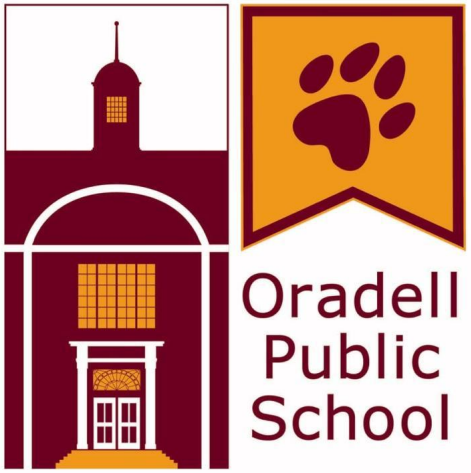

K-6

STEAM INTEGRATION

Oradell Public School District
Oradell, NJ
2023

Oradell Public School District

K-6 STEAM Integration Committee Credits:

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Grade 4: Heide O'Keeffe, Karen Marron
Grade 5: Jennifer Powers, Jamie Coccia, Sheri Malenda, Mia Rutigliano
Grade 6: Amanda Lozano, Carrie Malady, Christie Nobre

Board Policy

This revision is aligned with the New Jersey Student Learning Standards for Social Studies, the New Jersey Student Learning Standards for Career Readiness, Life Literacies, and Key Skills, the New Jersey Student Learning Standards for Computer Science and Design Thinking, and Social Emotional Learning Competencies.

Affirmative Action

During the development of this course of study, particular attention was paid to the elimination or exclusion of any materials which might discriminate on the basis of race, color, national origin, ancestry, age, sex, affectional or sexual orientation, gender identity or expression, marital status, familial status, genetic information, mental or physical disabilities, or in educational opportunities. Every effort has been made to uphold both the letter and spirit of Affirmative Action mandates as applied to the content, the texts and the instruction inherent in this course.

Megan Bozios, Superintendent
Michelle Hawley, Principal

Oradell Public School District
STEAM Integration
Grades K-6
Introduction

The Oradell Public School is dedicated to the ongoing pursuit of educational excellence through comprehensive innovative curriculum and instruction. The District is committed to providing opportunities for social, emotional, and academic discovery to foster curiosity, courage, and character. Our goal is to prepare our students to become life-long learners who are self-directed, resilient, productive and responsible citizens.

Our curriculum, which is aligned to the New Jersey Student Learning Standards, is designed to help students develop skills and learn core content through active, meaningful experiences that will lead to lasting understanding and the ability to apply and use knowledge in new contexts. Each area of the curriculum contains identified standards for learning. These standards help to guide classroom instruction and assessment. The standards articulate the skills and knowledge we believe all students need in order to become educated, responsible, and productive citizens. Oradell's STEAM integration allows students to be immersed in the Computer Science Design Thinking performance expectations both in and out of the STEAM lab. It provides opportunities for students to explore through an inquiry lens, seeking out answers to questions, and often developing more questions in the process.

The Oradell Public School curriculum is revised regularly to ensure that the curriculum is aligned with identified New Jersey academic standards. In addition, we seek to integrate career readiness standards that will prepare our students to become responsible community members. Practical and relevant real-life experiences are integrated into our curriculum and learning environment. We use New Jersey's Social Emotional Competencies to ensure our students are healthy and well, and we give our students opportunities to use cutting edge technology in order to prepare them for the future. Our students leave our schools well prepared for Middle School, High School, and beyond.

Oradell

K-6 STEAM Integration

New Jersey Student Learning Standards for Computer Science and Design Thinking STEAM Integration PACING			
Unit	**Grade Level**	**Activity/Project**	**Time of Year**
UNIT 1A UNIT 1B	K-2 3-5	Introduction to Design Thinking and Computing Systems	September-December
UNIT 2	K	Our Community	Jan - Map Building March - May
UNIT 3	1	The Road to ?	Apr - June
UNIT 4	2	How do we Keep Our Community Water Clean?	Launch - Sept Jan - March Finale - June
UNIT 5	3	Building our Community for Extreme Weather	Mar - June
UNIT 6	4	Survivor Nations: Where do we Settle and Survive?	Jan - Apr
UNIT 7	5	Hunger Games	Jan- Apr
UNIT 8	6	Steam Tank	Sept - June

Note: Highlighted activities indicate Holocaust Awareness or Amistad Commission or Asian American and Pacific Islander legislation related activities.

New Jersey Student Learning Standards for Computer Science and Design Thinking
UNIT 1A - Introduction to Design Thinking and Computing Systems
K-2
In Unit 1 - Students will be introduced to Engineering Design and Coding by completing plugged and unplugged activities both in the Creative Thinkers Lab and in their classrooms.

Disciplinary Concept	Core Idea	Performance Expectations
Design Thinking	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. 8.2.2.ED.2: Collaborate to solve a simple problem, or to illustrate how to build a product using the design process. 8.2.2.ED.3: Select and use appropriate tools and materials to build a product using the design process.
Design Thinking	Limitations (constraints) must be considered when engineering designs.	8.2.2.ED.4: Identify constraints and their role in the engineering design process.
Design Thinking	Human needs and desires determine which new tools are developed.	8.2.2.ITH.1: Identify products that are designed to meet human wants or needs. 8.2.2.ITH.2: Explain the purpose of a product and its value.

Design Thinking	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. 8.2.2.ITH.4: Identify how various tools reduce work and improve daily tasks. 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.
Design Thinking	Innovation and the improvement of existing technology involves creative thinking.	8.2.2.NT.1: Model and explain how a product works after taking it apart, identifying the relationship of each part, and putting it back together. 8.2.2.NT.2: Brainstorm how to build a product, improve a designed product, fix a product that has stopped working, or solve a simple problem.
Computing Systems	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.
Computing Systems	A computing system is composed of software and hardware.	8.1.2.CS.2: Explain the functions of common software and hardware components of computing Systems
Computing Systems	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 using accurate terminology.
Networks and the Internet	Computer networks can be used to connect individuals to other individuals, places, information,	8.1.2.NI.1: Model and describe how individuals use computers to connect

	and ideas. The Internet enables individuals to connect with others worldwide.	to other individuals, places, information, and ideas through a network. 8.1.2.NI.2: Describe how the Internet enables individuals to connect with others worldwide.
Networks and the Internet	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. 8.1.2.NI.4: Explain why access to devices need to be secured.
Data & Analysis	Individuals collect, use, and display data about individuals and the world around them. Computers store data that can be retrieved later. Data can be copied, stored in multiple locations, and retrieved. Data can be used to make predictions about the world.	8.1.2.DA.1: Collect and present data, including climate change data, in various visual formats. 8.1.2.DA.2: Store, copy, search, retrieve, modify, and delete data using a computing device. 8.1.2.DA.3: Identify and describe patterns in data visualizations. 8.1.2.DA.4: Make predictions based on data using charts or graphs.
Impacts of Computing	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.

UNIT 1A - Introduction to Design Thinking and Computing Systems K-2

Essential Questions

- What is the Engineering Design Process and how does it apply to everyday life?
- Why is it important to understand code and programming? How does this knowledge enrich our lives?

Learning Objectives

- Identify how technology impacts or improves life.
- Identify how various tools reduce work and improve daily tasks.
- Design a solution to a problem affecting the community in a collaborative team and explain the intended impact of the solution
- Identify constraints and their role in the engineering design process.
- Identify products that are designed to meet human wants or needs.
- Explain the purpose of a product and its value.
- Identify how technology impacts or improves life.
- Identify how various tools reduce work and improve daily tasks.
- Design a solution to a problem affecting the community in a collaborative team and explain the intended impact of the solution.
- Model and explain how a product works after taking it apart, identifying the relationship of each part, and putting it back together.
- Brainstorm how to build a product, improve a designed product, fix a product that has stopped working, or solve a simple problem.
- Select and operate computing devices that perform a variety of tasks accurately and quickly based on user needs and preferences.
- Explain the functions of common software and hardware components of computing Systems
- Describe basic hardware and software problems using accurate terminology.
- Model and describe how individuals use computers to connect to other individuals, places, information, and ideas through a network.

- Describe how the Internet enables individuals to connect with others worldwide.
- Create a password that secures access to a device.Explain why it is important to create unique passwords that are not shared with others.
- Explain why access to devices need to be secured.
- Collect and present data, including climate change data, in various visual formats.
- Store, copy, search, retrieve, modify, and delete data using a computing device.
- Identify and describe patterns in data visualizations.
- Make predictions based on data using charts or graphs.
- Compare how individuals live and work before and after the implementation of new computing technology.

