Picture, Hackers, Phishing

Differentiation: Provide print and digital materials, material to build prior knowledge, speech to text, text to speech, preferential seating, extended time, repeated exposure to materials, kinesthetic learning opportunities, chunking material, provide visual directions, checklist/rubrics, frequent check ins, mini lesson, small groups, student choice, students can add their own audio or video to help communicate their understanding

Enrichment: allow students to extend learning at their own pace/preferences, time for presentations with choice, various ways for students to present understanding, extension activities

ISTE Standard: 1.2 Digital Citizenship

Computer Science and Design Thinking Practice: 1.2 Collaborating Around Computing and Design, 3. Recognizing and Defining Computational Problems, 7. Communicating About Computing and Design

Core Concept: <i>Impacts of Computing</i>	Scope: <i>By the end of Grade 8</i>	Timeline						
		K	1	2	3	4	5	6
<p>Core Idea</p> <p>Advancements in computing technology can change an individual's behavior.</p> <p>Society is faced with trade-offs due to the increasing globalization and automation that computing brings.</p>	<p>8.1.8.IC.1: Compare the trade-offs associated with computing technologies that affect individuals' everyday activities and career options.</p>							I
	<p>8.1.8.IC.2: Describe issues of bias and accessibility in the designs of existing technologies.</p>							I

Essential Question: How do advancements in technology change our behaviors? How do existing technologies demonstrate bias and accessibility in their designs?

Resources: 1D Wa'J_s T!;Ich Hijacks our Beh2viQr, 5 wa'J_ technolo9J'.is changing huma□behavior - PCA

Materials: Anchor Chart: Bias and accessibility, Classbrain Storm: How tech advancements affect our lives (Digitally, use Slides, Padlet, Nearpod, or Jamboard), Small group brainstorms: How does tech demonstrate bias and accessibility (students create a sketch note poster using prior knowledge and online research)

Differentiation: Provide print and digital materials, material to build prior knowledge, speech to text, text to speech, preferential seating, extended time, repeated exposure to materials, kinesthetic learning opportunities, chunking material, provide visual directions, checklists, rubrics, frequent check ins, mini lesson, small groups, student choice, students can add their own audio or video to help communicate their understanding

Enrichment: allow students to extend learning at their own pace/preferences, time for presentations with choice, various ways for students to present understanding, extension activities

ISTE Standard: 1.2 Digital Citizen, 1.3 Knowledge Constructor, 1.6 Creative Communicator

Computer Science and Design Thinking Practice: 1. Fostering an Inclusive Computing and Design Culture, 2. Collaborating around Computing and Design, 7. Communicating About Computing and Design

Core Concept: Data and Analysis	Scope: By the end of Grade 8	Timeline						
Core Idea	Performance Expectation	K	1	2	3	4	5	6
People use digital devices and tools to automate the collection, use, and transformation of data. The manner in which data is collected and transformed is influenced by the type of digital device(s) available and the intended use of the data.	8.1.8.DA.1: Organize and transform data collected using computational tools to make usable for a specific purpose.							I

Essential Question: How can you organize and transform data using computational tools? Why does the purpose of the data affect the way we collect and transform it?

Resources: [CS Discoveries Curriculum Guide 2021 - 2022](#) Unit 5, [Diigo!](#), [leal!](#), [er Qujteli](#), 6th Grade Math Text

Materials: Provided on [Code.org](#) and with in Data Nuggets Drive Folder, Table for tracking time the spend on tech each day, Google Sheets (represent data in visual form), Padlet (Compare student data and draw conclusions) Online Research (Compare their data to other students)

across the globe)

Differentiation: Provide print and digital materials, material to build prior knowledge, speech to text, text to speech, preferential seating, extended time, repeated exposure to materials, kinesthetic learning opportunities, chunking material, provide visual directions, checklist/rubrics, frequent check ins, mini lesson, small groups, student choice, students can add their own audio or video to help communicate their understanding

Enrichment: allow students to extend learning at their own pace/preferences, time for presentations with choice, various ways for students to present understanding, extension activities

ISTE Standard: 1.1 Empowered Learner, 1.2 Digital Citizen, 1.3 Knowledge Constructor, 1.5 Computational Thinker, 1.6 Creative Communicator, 1.7 Global Collaborator

Computer Science and Design Thinking Practice: 1. Fostering an Inclusive Computing and Design Culture, 2. Collaborating About Computing and Design, 4. Developing and Using Abstractions, 5. Creating Computational Artifacts, 7. Communicating About Computing and Design

Core Concept: Data and Analysis	<i>Scope: By the end of Grade 8</i>	Timeline						
Core Idea	Performance Expectation	K	1	2	3	4	5	6
Data is represented in many formats. Software tools translate the low-level representation of B into a form understandable by individuals data is organized and accessible based on the application used to store it.	8.1.8.DA.2: Explain the difference between how the computer stores data as bits and how the data is displayed.							I
	8.1.8.DA.3: Identify the appropriate tool to access data based on its file format.							I

Essential Question: How is the way computers store data different from the way they display it? Why is it important to identify the appropriate tool to access data?

Resources: Covered in Standard 8.1.8.NI.3/4

Materials: Covered in Standard 8.1.8.NI.3/4

Differentiation: Covered in Standard 8.1.8.NI.3/4

ISTE Standard: Covered in Standard 8.1.8.NI.3/4														
Computer Science and Design Thinking Practice: Covered in Standard 8.1.8.NI.3/4														
Core Concept: Data and Analysis	Scope: By the end of Grade B						Timeline							
Core Idea	Performance Expectation						K	1	2	3	4	5	6	
The purpose of cleaning data is to remove errors and make it easier for computers to process.	8.1.8.DA.4: Transform data to remove errors and improve the accuracy of the data for analysis.													1
Essential Question: How do you remove errors and improve the accuracy of your data?														
Resources: Covered in 8.1.8.DA.1														
Materials: Covered in 8.1.8.DA.1														
Differentiation: Covered in 8.1.8.DA.1														
ISTE Standard: Covered in 8.1.8.DA.1														
Computer Science and Design Thinking Practice: Covered in 8.1.8.DA.1														
Core Concept: Data and Analysis	Scope: By the end of Grade B						Timeline							
Core Idea	Performance Expectation						K	1	2	3	4	5	6	
Computer models can be used to stimulate events, examine theories and inferences, or make predictions.	8.1.8.DA.5: Test, analyze, and refine computational models.													1
	8.1.8.DA.6: Analyze climate-change computational models and proposed refinement.													1
Essential Question: Why is it important to test, analyze, and refine computational models? How does the computational model demonstrate climate change? How can we positively affect this model?														

Resources: I Climate Change Data.pdf , li Climate-Generation-Next-Generation-Climate-6to8-2022.pdf 6th Grade Science Curriculum

Materials: Materials provided in links above as well as Science Curriculum, [Starlogo Nova](#) [Microsoft MakeCode](#) or Ozobots to create Computational Models

Differentiation: Provide print and digital materials, material to build prior knowledge, speech to text, text to speech, preferential seating, extended time, repeated exposure to materials, kinesthetic learning opportunities, chunking material, provide visual directions, checklist/rubrics, frequent check ins, mini lesson, small groups, student choice, students can add their own audio or video to help communicate their understanding

Enrichment: Allow students to extend learning at their own pace/preferences, time for presentations with choice, various ways for students to present understanding, extension activities (publish and share code, use other coding language, code a second version of game, create comic of coded project using Pixton)

ISTE Standard: 1.1 Empowered Learner, 1.2 Digital Citizen, 1.3 Knowledge Constructor, 1.4 Innovative Designer, 1.5 Computational Thinker, 1.6 Creative Communicator

Computer Science and Design Thinking Practice: 3. Recognizing and Defining Computational Problems, 4. Developing and Using Abstractions, 5. Creating Computational Artifacts, 6. Testing and Refining Computational Artifacts

Core Concept: Algorithm and Programs	Scope: By the end of Grade 8	Timeline						
Core Idea	Performance Expectation	K	1	2	3	4	5	6
Individuals design algorithms that are reusable in many situations. Algorithms that are readable are easier to follow, test and debug.	8.1.8.AP.1: Design and illustrate algorithms that solve complex problems using flowcharts and/or pseudocode							I

Essential Question: How does the algorithm in your flowchart solve a complex problem? How can you reuse it in a different situation?