Modifications	
English Language Learners	● Feelings chart ● Pantomime actions and words to provide clarification ● Provide opportunities for students to turn and talk. ● Include hands-on activities. ● Model fluency, intonation, and inflection while reading aloud. ● Model productive and engaging partner talk. ● Stop often to monitor and check for understanding. ● Allow handheld translator. ● Consult with ESL teacher
Special Education	● Use preferential seating. ● Ask students to recall what they already learned in ways that activate their prior knowledge and allow them to build on that knowledge. ● Provide direct instruction and reinforce vocabulary with pictures. ● Include hands-on activities. ● Model fluency, intonation, and inflection while reading aloud. ● Model productive and engaging partner talk. ● Model text to word connections. ● Offer different seating options.

At-Risk	● Limit the amount of information per page ● Use preferential seating. ● Ask students to recall what they already learned in ways that activate their prior knowledge and allow them to build on that knowledge. ● Provide direct instruction and reinforce vocabulary with pictures. ● Provide opportunities for students to turn and talk. ● Include hands-on activities. ● Model fluency, intonation, and inflection while reading aloud. ● Model productive and engaging partner talk. ● Use of timers ● Frequent check-ins
Gifted and Talented	● Engaging partner talk ● Problem solving ● Share solutions ● Brainstorming ● Provide additional opportunities to record their ideas
504	● Use preferential seating. ● Ask students to recall what they already learned in ways that activate their prior knowledge and allow them to build on that knowledge. ● Provide direct instruction and reinforce vocabulary with pictures. ● Provide opportunities for students to turn and talk. ● Include hands-on activities. ● Model fluency, intonation, and inflection while reading aloud. ● Model productive and engaging partner talk. ● Provide audio books or headphones when available. ● Include visual supports like large or personalized texts for better viewing. ● Offer different seating options. ● Model text to word connections.

Suggested Student Learning Activities Directly Connected to Student Learning Objectives:

- Communicate the function of a product or device,collaborate to solve a simple problem, or to illustrate how to build a product using the design process, select and use appropriate tools and materials to build a product using the design process, Identify constraints and their role in the engineering design process, identify products that are designed to meet human wants or needs, explain the purpose of a product and its value, identify how technology impacts or improves life, identify how various tools reduce work and improve daily tasks.design a solution to a problem affecting the community in a collaborative team and explain the intended impact of the solution, model and explain how a product works after taking it apart, identifying the relationship of each part, and putting it back together and brainstorm how to build a product, improve a designed product, fix a product that has stopped working, or solve a simple problem by:
    - Working together as a team
    - Following Classroom Rules
    - Exploring a challenging and brainstorming ideas
    - Explaining through reflection by writing and drawing
    - Completing one of the following Challenges:
        - What is Science? - K
            - Name Tag Challenge
            - Tower Challenge
        - Be a Maker - 1
            - Build a way home
        - Made by Me -2
            - Make a useful classroom tool
        - Make a Mural - K - 2
            - FabMaker Studio
            - Animation-Ish — FableVision Learning
            - Pixilart - Free online pixel art drawing too
        - SEL - K - 2
            - My Mouth is a Volcano
            - Bucket Filler
            - A Bug and A Wish
            - A Bad Cast of Tattle Tongue

        - Team Building
            - Build a Boat
            - Catapult Challenge
            - Spaghetti Tower
            - Marshmallow Tower

- Accountable talk
    - Let's Be Scientists: - Read Aloud - Kinder
    - https://safeshare.tv/x/ss62e13a7b33c63

    - Be A Maker - Read aloud - 1st Grade
    - https://safeshare.tv/x/ss62e2d249ceed1

    - Made by Maxine - Read aloud - 2nd Grade
    - https://safeshare.tv/x/ss62f4fe5555f0c

    - Miss Makey - Read Aloud 3rd Grade
    - https://safeshare.tv/x/ss62fbc21ca59e7

    - Upcycling - Rubbish Rebel - 3rd Grade
    - https://safeshare.tv/x/9jI27zb35_A

- Select and operate computing devices that perform a variety of tasks accurately and quickly based on user needs and preferences, explain the functions of common software and hardware components of computing systems, describe basic hardware and software problems using accurate terminology by
    - Individuals using computing devices to perform a variety of tasks accurately and quickly.
    - Computing devices interpret and follow the instructions they are given literally.
    - A computing system is composed of software and hardware.
    - Describing a problem is the first step toward finding a solution when computing systems do not work as expected.

    - Computing devices may be connected to other devices to form a system as a way to extend their capabilities.
    - Software and hardware work together as a system to accomplish tasks (e.g., sending, receiving, processing, and storing units of information).
    - Shared features allow for common troubleshooting strategies that can be effective for many systems
        - Computing Systems K-2
- Collect and present data, including climate change data, in various visual formats, store, copy, search, retrieve, modify, and delete data using a computing device, identify and describe patterns in data visualizations and make predictions based on data using charts or graphs by:
    - Individuals collect, use, and display data about individuals and the world around them.
    - Computers store data that can be retrieved later. Data can be copied, stored in multiple locations, and retrieved.
    - Data can be used to make predictions about the world.
    - Data can be organized, displayed, and presented to highlight relationships.
    - The type of data being stored affects the storage requirements.
    - Individuals can select, organize, and transform data into different visual representations and communicate insights gained from the data.
    - Many factors influence the accuracy of inferences and predictions.
        - Data and Analysis K-2

- Model and describe how individuals use computers to connect to other individuals, places, information, and ideas through a network, describe how the Internet enables individuals to connect with others worldwide, create a password that secures access to a device. Explain why it is important to create unique passwords that are not shared with others and explain why access to devices need to be secured by
    - Discussing online safety protocols
    - Explore and begin to implement block coding in both plugged and unplugged activities
    - Explain loops, events, algorithms, and sequencing
    - Discover that the Internet can be used to visit far-away places and learn new things.
    - Compare how staying safe online is similar to staying safe in the real world.
    - Explain rules for traveling safely on the Internet.
- Identify and explore different features of an informational website.
- Understand, in basic terms, how to identify a unique password.
- Passwords should not be shared.

- Code.org
  - K https://studio.code.org/s/coursea-2022?section_id=4534467
  - 1 https://studio.code.org/s/courseb-2022?section_id=4534467
  - 2 https://studio.code.org/s/coursec-2021?section_id=4534467
  - 1-2 Learn to Code Curriculum - Wonder App - Scroll Quests

- CS4NJ
  - Networks & the Internet K-2

- Compare how individuals live and work before and after the implementation of new computing technology by:
  - Computing technology can positively and negatively change the way individuals live and work (e.g., entertainment, communication, productivity tools).
  - Computers come in all shapes and sizes.
  - Computers can have specific and general purposes.
    - Impact of Computing Lesson K-2

Evidence of Learning - Assessment

Formative:

- Teacher observations
- Discussion questions
- Planning Journal pages

Summative:

- Reflection Journal
- Rubric
- Completed Pause and Think Moment Worksheet
- Completed Drawing of Internet and answer to related questions

Core Instructional Materials

Journals
Chart Paper
Markers
Glue
Pipe Cleaners
Pompoms
Cotton Swabs and balls
Popsicle sticks
Index cards
Scissors
Toilet Paper Rolls
Water Bottles
Cardboard
Cereal boxes
String
Tape
Laptops
Handouts

Books:

- *Ada Lovelace, Poet of Science: The First Computer Programmer* by Diane Stanley or
- *Ada Byron Lovelace and The Thinking Machine* by Laurie Wallmark
- *Grace Hopper: Queen of Computer Code* by Laurie Wallmark
- *Chicken Clicking* by Jeanne Willis
- *How to Code a Sandcastle* by Josh Funk
- *A Computer Called Katherine* by Suzanne Slade
- *First Day Jitters* by Julie Danneberg
- *My Mouth is a Volcano* by Julia Cook

- *A Bug and A Wish by* Karen Scheuer
- *Have You Filled a Bucket Today?* By Carol McCloud

Digital Resources

Let's Be Scientists: - Read Aloud - Kinder
https://safeshare.tv/x/ss62e13a7b33c63

Be A Maker - Read aloud - 1st Grade
https://safeshare.tv/x/ss62e2d249ceed1

Made by Maxine - Read aloud - 2nd Grade
https://safeshare.tv/x/ss62f4fe5555f0c

Code.org
K
https://studio.code.org/s/coursea-2022?section_id=4534467
1
https://studio.code.org/s/courseb-2022?section_id=4534467
2
https://studio.code.org/s/coursec-2021?section_id=4534467

https://cs4nj.org/sample-k-2-cs-lessons/

Worksheets:
Safety in My Online Neighborhood Worksheet
https://hello-ruby-production.s3.amazonaws.com/uploads/exercise_material/attachment/63/Task_24.pdf
Draw the Internet
https://ny.pbslearningmedia.org/resource/msts14.ela.virtmartha/technology-virtually-martha/

Interdisciplinary Connections

Language Arts:

Writing:

NJSLSA.W6. Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.