Resources: EI CS Discoveries Curriculum Guide 2021 - 2022 (Unit 6 Physical Computing) [Code.org](#)

Materials: Provided at Code.org in link above

Differentiation: Provide print and digital materials, material to build prior knowledge, speech to text, text to speech, preferential seating, extended time, repeated exposure to materials, kinesthetic learning opportunities, chunking material, provide visual directions, checklists/rubrics, frequent check ins, mini lesson, small groups, student choice, students can add their own audio or video to help communicate their understanding

Enrichment: Allow students to extend learning at their own pace/preferences, time for presentations with choice, various ways for students to present understanding, extension activities

ISTE Standard: 1.1 Empowered Learner, 1.3 Knowledge Constructor, 1.4 Innovative Designer, 1.5 Computational Thinker, 1.6 Creative Communicator

Computer Science and Design Thinking Practice: 3. Recognizing and Defining Computational Problems, 4. Developing and Using Abstractions, 5. Creating Computational Artifacts, 6. Testing and Refining Computational Artifacts

Core Concept: Algorithm and Programs	Scope: By the end of Grade 8	Timeline						
Core Idea	Performance Expectation	K	1	2	3	4	5	6
Programmers create variables to store data values of different types and perform appropriate operations on their values.	8.1.8.AP.2: Create clearly named variables that represent different data types and perform operations on their values.							I

Essential Question: Why do we use variables to represent different types of data? How do we perform operations on their values?

Resources: [CS Discoveries Curriculum Guide 2021 - 2022 \(Unit 3 Interactive Games and Animation\)](#) [Code.org](#)

Materials: Provided at Code.org in link above

Differentiation: Provide print and digital materials, material to build prior knowledge, speech to text, text to speech, preferential seating, extended time, repeated exposure to materials, kinesthetic learning opportunities, chunking material, provide visual directions, checklists/rubrics, frequent check ins, mini lesson, small groups, student choice, students can add their own audio or video to help communicate their understanding

Enrichment: Allow students to extend learning at their own pace/preferences, time for presentations with choice, various ways for students to present understanding, extension activities

ISTE Standard: 1.1 Empowered Learner, 1.3 Knowledge Constructor, 1.4 Innovative Designer, 1.5 Computational Thinker, 1.6 Creative Communicator

Computer Science and Design Thinking Practice: 3. Recognizing and Defining Computational Problems, 4. Developing and Using Abstractions, 5. Creating Computational Artifacts, 6. Testing and Refining Computational Artifacts

Core Concept: Algorithm and Programs	<i>Scope: By the end of Grade 8</i>	Timeline						
Core Idea	Performance Expectation	K	1	2	3	4	5	6
Control structures are selected and combined in programs to solve more complex problems.	8.1.8.AP.3: Design and iteratively develop programs that combine control structures, including nested loops and compound conditionals.							I

Essential Question: How do combined control structures within programs help us to solve complex problems? Why is the iterative process important when designing programs that include nested loops, and compound conditionals?

Resources: [Code.org Express Course](#) (Lesson 11)/ Also covered in Standard 8.1.8.AP.2

Materials: Covered in Standard 8.1.8.AP.2

Differentiation: Covered in Standard 8.1.8.AP.2

ISTE Standard: Covered in Standard 8.1.8.AP.2

Computer Science and Design Thinking Practice: Covered in Standard 8.1.8.AP.2

Core Concept: Algorithm and Programs	<i>Scope: By the end of Grade 8</i>	Timeline						
Core Idea	Performance Expectation	K	1	2	3	4	5	6
Programs use procedures to organize code and hide implementation details. Procedures can be repurposed in new programs. Defining parameters for procedures can generalize behavior and increase usability.	8.1.8.AP.4: Decompose problems and sub problems in two parts to facilitate the design, implementation, and review of programs							I
	8.1.8.AP.5: Create procedures with parameters to organize							I