Reading:

RL.K.4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on kindergarten reading and content. A. Identify new meanings for familiar words and apply them accurately (e.g., knowing duck is a bird and learning the verb to duck). B. Use the most frequently occurring affixes (e.g., -ed, -s, -ing) as a clue to the meaning of an unknown word.

L.K.1. With prompting and support, ask and answer questions about key details in a text (e.g., who, what, where, when, why, how).

RI.1.1. Ask and answer questions about key details in a text.

L.1.4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grade 1 reading and content, choosing flexibly from an array of strategies. A. Use sentence-level context as a clue to the meaning of a word or phrase.

RL.2.1. Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text.

L.2.4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grade 2 reading and content, choosing flexibly from an array of strategies. A. Use sentence-level context as a clue to the meaning of a word or phrase. B. Determine the meaning of the new word formed when a known prefix is added to a known word (e.g., happy/unhappy, tell/retell). C. Use a known root word as a clue to the meaning of an unknown word with the same root (e.g., addition, additional). D. Use knowledge of the meaning of individual words to predict the meaning of compound words (e.g., birdhouse, lighthouse, housefly; bookshelf, notebook, bookmark). E. Use glossaries and beginning dictionaries, both print and digital, to determine or clarify the meaning of words and phrases

Speaking and Listening:

NJSLSA.SL1. Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.

NJSLSA.SL4. Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.

NJSLSA.SL5. Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations.

Math:
NJSLS.2.MD.D.10 Measurement Data and Data Representations
NJSLS.3.MD.B.3 Spatial Reasoning and Fluency with Operations
NGSS 3-ESS2-1: Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.
2.MD.D.10 (MATH) Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph.

NJSLS Career Readiness, Life Literacies, and Key Skills

9.4.2.CI.1: Demonstrate openness to new ideas and perspectives (e.g., 1.1.2.CR1a, 2.1.2.EH.1, 6.1.2.CivicsCM.2).
9.4.2.CI.2: Demonstrate originality and inventiveness in work (e.g., 1.3A.2CR1a).
9.4.2.CT.1: Gather information about an issue, such as climate change, and collaboratively brainstorm ways to solve the problem (e.g., K-2-ETS1-1, 6.3.2.GeoGI.2).
9.4.2.CT.2: Identify possible approaches and resources to execute a plan (e.g., 1.2.2.CR1b, 8.2.2.ED.3).
9.4.2.CT.3: Use a variety of types of thinking to solve problems (e.g., inductive, deductive).
9.4.2.DC.1: Explain differences between ownership and sharing of information.
9.4.2.DC.2: Explain the importance of respecting digital content of others.
9.4.2.DC.3: Explain how to be safe online and follow safe practices when using the internet (e.g., 8.1.2.NI.3, 8.1.2.NI.4).
9.4.2.DC.4: Compare information that should be kept private to information that might be made public.
9.4.2.DC.5: Explain what a digital footprint is and how it is created.
9.4.2.DC.6: Identify respectful and responsible ways to communicate in digital environments.
9.4.2.TL.2: Create a document using a word processing application.
9.4.2.TL.3: Enter information into a spreadsheet and sort the information.
"9.4.2.TL.4: Navigate a virtual space to build context and describe the visual content.
9.4.2.TL.5: Describe the difference between real and virtual experiences."
9.4.2.TL.6: Illustrate and communicate ideas and stories using multiple digital tools (e.g., SL.2.5.).
9.4.2.TL.7: Describe the benefits of collaborating with others to complete digital tasks or develop digital artifacts (e.g., W.2.6., 8.2.2.ED.2).

Practices

- CLKSP1 Act as a responsible and contributing community member and employee.
- CLKSP3 Consider the environmental, social, and economic impacts of decisions.
- CLKSP4 Demonstrate creativity and innovation.
- CLKSP5 Utilize critical thinking to make sense of problems and persevere in solving them.
- CLKSP6 Model integrity, ethical leadership and effective management.

Social Emotional Learning Competencies

- **Self-Awareness**: ability to recognize one's emotions and know one's strengths and limitations
    - Connections:
        - Reflecting on one's learning (Oral, Thumbs Up, Thumbs Down, Pictures, etc.)
        - Feelings chart
        - Movement breaks
        - Headphones for lower volume
        - Privacy boards when working independently

- **Self-Management**: ability to regulate and control one's emotions and behaviors, particularly in stressful situations
    - Connections:
        - Visit the mindfulness/cool down corner in the classroom for self-soothing activities (Squishy ball, sand timer, fidget popper, etc.)
        - Take a drawing break
        - Look at book
        - Have visual prompt for teacher assistance

- **Social Awareness**: ability to take the perspective of others, demonstrate empathy, acknowledge and appreciate

similarities and differences, and understand how one's actions influence and are influenced by others
    - Connections:
        - Engage in discussions with peers
        - Including others when noticing they are left out (in social play situations when practicing rules)
        - Engaging in discussion around *The Golden Rule* when developing rules and problem solving throughout the unit.

- **Relationship Skills**: refers to one's ability to demonstrate prosocial skills and behaviors in order to develop meaningful relationships and resolve interpersonal conflicts
    - Connections:
        - Provide opportunities to have turn and talks
        - Engage in discussions around the importance of discussing problems to work collaboratively to create solutions and develop expectations of how interact and engage with peers
        - Use a problem box to address problems in the classroom

- **Responsible Decision-Making**: refers to the ability to use multiple pieces of information to make ethical and responsible decisions
    - Connections:
        - Developing and following rules in the classroom community
        - Following directions

Grades 3-5 **In Unit 1 - Students will be introduced to Computer Systems and Coding by completing plugged/unplugged activities. They will discuss how Social Media and the Digital Footprints they leave remain on the internet and review internet safety protocols. These activities will take place in both the Creative Thinkers Lab and in the Classroom.**		
Disciplinary Concept	**Core Idea**	**Performance Expectations**
Computing Systems	Computing devices may be connected to other devices to form a system as a way to extend their capabilities.	8.1.5.CS.1: Model how computing devices connect to other components to form a system.
Computing Systems	Software and hardware work together as a system to accomplish tasks (e.g., sending, receiving, processing, and storing units of information).	8.1.5.CS.2: Model how computer software and hardware work together as a system to accomplish tasks.
Computing Systems	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 problems using common troubleshooting strategies
Networks and the Internet	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.
Networks and the Internet	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.
Impacts of Computing	The development and modification of computing	8.1.5.IC.1: Identify computing

	technology is driven by individual's needs and wants and can affect individuals differently.	technologies that have impacted how individuals live and work and describe the factors that influenced the changes. 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.
Algorithms & Programming	Different algorithms can achieve the same result. Some algorithms are more appropriate for a specific use than others.	8.1.5.AP.1: Compare and refine multiple algorithms for the same task and determine which is the most appropriate.
Algorithms & Programming	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.
Algorithms & Programming	A variety of control structures are used to change the flow of program execution (e.g., sequences, events, loops, conditionals).	8.1.5.AP.3: Create programs that include sequences, events, loops, and conditionals..
Algorithms & Programming	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. 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.
Algorithms & Programming	Individuals develop programs using an iterative process involving design, implementation, testing,	8.1.5.AP.6: Develop programs using an iterative process, implement the

	and review.	program design, and test the program to ensure it works as intended.
Data & Analysis	Data can be organized, displayed, and presented to highlight relationships. The type of data being stored affects the storage requirements. Individuals can select, organize, and transform data into different visual representations and communicate insights gained from the data. Many factors influence the accuracy of inferences and predictions.	8.1.5.DA.1: Collect, organize, and display data in order to highlight relationships or support a claim. 8.1.5.DA.2: Compare the amount of storage space required for different types of data. 8.1.5.DA.3: Organize and present collected data visually to communicate insights gained from different views of the data. 8.1.5.DA.4: Organize and present climate change data visually to highlight relationships or support a claim. 8.1.5.DA.5: Propose cause and effect relationships, predict outcomes, or communicate ideas using data.

UNIT 1B - Introduction to Computer Systems Grades 3-5

Essential Questions

- What is hardware/software and how do they work together?
- How are networks established wired/wireless?
- Does our digital footprints impact our future?
- Why is internet safety and security important?

Student Learning Objectives

- Model how computing devices connect to other components to form a system.
- Model how computer software and hardware work together as a system to accomplish tasks.
- Identify potential solutions for simple hardware and software problems using common troubleshooting strategies
- Develop models that successfully transmit and receive information using both wired and wireless methods.
- Describe physical and digital security measures for protecting sensitive personal information.
- Identify computing technologies that have impacted how individuals live and work and describe the factors that influenced the changes.
- Identify possible ways to improve the accessibility and usability of computing technologies to address the diverse needs and wants of users.
- Compare and refine multiple algorithms for the same task and determine which is the most appropriate.
- Create programs that use clearly named variables to store and modify data.
- Create programs that include sequences, events, loops, and conditionals..
- Break down problems into smaller, manageable sub-problems to facilitate program development.
- Modify, remix, or incorporate pieces of existing programs into one's own work to add additional features or create a new program.
- Develop programs using an iterative process, implement the program design, and test the program to ensure it works as intended.
- Collect, organize, and display data in order to highlight relationships or support a claim.
- Compare the amount of storage space required for different types of data.
- Organize and present collected data visually to communicate insights gained from different views of the data.
- Organize and present climate change data visually to highlight relationships or support a claim.
- Propose cause and effect relationships, predict outcomes, or communicate ideas using data

Modifications	
English Language Learners	● Feelings chart ● Pantomime actions and words to provide clarification

	● Provide opportunities for students to turn and talk. ● Include hands-on activities. ● Model fluency, intonation, and inflection while reading aloud. ● Model productive and engaging partner talk. ● Stop often to monitor and check for understanding. ● Allow handheld translator. ● Consult with ESL teacher
Special Education	● Use preferential seating. ● Ask students to recall what they already learned in ways that activate their prior knowledge and allow them to build on that knowledge. ● Provide direct instruction and reinforce vocabulary with pictures. ● Include hands-on activities. ● Model fluency, intonation, and inflection while reading aloud. ● Model productive and engaging partner talk. ● Model text to word connections. ● Offer different seating options.
At-Risk	● Limit the amount of information per page ● Use preferential seating. ● Ask students to recall what they already learned in ways that activate their prior knowledge and allow them to build on that knowledge. ● Provide direct instruction and reinforce vocabulary with pictures. ● Provide opportunities for students to turn and talk. ● Include hands-on activities. ● Model fluency, intonation, and inflection while reading aloud. ● Model productive and engaging partner talk. ● Use of timers ● Frequent check-ins
Gifted and Talented	● Engaging partner talk ● Problem solving

	• Share solutions • Brainstorming • Provide additional opportunities to record their ideas
504	• Use preferential seating. • Ask students to recall what they already learned in ways that activate their prior knowledge and allow them to build on that knowledge. • Provide direct instruction and reinforce vocabulary with pictures. • Provide opportunities for students to turn and talk. • Include hands-on activities. • Model fluency, intonation, and inflection while reading aloud. • Model productive and engaging partner talk. • Provide audio books or headphones when available. • Include visual supports like large or personalized texts for better viewing. • Offer different seating options. • Model text to word connections.

Suggested Learning Activities Directly Connected to Student Learning Objectives:

Compare and refine multiple algorithms for the same task and determine which is the most appropriate, create programs that use clearly named variables to store and modify data, create programs that include sequences, events, loops, and conditionals, break down problems into smaller, manageable sub-problems to facilitate program development, modify, remix, or incorporate pieces of existing programs into one's own work to add additional features or create a new program and develop programs using an iterative process, implement the program design, and test the program to ensure it works as intended by:

- Grade 3 - Color Coding with Ozobots
  - UPDATED-2022-23 Ozobot-Pacing-Guide-3rd-Grade
- Grade 4 - Blockly Coding with Ozobots
  - UPDATED-2022-23 Ozobot-Pacing-Guide-4th Grade
- Grade 5 - Intro to MicoBits
  - Intro to CS
- All Grades - Make a Mural - Meet the Artist

- SEL - K - 2

    - My Mouth is a Volcano
    - Bucket Filler
    - A Bug and A Wish
    - A Bad Cast of Tattle Tongue
- Team Building
    - Build a Boat
    - Catapult Challenge
    - Spaghetti Tower
    - Marshmallow Tower
- Model how computing devices connect to other components to form a system, model how computer software and hardware work together as a system to accomplish tasks and identify potential solutions for simple hardware and software problems using common troubleshooting strategies by:
    - Individuals use computing devices to perform a variety of tasks accurately and quickly.
    - Computing devices interpret and follow the instructions they are given literally.
    - A computing system is composed of software and hardware.
    - Describing a problem is the first step toward finding a solution when computing systems do not work as expected.
    - Computing devices may be connected to other devices to form a system as a way to extend their capabilities.
    - Software and hardware work together as a system to accomplish tasks (e.g., sending, receiving, processing, and storing units of information).
    - Shared features allow for common troubleshooting strategies that can be effective for many systems.
      Computing Systems 3-5

Collect, organize, and display data in order to highlight relationships or support a claim, compare the amount of storage space required for different types of data, organize and present collected data visually to communicate insights gained from different views of the data, organize and present climate change data visually to highlight relationships or support a claim,and propose cause and effect relationships, predict outcomes, or communicate ideas using data by:

- Computers store data that can be retrieved later. Data can be copied, stored in multiple locations, and retrieved.
- Data can be used to make predictions about the world.

- Data can be organized, displayed, and presented to highlight relationships.
- The type of data being stored affects the storage requirements.
- Individuals can select, organize, and transform data into different visual representations and communicate insights gained from the data.
- Many factors influence the accuracy of inferences and predictions.
    - Data and Analysis 3-5

Identify computing technologies that have impacted how individuals live and work and describe the factors that influenced the changes, and identify possible ways to improve the accessibility and usability of computing technologies to address the diverse needs and wants of users by:

- Learn about assistive technologies.
- Gain awareness of the assistive technologies they use or benefit from.
- Technological innovation affects society.
    - The needs of people whose physical skills and abilities may differ from their own.
      Impacts of Computing Lesson 3-5

Develop models that successfully transmit and receive information using both wired and wireless methods and describe physical and digital security measures for protecting sensitive personal information by:

- Information needs a physical or wireless path to travel to be sent and received.
- 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).
    - Networks & the Internet 3-5

Evidence of Learning - Assessment

Formative:

- Teacher observations
- Discussion questions

Summative:

- Finished Lessons

- Tested Maps/Paths

Core Instructional Materials

Markers
Pencils
Ozobot Maps
Microbit handouts
Ozobot handouts

- Books
  - *First Day Jitters* by Julie Danneberg
  - *My Mouth is a Volcano* by Julia Cook
  - *A Bug and A Wish by* Karen Scheuer
  - *Have You Filled a Bucket Today?* By Carol McCloud

Digital Resources

3rd Grade - Code.org Course D
Course D
4th Grade - Code.org Course E
Course E
5th Grade - Code.org Course F
Course F

https://code.org/maker/csf-microbit
https://bootuppd.org/scratch/
https://classroom.ozobot.com/help/pacing-guides

Make a Mural - 3-5
FabMaker Studio
Animation-Ish — FableVision Learning
Pixilart - Free online pixel art drawing tool

https://www.canva.com

3rd Grade - Color coding with Ozobots
https://classroom.ozobot.com/help/pacing-guides

4th Grade - Blockly coding with Ozobots
https://classroom.ozobot.com/help/pacing-guides

5th Grade - Coding with Microbits
https://makecode.microbit.org/courses/csintro
https://microbit.org/teach/classroom-resources/

- Design Process Activities
  - SEL - 3-5
    - My Mouth is a Volcano
    - Bucket Filler
    - A Bug and A Wish
    - A Bad Cast of Tattle Tongue
  - Team Building
    - Build a Boat
    - Catapult Challenge
    - Spaghetti Tower
    - Marshmallow Tower

Interdisciplinary Connections

SL.3.1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly.

- A. Explicitly draw on previously read text or material and other information known about the topic to explore ideas under discussion.
- B. Follow agreed-upon norms for discussions (e.g., gaining the floor in respectful ways, listening to others with

care, speaking one at a time about the topics and texts under discussion).
- C. Ask questions to check understanding of information presented, stay on topic, and link their comments to the remarks of others.
- D. Explain their own ideas and understanding in light of the discussion.