	code and make it easier to reuse.								
<p>Essential Question: How does decomposing problems and subproblems into two parts help us design, implement, and review programs? Why do parameters make it easier for us to reuse a program?</p> <p>Resources: Covered in Standard 8.1.8.AP.2</p> <p>Materials: Covered in Standard 8.1.8.AP.2</p> <p>Differentiation: Covered in Standard 8.1.8.AP.2</p> <p>ISTE Standard: Covered in Standard 8.1.8.AP.2</p> <p>Computer Science and Design Thinking Practice: Covered in Standard 8.1.8.AP.2</p>									
Core Concept: Algorithm and Programs	Scope: By the end of Grade 8	Timeline							
Core Idea	Performance Expectation	K	1	2	3	4	5	6	
Individuals design and test solutions to identify problems taking into consideration the diverse needs of the users and the community.	8.1.8.AP.6: Refine a solution that meets its 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: Systemically 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.								
<p>Essential Question: Why is it important to refine a solution based on their feedback from team members and users? How can you incorporate existing code or media into your own design? Why is it important to give attribution? How do you test and refine programs? Why does documenting programs make it easier to follow, test and debug them?</p> <p>Resources: !!!! CS Discoveries Curriculum Guide 2021 - 2022 (Unit 4 Design Process) CQde Qrg</p>									

Materials: Provided at Code.org using link above

Differentiation: Provide print and digital materials, material to build prior knowledge, speech to text, text to speech, preferential seating, extended time, repeated exposure to materials, kinesthetic learning opportunities, chunking material, provide visual directions, checklist/rubrics, frequent check ins, mini lesson, small groups, student choice, students can add their own audio or video to help communicate their understanding

Enrichment: Allow students to extend learning at their own pace/preferences, time for presentations with choice, various ways for students to present understanding, extension activities (other coding platforms)

ISTE Standard: 1.1 Empowered Learner, 1.3 Knowledge Constructor, 1.4 Innovative Designer, 1.5 Computational Thinker, 1.6 Creative Communicator

Computer Science and Design Thinking Practice: 3. Recognizing and Defining Computational Problems, 4. Developing and Using Abstractions, 5. Creating Computational Artifacts, 6. Testing and Refining Computational Artifacts

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Core Concept: Engineer. Ing Design	<i>Sc::Ope<B" y the encl @f (JJ"facile 8</i>	Tfmellne						
Core Idea	Performance Expectation	K	1	2	3	4	5	6
Engineering design is a systemic, creative, and iterative process used to address local and global problems. The process includes generating ideas, choosing the best solution, and making testing, and redesigning models and prototypes.	8.1.8.ED.1: Evaluate the function, value, and aesthetics of a technological product or system, from the perspective of the user and the producer.							I
	8.1.8.ED.2: Identify the steps in the design process that could be used to solve a problem.							I
	8.1.8.ED.3: Develop a proposal for a solution to a real world							I

	problem that includes a model (e.g., physical prototype, graphical/ technical sketch).								
	8.1.8.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.								I

Essential Question: How can we use the engineering design process to address local and global problems? Why is function, value, and aesthetics important to the user and producer? How does the model of your proposal solve a real-world problem? How can you troubleshoot a malfunctioning system? Why is it important to test options and repair it as a collaborative team?

Resources: cs Discoveries Curriculum Guide 2021 - 2022 (Unit 4 - Design Process), [Free Lessons and Videos to Teach the Engineering Design Process | Science Buddies Blog](#), [16 Engineering Challenges for Middle School | Science Buddies Blog](#) /example: Earthquake Resistant Housing, [Engineering Design Process - TeachEngineering](#) See 6th Grade Science Curriculum as well

Materials: Activities and materials provided in the links above, STEAM materials would need to be purchased as well

Differentiation: Provide print and digital materials, material to build prior knowledge, speech to text, text to speech, preferential seating, extended time, repeated exposure to materials, kinesthetic learning opportunities, chunking material, provide visual directions, checklist/rubrics, frequent check ins, mini lesson, small groups, student choice, students can add their own audio or video to help communicate their understanding

Enrichment: Allow students to extend learning at their own pace/preferences, time for presentations with choice, various ways for students to present understanding, extension activities

ISTE Standard: 1.1 Empowered Learner, 1.3 Knowledge Constructor, 1.4 Innovative Designer, 1.5 Computational Thinker, 1.6 Creative communicator, 1.7 Global Collaborator