SL.4.1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 4 topics and texts, building on others' ideas and expressing their own clearly.
- A. Explicitly draw on previously read text or material and other information known about the topic to explore ideas under discussion.
- B. Follow agreed-upon rules for discussions and carry out assigned roles.
- C. Pose and respond to specific questions to clarify or follow up on information, and make comments that contribute to the discussion and link to the remarks of others.
- D. Review the key ideas expressed and explain their own ideas and understanding in light of the discussion

SL.5.1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts, building on others' ideas and expressing their own clearly.
- A. Explicitly draw on previously read text or material and other information known about the topic to explore ideas under discussion.
- B. Follow agreed-upon rules for discussions and carry out assigned roles.
- C. Pose and respond to specific questions by making comments that contribute to the discussion and elaborate on the remarks of others.
- D. Review the key ideas expressed and draw conclusions in light of information and knowledge gained from the discussions.

NJSLS Career Readiness, Life Literacies, and Key Skills

9.4.5.CT.3: Describe how digital tools and technology may be used to solve problems.

9.4.5.CT.4: Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global (e.g., 6.1.5.CivicsCM.3).

9.4.5.DC.5: Identify the characteristics of a positive and negative online identity and the lasting implications of online activity.

9.4.5.DC.7: Explain how posting and commenting in social spaces can have positive or negative consequences.

Practices
- CLKSP1 Act as a responsible and contributing community member and employee.

- CLKSP3 Consider the environmental, social, and economic impacts of decisions.
- CLKSP4 Demonstrate creativity and innovation.
- CLKSP5 Utilize critical thinking to make sense of problems and persevere in solving them.
- CLKSP6 Model integrity, ethical leadership and effective management.

Social Emotional Learning Competencies

- **Self-Awareness**: ability to recognize one's emotions and know one's strengths and limitations
    - Connections:
        - Reflecting on one's learning (Oral, Thumbs Up, Thumbs Down, Pictures, etc.)
        - Feelings chart
        - Movement breaks
        - Headphones for lower volume
        - Privacy boards when working independently

- **Self-Management**: ability to regulate and control one's emotions and behaviors, particularly in stressful situations
    - Connections:
        - Visit the mindfulness/cool down corner in the classroom for self-soothing activities (Squishy ball, sand timer, fidget popper, etc.)
        - Take a drawing break
        - Look at book
        - Have visual prompt for teacher assistance

- **Social Awareness**: ability to take the perspective of others, demonstrate empathy, acknowledge and appreciate similarities and differences, and understand how one's actions influence and are influenced by others
    - Connections:
        - Engage in discussions with peers

        - Including others when noticing they are left out (in social play situations when practicing rules)
        - Engaging in discussion around *The Golden Rule* when developing rules and problem solving throughout the unit.

- **<u>Relationship Skills</u>**: refers to one's ability to demonstrate prosocial skills and behaviors in order to develop meaningful relationships and resolve interpersonal conflicts
    - Connections:
        - Provide opportunities to have turn and talks
        - Engage in discussions around the importance of discussing problems to work collaboratively to create solutions and develop expectations of how interact and engage with peers
        - Use a problem box to address problems in the classroom

- **<u>Responsible Decision-Making</u>**: refers to the ability to use multiple pieces of information to make ethical and responsible decisions
    - Connections:
        - Developing and following rules in the classroom community
        - Following directions

New Jersey Student Learning Standards for Computer Science and Design Thinking
UNIT 2- Our Community
Kindergarten

Project Idea:
Students will build a community as they learn about the roles that its members play. Students will work in groups to create a map and create a blueprint for their community. They will think about the tools needed for the various buildings in a community. Blueprints will be shared with the following grades with the goal indicated:

Grade 1: Build roads
Grade 2: Infrastructure for water
Grade 3: Build the actual community buildings.
Once they have decided on the businesses that will be in the center, they will design and build the tools necessary for workers.

Problem Statement:

Towns need to be functional to ensure they meet the needs of the citizens. They need to know and represent the communities and its members is essential. Students will come to understand the difference between needs and wants and how this applies to a community.

Launch

Students will take a working trip to observe and draw what they see in a graphic organizer. They will then see a short skit where someone needs a hospital, look at the map, do we have one? Is there one nearby? The librarian will read *Thank You Neighbor* by Ruth Chan and discuss communites.

Design Thinking	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. 8.2.2.ED.2: Collaborate to solve a simple problem, or to illustrate how to build a product using the design process. 8.2.2.ED.3: Select and use appropriate tools and materials to build a product using the design process.
Design Thinking	Limitations (constraints) must be considered when engineering designs.	8.2.2.ED.4: Identify constraints and their role in the engineering design process.
Design Thinking	Human needs and desires determine which new tools are developed.	8.2.2.ITH.1: Identify products that are designed to meet human wants or

		needs. 8.2.2.ITH.2: Explain the purpose of a product and its value.
Design Thinking	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. 8.2.2.ITH.4: Identify how various tools reduce work and improve daily tasks. 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.
Design Thinking	Innovation and the improvement of existing technology involves creative thinking.	8.2.2.NT.2: Brainstorm how to build a product, improve a designed product, fix a product that has stopped working, or solve a simple problem.

New Jersey Student Learning Standards for Computer Science and Design Thinking
Kinder - UNIT 2: Our Community

Essential Questions

- How do we, as people, develop a plan for a community so that we meet our everyday needs and wants?

Student Learning Objectives

Students will be able to:

- Communicate the function of a product or device.
- Collaborate to solve a simple problem, or to illustrate how to build a product using the design process.
- Select and use appropriate tools and materials to build a product using the design process.

- Identify constraints and their role in the engineering design process.
- Identify products that are designed to meet human wants or needs.
- Explain the purpose of a product and its value.
- Identify how technology impacts or improves life.
- Identify how various tools reduce work and improve daily tasks.
- Design a solution to a problem affecting the community in a collaborative team and explain the intended impact of the solution.
- Brainstorm how to build a product, improve a designed product, fix a product that has stopped working, or solve a simple problem.

Modifications	
English Language Learners	● Feelings chart ● Pantomime actions and words to provide clarification ● Provide opportunities for students to turn and talk. ● Include hands-on activities. ● Model fluency, intonation, and inflection while reading aloud. ● Model productive and engaging partner talk. ● Stop often to monitor and check for understanding. ● Allow handheld translator. ● Consult with ESL teacher
Special Education	● Use preferential seating. ● Ask students to recall what they already learned in ways that activate their prior knowledge and allow them to build on that knowledge. ● Provide direct instruction and reinforce vocabulary with pictures. ● Include hands-on activities. ● Model fluency, intonation, and inflection while reading aloud. ● Model productive and engaging partner talk. ● Model text to word connections. ● Offer different seating options.

At-Risk	● Limit the amount of information per page ● Use preferential seating. ● Ask students to recall what they already learned in ways that activate their prior knowledge and allow them to build on that knowledge. ● Provide direct instruction and reinforce vocabulary with pictures. ● Provide opportunities for students to turn and talk. ● Include hands-on activities. ● Model fluency, intonation, and inflection while reading aloud. ● Model productive and engaging partner talk. ● Use of timers ● Frequent check-ins
Gifted and Talented	● Engaging partner talk ● Problem solving ● Share solutions ● Brainstorming ● Provide additional opportunities to record their ideas
504	● Use preferential seating. ● Ask students to recall what they already learned in ways that activate their prior knowledge and allow them to build on that knowledge. ● Provide direct instruction and reinforce vocabulary with pictures. ● Provide opportunities for students to turn and talk. ● Include hands-on activities. ● Model fluency, intonation, and inflection while reading aloud. ● Model productive and engaging partner talk. ● Provide audio books or headphones when available. ● Include visual supports like large or personalized texts for better viewing. ● Offer different seating options. ● Model text to word connections.

Suggested Learning Activities Directly Connected to Student Learning Objectives

- Communicate the function of a product or device and collaborate to solve a simple problem, or to illustrate how to build a product using the design process by exploring the flow of the design process through the following activity:
  - The Engineering Design Process
- Communicate the function of a product or device, identify how technology impacts or improves life, identify how various tools reduce work and improve daily tasks, select and use appropriate tools and materials to build a product using the design process, identify constraints and their role in the engineering design process and identify products that are designed to meet human wants or needs by mapping out a city street that meets the needs of the community by planning and mapping a community street using:
  - Colorful Business Map
- Explain the purpose of a product and its value, identify how various tools reduce work and improve daily tasks, design a solution to a problem affecting the community in a collaborative team and explain the intended impact of the solution and brainstorm how to build a product, improve a designed product, fix a product that has stopped working, or solve a simple problem by:
  - Brainstorming and collaborating on the needs and wants of community stakeholders in building a city. They will sketch a map placing various businesses as needs of the city. They will then decide what tools each business would need to operate. The students will then make the tools of the trade using various materials. Community Helpers and STEAM Journal

Facilitation Questions to Refer to Throughout Project **COMPREHENSION:** **Ask questions that ensure students understand content and skills needed to solve the problem.** **APPLICATION:** **Ask questions that ensure the ability of students to apply learning to new situations.**	**Comprehension:** ● What is the difference between a need and a want? ● Who are community members? ● Who are the essential members of a community? ● Who might be an important member of our school community? ● How do we learn about something new? ● What is the importance of maps?

CONNECTION: **Ask questions that ensure the ability of students to apply learning to their lives.** **SYNTHESIS:** **Ask questions that encourage students to create new information from existing data.** **METACOGNITION:** **Ask questions which prompt students to think about their own thinking process.**	● What is a blueprint? ● Why are labels important when creating maps? ● Why should we add symbols/keys to our map/blueprint? ● What shapes are buildings? Why? ● What tools can you find in your community buildings? ● What artifacts would be left behind from our community? ● What do shapes look like from different perspectives? (2D/3D & Birdseye Views) ● How have our community tools have improved over time? **Application:** ● What does our community have & why? ● What does our community need & why? ● What might change if a building was shaped like a circle, triangle..? **Connection:** ● What is in your community? (thinking community walk) ● Have you always lived in Oradell or have you ever lived somewhere else? How might they differ? How are they similar? ● How are your needs and wants different from each other/community? **Synthesis:** ● Where might you want to build certain places?

	Why? ● If you have a big/small population, how large or small might you have to build your community buildings? ● What might happen to your map if the buildings' sizes change? **Metacognition:** ● What do you find the most challenging about using others' plans/creating plans for someone else? ● When creating your group's project, how did you plan, use your materials and was anything left out or added later? ● What did you enjoy the most when you were designing your community? ● Reflecting on the design process, which step was most challenging and why? How did you grow from it?

Evidence of Learning - Assessment

Formative:

- Teacher observations
- Discussion questions

Summative:

- Completed Maps of Community
- Tools of the trade for community members

Core Instructional Materials

Community Research - Members of our Community
Community Books,
Scholastic Articles
Model Magic, Aprons - Uniforms, toothpicks, paint, sidewalk paper, cardboard boxes, cutting tools (for creation of tools found in each building/artifacts of society's needs

Digital Resources

Kinder Resources

Interdisciplinary Connections

Language Arts:

Reading:

Students will be learning about community helpers in Unit 5: Growing Expertise in Informational Books.

RI.K.1. With prompting and support, ask and answer questions about key details in a text.
RI.K.2. With prompting and support, identify the main topic and retell key details of a text.
RI.K.3. With prompting and support, describe the connection between two individuals, events, ideas, or pieces of information in a text.

Speaking and Listening:

SL.K.1. Participate in collaborative conversations with diverse partners about kindergarten topics and texts with peers and adults in small and larger groups.
Follow agreed-upon norms for discussions (e.g., listening to others with care and taking turns speaking about the topics and texts under discussion).
Continue a conversation through multiple exchanges.
SL.K.2. Confirm understanding of a text read aloud or information presented orally or through other media by asking and answering questions about key details and requesting clarification if something is not understood.
SL.K.3. Ask and answer questions in order to seek help, get information, or clarify something that is not understood.
SL.K.4. Describe familiar people, places, things, and events and, with prompting and support, provide additional detail.
SL.K.6. Speak audibly and express thoughts, feelings, and ideas clearly.

Science:

Students will learn about living things and what they need to survive in Unit 3. Through this discussion, students will brainstorm ideas of what humans need to survive. This will connect directly to the discussion in social studies around the difference between needs and wants. Students will brainstorm types of buildings a town will need to meet the needs of the people living in it.
LS1.C: Organization for Matter and Energy Flow in Organisms
All animals need food in order to live and grow. They obtain their food from plants or from other animals. Plants need water and light to live and grow. (K-LS1-1)
ESS2.E: Biogeology
Plants and animals can change their environment. (K-ESS2-2)
ESS3.A: Natural Resources
Living things need water, air, and resources from the land,
and they live in places that have the things they need. Humans use natural
resources for everything they do. (K-ESS3-1)
ESS3.C: Human Impacts on Earth Systems
Things that people do to live comfortably can affect the world around them. But they can make choices that reduce their impacts on the land, water, air, and other living things. (secondary to K-ESS2-2),(K-ESS3-3)

Math:
Students will learn about geometrical shapes in Unit 3. When designing the blueprint for their town, students will recall various shapes and the difference between two-dimensional and three-dimensional shapes.
K.GA. Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres).
1. Describe objects in the environment using names of shapes, and describe the relative positions of these objects using terms such as above, below, beside, in front of, behind, and next to.
2. Correctly name shapes regardless of their orientations or overall size.
3. Identify shapes as two-dimensional (lying in a plane, “flat”) or three-dimensional (“solid”).

Social Studies:
Students will learn about communities and community helpers in Unit 2. In class they will discuss how all community members’ actions and decisions impact the community overall, and learn about the difference between needs and wants. After this is established, students learn about their own town of Oradell. Teachers will share how the community of Oradell has changed over time using maps and stories from the past and present (Invite in members who have lived

in the community since childhood to share as well as use Oradell library/historian as a resource to learn about the sequence of events that brought about change in the community.). Students will then brainstorm what they feel should be included in the building of a town, keeping in mind the difference between wants and needs.

6.1.2.EconET.1: Explain the difference between needs and wants.
6.1.2.EconEM.1: Describe the skills and knowledge required to produce specific goods and services.
6.1.2.CivicsPI.4: Explain how all people, not just official leaders, play important roles in a community.
6.1.2.HistoryCC.1: Use multiple sources to create a chronological sequence of events that describes how and why your community has changed over time.

NJSLS Career Readiness, Life Literacies, and Key Skills

9.1.2. FI.1: Differentiate the various forms of money and how they are used (e.g., coins, bills, checks, debit and credit cards).
9.1.2.FP.2: Differentiate between financial wants and needs.
9.1.2.FP.3: Identify the factors that influence people to spend or save (e.g., commercials, family, culture, society)
9.1.2.PB.1: Determine various ways to save and places in the local community that help people save and accumulate money over time.
9.1.2.RM.1: Describe how valuable items might be damaged or lost and ways to protect them.
9.2.2.CAP.1: Make a list of different types of jobs and describe the skills associated with each job.
9.2.2.CAP.2: Explain why employers are willing to pay individuals to work.
9.2.2.CAP.4: List the potential rewards and risks to starting a business
9.4.2.CI.1: Demonstrate openness to new ideas and perspectives (e.g., 1.1.2.CR1a, 2.1.2.EH.1, 6.1.2.CivicsCM.2).
9.4.2.CI.2: Demonstrate originality and inventiveness in work (e.g., 1.3A.2CR1a).
9.4.2.CT.1: Gather information about an issue, such as climate change, and collaboratively brainstorm ways to solve the problem (e.g., K-2-ETS1-1, 6.3.2.GeoGI.2).
9.4.2.CT.2: Identify possible approaches and resources to execute a plan (e.g., 1.2.2.CR1b, 8.2.2.ED.3).
9.4.2.CT.3: Use a variety of types of thinking to solve problems (e.g., inductive, deductive)
9.4.2.DC.7: Describe actions peers can take to positively impact climate change (e.g., 6.3.2.CivicsPD.1).

Practices

- CLKSP1 Act as a responsible and contributing community member and employee.
- CLKSP3 Consider the environmental, social, and economic impacts of decisions.
- CLKSP4 Demonstrate creativity and innovation.

- CLKSP5 Utilize critical thinking to make sense of problems and persevere in solving them.
- CLKSP6 Model integrity, ethical leadership and effective management.