Computer Science and Design Thinking Practice: 1. Fostering an Inclusive Computing and Design Culture, 2. Collaborating About Computing and Design, 4. Developing and Using Abstractions, 5. Creating Computational Artifacts, 7. Communicating About Computing and Design

Core Concept: Engineering Design	Scope: By the end of Grade 8	Timeline							
Core Idea	Performance Expectation	K	1	2	3	4	5	6	
Engineering design requirements and	8.1.8.ED.5: Explain the need for optimization in a design								I

specifications involve making trade-offs between competing requirements and desired design features.	process.								
	8.1.8.ED.6: Analyze how trade-offs can impact the design of a product.								I
	8.1.8.ED.7: Design product to address a real-world problem and document the iterative design process including decisions made as a result of specific constraints in trade-offs (e.g., annotated sketches).								I
<p>Essential Question: Why do we need optimization in the design process? How do trade-offs impact the design of the products? How did you consider the interactive design process when making decisions regarding trade offs within your product?</p> <p>Resources: Best practices: Use of the iterative process to improve students' writing Engaging Students Through the Iterative Process, Trade-off brainstorm and anchor chart</p> <p>Materials: Covered in Standards 8.1.8.ED.1-4</p> <p>Differentiation: Covered in Standards 8.1.8.ED.1-4</p> <p>ISTE Standard: Covered in Standards 8.1.8.ED.1-4</p> <p>Computer Science and Design Thinking Practice: Covered in Standards 8.1.8.ED.1-4</p>									
Core G: concept; Interaction of Technology, and Humans	<i>Science, By the end of Grade 8</i>	Timeline							
Core Idea	Performance Expectation	K	1	2	3	4	5	6	
Economic, political, social and cultural aspects of society Drive development of new technological products, processes and systems.	8.1.8.ITH.1: Explain how the development and use of technology influence economic, political, social and cultural issues.								I
<p>Essential Question: How has the development and use of technology positively/negatively influenced our economic, political, social, and cultural</p>									

issues?

Resources: • Grade_06_Social_Studies_Unit_13_Exemplar_Lesson_02_Making_Predictions.pdf

Materials: Resources provided in link above, online research and note taking sheet

Differentiation: Provide print and digital materials, material to build prior knowledge, speech to text, text to speech, preferential seating, extended time, repeated exposure to materials, kinesthetic learning opportunities, chunking material, provide visual directions, checklist/rubrics, frequent check ins, mini lesson, small groups, student choice, students can add their own audio or video to help communicate their understanding

Enrichment: Allow students to extend learning at their own pace/preferences, time for presentations with choice, various ways for students to present understanding, extension activities

ISTE Standard: 1.1 Empowered Learner, 1.2 Digital Citizen, 1.3 Knowledge Constructor, 1.6 Creative Communicator, 1.7 Global Collaborator

Computer Science and Design Thinking Practice: 1. Fostering an Inclusive Computing and Design Culture, 2. Collaborating About Computing and Design, 7. Communicating About Computing and Design

Core Concept: Engin erlhg Design	<i>Scope: By the end of Grade 8</i>	Timehne						
Core Idea	Performance Expectation	K	1	2	3	4	5	6
<p>Technology interacts with Society, sometimes bringing about changes in society's economy, politics, and culture, and often leading to the creation of new Needs & Wants.</p> <p>New needs and wants create strains on local economies and work forces.</p> <p>Improvements in Technologies are intended to make the completion of tasks easier, safer, and/or more efficient.</p>	<p>8.1.8.ITH.2: Compare how technologies have influenced society overtime.</p>							I
	<p>8.1.8.ITH.3: Evaluate the impact of sustainability on the development of a designed product or system.</p>							I