Social Emotional Learning Competencies

- **Self-Awareness**: ability to recognize one's emotions and know one's strengths and limitations
    - Connections:
        - Reflecting on one's learning (Oral, Thumbs Up, Thumbs Down, Pictures, etc.)
        - Feelings chart
        - Movement breaks
        - Headphones for lower volume
        - Privacy boards when working independently

- **Self-Management**: ability to regulate and control one's emotions and behaviors, particularly in stressful situations
    - Connections:
        - Visit the mindfulness/cool down corner in the classroom for self-soothing activities (Squishy ball, sand timer, fidget popper, etc.)
        - Take a drawing break
        - Look at book
        - Have visual prompt for teacher assistance

- **Social Awareness**: ability to take the perspective of others, demonstrate empathy, acknowledge and appreciate similarities and differences, and understand how one's actions influence and are influenced by others
    - Connections:
        - Engage in discussions with peers
        - Including others when noticing they are left out (in social play situations when practicing rules)
        - Engaging in discussion around *The Golden Rule* when developing rules and problem solving

throughout the unit.

- **Relationship Skills**: refers to one's ability to demonstrate prosocial skills and behaviors in order to develop meaningful relationships and resolve interpersonal conflicts
    - Connections:
        - Provide opportunities to have turn and talks
        - Engage in discussions around the importance of discussing problems to work collaboratively to create solutions and develop expectations of how interact and engage with peers
        - Use a problem box to address problems in the classroom

- **Responsible Decision-Making**: refers to the ability to use multiple pieces of information to make ethical and responsible decisions
    - Connections:
        - Developing and following rules in the classroom community
        - Following directions

New Jersey Student Learning Standards for Computer Science and Design Thinking
UNIT 3
Grade 1 - The Road to ?

Project Idea:
Students will work with the Kindergarten town plan, to make roads that will include traffic lights, bike paths and what mass transportation would be needed in the town. All towns need effective roadways that help community members in

their daily routines. Due to climate change conserving energy and reducing transportation emissions is essential and towns now need better modes of transportation including bike baths that can better connect to our community needs. Students will program Kibo to ride the roads, pathways and bike paths to test them for future community use.

Problem Statement:

It is important to consider animals and their habitats in addition to ways to reduce our carbon footprint when making decisions to develop roadways in a community. Local government needs to be included to fully understand the process of this development.

Launch

Students will use various materials such as clay, stones and sand to build roads, they will then test them in the sun, rain, and traffic to see if they can withstand weathering and erosion.

Library - Read aloud and discussion: *Crossings* by Katy Duffield and *Make Way for Animals* by Meeg Pincus. Videos: *Animals Use Special Bridge to Cross Highway* and/or *BBC News: The Animal Crossing Helping Wildlife Between Mountains*.

Disciplinary Concept	**Core Idea**	**Performance Expectations**
Interaction of Technology and Humans	Human needs and desires determine which new tools are developed.	8.2.2.ITH.1: Identify products that are designed to meet human wants or needs. 8.2.2.ITH.2: Explain the purpose of a product and its value.
Interaction of Technology and Humans	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. 8.2.2.ITH.4: Identify how various tools reduce work and improve daily tasks. 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.
Engineering Design	Engineering design is a creative process for meeting	8.2.2.ED.1: Communicate the function

	human needs or wants that can result in multiple solutions	of a product or device. 8.2.2.ED.2: Collaborate to solve a simple problem, or to illustrate how to build a product using the design process. 8.2.2.ED.3: Select and use appropriate tools and materials to build a product using the design
Engineering Design	Limitations (constraints) must be considered when engineering designs	8.1.2.AP.3: Create programs with sequences and simple loops to accomplish tasks.
Algorithms & Programming	Complex tasks can be broken down into simpler instructions, some of which can be broken down even further.	8.1.2.AP.4 - Break down a task into a sequence of steps
Algorithms & Programming	People work together to develop programs for a purpose, such as expressing ideas or addressing problems. The development of a program involves identifying a sequence of events, goals, and expected outcomes, and addressing errors (when necessary).	8.1.2.AP.5 - Describe a program's sequence of events, goals, and expected outcomes. 8.1.2.AP.6 - Debug errors in an algorithm or program that includes sequences and simple loops.
Nature of Technology	Innovation and the improvement of existing technology involves creative thinking	8.2.2.NT.1 - Model and explain how a product works after taking it apart, identifying the relationship of each part, and putting it back together. 8.2.2.NT.2 - Brainstorm how to build a product, improve a designed
Effect of Technology on the Natural World	The use of technology developed for the human designed world can affect the environment, including	8.2.2.ETW.1: Classify products as resulting from nature or produced as a

	land, water, air, plants, and animals. Technologies that use natural sources can have negative effects on the environment, its quality, and inhabitants. Reusing and recycling materials can save money while preserving natural resources and avoiding damage to the environment.	result of technology. 8.2.2.ETW.2: Identify the natural resources needed to create a product. 8.2.2.ETW.3: Describe or model the system used for recycling technology. 8.2.2.ETW.4: Explain how the disposal of or reusing a product affects the local and global environment.

UNIT 3: The Road to ?
Essential Questions ● How do we, as community members, build roadways/paths so that our wildlife is protected and emissions are reduced?
Student Learning Objectives Students will be able to: ● Identify products that are designed to meet human wants or needs. ● Explain the purpose of a product and its value. ● Identify how technology impacts or improves life. ● Identify how various tools reduce work and improve daily tasks ● Design a solution to a problem affecting the community in a collaborative team and explain the intended impact of the solution. ● Communicate the function of a product or device. ● Collaborate to solve a simple problem, or to illustrate how to build a product using the design process. ● Select and use appropriate tools and materials to build a product using the design process. ● Identify constraints and their role in the engineering design process. ● Create programs with sequences and simple loops to accomplish tasks. ● Break down a task into a sequence of steps

- Describe a program's sequence of events, goals, and expected outcomes.
- Debug errors in an algorithm or program that includes sequences and simple loops
- Model and explain how a product works after taking it apart, identifying the relationship of each part, and putting it back together.
- Brainstorm how to build a product, improve a designed
- Brainstorm how to build a product, improve a designed
- Classify products as resulting from nature or produced as a result of technology.
- Identify the natural resources needed to create a product.
- Describe or model the system used for recycling technology.
- Explain how the disposal of or reusing a product affects the local and global environment

Modifications	
English Language Learners	● Feelings chart ● Pantomime actions and words to provide clarification ● Provide opportunities for students to turn and talk. ● Include hands-on activities. ● Model fluency, intonation, and inflection while reading aloud. ● Model productive and engaging partner talk. ● Stop often to monitor and check for understanding. ● Allow handheld translator. ● Consult with ESL teacher
Special Education	● Use preferential seating. ● Ask students to recall what they already learned in ways that activate their prior knowledge and allow them to build on that knowledge. ● Provide direct instruction and reinforce vocabulary with pictures. ● Include hands-on activities. ● Model fluency, intonation, and inflection while reading aloud. ● Model productive and engaging partner talk.

	● Model text to word connections. ● Offer different seating options.
At-Risk	● Limit the amount of information per page ● Use preferential seating. ● Ask students to recall what they already learned in ways that activate their prior knowledge and allow them to build on that knowledge. ● Provide direct instruction and reinforce vocabulary with pictures. ● Provide opportunities for students to turn and talk. ● Include hands-on activities. ● Model fluency, intonation, and inflection while reading aloud. ● Model productive and engaging partner talk. ● Use of timers ● Frequent check-ins
Gifted and Talented	● Engaging partner talk ● Problem solving ● Share solutions ● Brainstorming ● Provide additional opportunities to record their ideas
504	● Use preferential seating. ● Ask students to recall what they already learned in ways that activate their prior knowledge and allow them to build on that knowledge. ● Provide direct instruction and reinforce vocabulary with pictures. ● Provide opportunities for students to turn and talk. ● Include hands-on activities. ● Model fluency, intonation, and inflection while reading aloud. ● Model productive and engaging partner talk. ● Provide audio books or headphones when available. ● Include visual supports like large or personalized texts for better viewing.

	● Offer different seating options. ● Model text to word connections.