<p>Sometimes a technology developed for one purpose is adapted to serve other purposes.</p> <p>Engineers use a systematic process of creating or modifying technologies that is fueled and constrained by physical laws, cultural norms, and economic resources. Scientists use systematic investigation to understand the natural world.</p>									
	8.1.8.NT.2: Analyze an existing technological product that has been repurposed for a different function.								
	8.1.8.NT.3: Examine a system, consider how each part relates to other parts, and redesign it for another purpose.								
	8.1.8.NT.4: Explain how a product designed for a specific demand was modified to meet a new demand and led to a new product.								
<p>Essential Question: When examining a malfunctioning tool or product how do you identify the problem and propose a viable solution? How can you tell that an existing product has been repurposed for a different function? How can understanding how parts of a system work together help you to redesign it for another purpose? How has a specific product been modified to meet a new demand, leading to a new product?</p> <p>Resources: Creative Thinking Lesson Plans for Teachers.</p> <p>Materials: malfunctioning tool or product, Engineering Design Brainstorm Sheet, Reflection Sheet, Diagram of tool</p> <p>Differentiation: Provide print and digital materials, material to build prior knowledge, speech to text, text to speech, preferential seating, extended time, repeated exposure to materials, kinesthetic learning opportunities, chunking material, provide visual directions, checklist/rubrics, frequent check ins, mini lesson, small groups, student choice, students can add their own audio or video to help communicate their understanding</p> <p>Enrichment: Allow students to extend learning at their own pace/preferences, time for presentations with choice, various ways for students to present understanding, extension activities</p> <p>ISTE Standard: 1.1 Empowered Learner, 1.3 Knowledge Constructor, 1.4 Innovative Designer, 1.5 Computational Thinker, 1.6 Creative</p>									

Materials: [A project like this/Think](#) Pair Share in smalls groups based on prior knowledge and online research (Research guided by Essential Questions), Pixton, Google Slides, Canva (Presentation tools)

Differentiation: Provide print and digital materials, material to build prior knowledge, speech to text, text to speech, preferential seating, extended time, repeated exposure to materials, kinesthetic learning opportunities, chunking material, provide visual directions, checklisUrubrics, frequent check ins, mini lesson, small groups, student choice, students can add their own audio or video to help communicate their understanding.

Enrichment: Allow students to extend learning at their own pace/preferences, time for presentations with choice, various ways for students to present understanding, extension activities

ISTE Standard: 1.1 Empowered Learner, 1.2 Digital Citizen, 1.3 Knowledge Constructor, 1.4 Innovative Designer, 1.5 Computational Thinker, 1.6 Creative Communicator, 1.7 Global Collaborator

Computer Science and Design Thinking Practice: 1. Fostering an Inclusive Computing and Design Culture, 2. Collaborating About Computing and Design, 5. Creating Computational Artifacts, 7. Communicating About Computing and Design

Core Concept: Ethics and Culture	Scope: By the end of Grade 8	Timeline						
Core Idea	Performance Expectation	K	1	2	3	4	5	6
Technological disparities have consequences for public health and prosperity.	8.1.8.EC.1: Explain ethical issues that may arise from the use of new technologies.							I
	8.1.8.EC.2: Examine the effects of ethical and unethical practices in product design and development.							I

Essential Question: How do new technologies present ethical issues? How do ethical and unethical practices affect product design and development?

Resources: [Why we need to talk about ethics in technology](#) - Hello World, [Teaching Your Child to Be Ethical](#) | [Education.com](#), [Ethics Facts for Kids](#), [a Ethics](#) | [Ethics Defined](#)

Materials: Discussion Questions such as: • [DigitalTechnologyandEthicsDISCUSSIONItemSU0002-1.pdf](#) Cause and Effect Graphic Organizer (Ethics vs Product Design)

Differentiation: Provide print and digital materials, material to build prior knowledge, speech to text, text to speech, preferential seating, extended time, repeated exposure to materials, kinesthetic learning opportunities, chunking material, provide visual directions, checklists/rubrics, frequent check ins, mini lesson, small groups, student choice, students can add their own audio or video to help communicate their understanding.

Enrichment: Allow students to extend learning at their own pace/preferences, time for presentations with choice, various ways for students to present understanding, extension activities

ISTE Standard: 1.1 Empowered Learner, 1.2 Digital Citizen, 1.3 Knowledge Constructor, 1.6 Creative Communicator

Computer Science and Design Thinking Practice: 1. Fostering an Inclusive Computing and Design Culture, 2. Collaborating About Computing and Design, 7. Communicating About Computing and Design