Suggested Learning Activities Directly Connected to Student Learning Objectives

Students will be able to:

- Identify products that are designed to meet human wants or needs, explain the purpose of a product and its value, identify how technology impacts or improves life and identify how various tools reduce work and improve daily tasks
    - By reading the kindergarten blueprints and discussing the layout of the water system. Students will discuss how they can build roads, pathways and bike paths to connect streets. They will discuss what limitations they may have and how to work with them.
- Design a solution to a problem affecting the community in a collaborative team and explain the intended impact of the solution, communicate the function of a product or device, collaborate to solve a simple problem, or to illustrate how to build a product using the design process, select and use appropriate tools and materials to build a product using the design process and identify constraints and their role in the engineering design process.
    - By brainstorming, planning and designing roads and paths that take into consideration protected land and animal habitats. They will also look at the various materials that are available for roads and paths to find which they believe would be best for the environment.
- Create programs with sequences and simple loops to accomplish tasks, break down a task into a sequence of steps, describe a program's sequence of events, goals, and expected outcomes, debug errors in an algorithm or program that includes sequences and simple loops, model and explain how a product works after taking it apart, identifying the relationship of each part, and putting it back together, and brainstorm how to build a product, improve a designed
    - By programming Kibo to test the roads and paths to see if they can withstand weights and weather.
- Brainstorm how to build a product, improve a designed, classify products as resulting from nature or produced as a result of technology, identify the natural resources needed to create a product, describe or model the system used for recycling technology, and explain how the disposal of or reusing a product affects the local and global environment
    - By looking at products made of natural materials and those made of recycled/reused materials. Paving with tar, asphalt, plastics

Facilitation Questions to Refer to Throughout Project **COMPREHENSION:** **Ask questions that ensure students understand content and skills needed to solve the problem.** **APPLICATION:** **Ask questions that ensure the ability of students to apply learning to new situations.** **CONNECTION:** **Ask questions that ensure the ability of students to apply learning to their lives.** **SYNTHESIS:** **Ask questions that encourage students to create new information from existing data.** **METACOGNITION:** **Ask questions which prompt students to think about their own thinking process.**	**Comprehension:** ● What animals live in suburban towns? ● What do animals need to live? ● What are the rules in a community? ● What are community rules around traffic? ● What are different types of transportation? **Application:** ● Why is it important to consider the animals who live in the area where we are planning to build? ● What would be the best ways to travel through town? ● Why is it important to follow traffic rules? **Connection:** ● How do animals adapt to their environment? ● How would a bike path impact the community? ● Why is it important for members of a community to work together to develop community projects such as roadways and bike paths? ● Why would having alternatives to roads impact the community? **Synthesis:** ● How do you design roadways that protect animals' habitats while considering community safety? ● How would we make decisions in developing roadways in a town if we no longer had cold winters? ● How would our decisions change if our town was near the beach?

	● How would an increase in population of the town impact the plans we made? **Metacognition:** ● What do you find the most challenging about using others' plans/creating plans for someone else? ● When creating your group's project, how did you plan, use your materials and was anything left out or added later? ● What did you enjoy the most when you were designing your community? ● Reflecting on the design process, which step was most challenging and why? How did you grow from it?

Evidence of Learning - Assessment

Formative:

- Teacher observations
- Discussion questions
- Review Kindergarten's blueprints for the town and make modifications.
- Journal check - Brainstorm other factors that may come into play when making decisions on building roads. (animal habitats, possible roadway designs)
- List of community members to reach out to in order to learn more about local rules around building/protecting wildlife.
- Completed blueprint of roadways/pathways with any modifications.

Summative:

- Completed Rubric
- Final Presentation

- STEAM Journal

Core Instructional Materials

- Model magic
- Black paper
- Sand
- Stones
- Play dough
- Paint
- White paper
- Books
    - *Crossings* by Katy Duffield
    - *Make Way for Animals* by Meeg Pincus.

Digital Resources

'Plastic Roads' Are Paved With Good Intention | The Pew Charitable Trusts (picture of road made from recycled plastic)

- Videos:
    - *Animals Use Special Bridge to Cross Highwayr*
    - *BBC News: The Animal Crossing Helping Wildlife Between Mountains*.
- Books
    - *Read Symbols* by Tana Hoban
    - *Shapes, Shapes, Shapes* by Tana Hoban
    - *Builder Brothers, Better Together* by Drew Scott

Community Partner Resources:

- Environmental:- Zoo member to share about how to protect animals
    - Contact: friends@friendsofbergencountyzoo.org
- Oradell Zoning Board - Write letter to invite representatives from Town Council in to share about their job with regards to this project.
    - Gabrielle Ferrezza (201) 261-8005
- Mayor and Council
    - Deputy Borough Clerk: (201) 261-8200 ext. 249

Interdisciplinary Connections

Language Arts:

This project will take place at the end of the school year.

Writing:

Students will compose a fiction story about the K-3 community as part of the independent writing choice in Unit 7: Independent Writing Projects Across the Genres

W.1.3. Write narratives in which they recount two or more appropriately sequenced events, include some details regarding what happened, use temporal words to signal event order, and provide some sense of closure.
W.1.5. With guidance and support from adults, focus on a topic, respond to questions and suggestions from peers and self-reflection, and add details to strengthen writing and ideas as needed.
W.1.8. With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.
Language:
L.1.1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.

E. Use singular and plural nouns with matching verbs in basic sentences (e.g., He hops; We hop).

G. Use verbs to convey a sense of past, present, and future (e.g., Yesterday I walked home; Today I walk home; Tomorrow I will walk home).

Reading:

In Unit 7: FICTION: Studying Characters and Their Stories, students will revisit fictional characters and use this information in their writing a story about the K-3 community.

RL.1.1. Ask and answer questions about key details in a text.
RL.1.2. Retell stories, including key details, and demonstrate understanding of their central message or lesson.

Speaking and Listening:

SL.1.1. Participate in collaborative conversations with diverse partners about *grade 1 topics and texts* with peers and adults in small and larger groups.

A. Follow agreed-upon norms for discussions (e.g., listening to others with care, speaking one at a time about the topics and texts under discussion).
B. Build on others' talk in conversations by responding to the comments of others through multiple exchanges.
C. Ask questions to clear up any confusion about the topics and texts under discussion.

SL.1.2. Ask and answer questions about key details in a text read aloud or information presented orally or through other media.

SL.1.3. Ask and answer questions about what a speaker says in order to gather additional information or clarify something that is not understood.

Science:

After learning about animals, their habitats, and how animals adapt to their environment in Unit 2: Life Science: Structure and Function, students will engage in a discussion about the importance of considering the animals who live in Oradell when making decisions to develop roadways in a community. Students will brainstorm ideas such as building walkways/bike paths in addition to roads when appropriate.

LS1.A: Structure and Function

All organisms have external parts. Different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water and air. Plants also have different parts (roots, STEAMs, leaves, flowers, fruits) that help them survive and grow. (1-LS1-1)

LS1.B: Growth and Development of Organisms

Adult plants and animals can have young. In many kinds of animals, parents and the offspring themselves engage in behaviors that help the offspring to survive. (1-LS1-2)

LS1.D: Information Processing

Animals have body parts that capture and convey different kinds of information needed for growth and survival. Animals respond to these inputs with behaviors that help them survive. Plants also respond to some external inputs. (1-LS1-1)

Math:

After completing Unit 4: Measurement and Data, students will apply their learning to the planning and construction of the roads in the community.

1.MD.A. Measure lengths indirectly and by iterating length units.
1.MD.C. Represent and interpret data.
2.OA.A. Represent and solve problems involving addition and subtraction.
2.OA.C. Add and subtract within 20.
2.OA.D. Work with addition and subtraction equations.

Social Studies:
In Unit 4 - Around Our World, students will revisit what they learned about rules in Unit 1 and consider how local governments make rules that impact communities. Students will also take into consideration how the needs of the community will impact decisions around transportation. Students will revisit this content as they learn about how building roads, including traffic lights, stop signs, etc. require research of traffic patterns to ensure public safety. Students will think about their community of Oradell to decide what types of roads will best service the community, including the possibility of bike paths throughout the town as a way of transportation.

6.1.2.CivicsPI.3: Explain how individuals work with different levels of government to make rules
6.1.2.Geo.HE.2: Describe how human activities affect the culture and environmental characteristics of places or regions (e.g., transportation, housing, dietary needs).

NJSLS Career Readiness, Life Literacies, and Key Skills

- 9.1.2. FI.1: Differentiate the various forms of money and how they are used (e.g., coins, bills, checks, debit and credit cards).
- 9.1.2.FP.1: Explain how emotions influence whether a person spends or saves money.
- 9.1.2.FP.2: Differentiate between financial wants and needs.
- 9.1.2.PB.1: Determine various ways to save and places in the local community that help people save and accumulate money over time
- 9.1.2.RM.1: Describe how valuable items might be damaged or lost and ways to protect them.
- 9.4.2.CI.1 Demonstrate openness to new ideas and perspectives (e.g., 1.1.2.CR1a, 2.1.2.EH.1, 6.1.2.CivicsCM.2).
- 9.4.2.CI.2 Demonstrate originality and inventiveness in work (e.g., 1.3A.2CR1a).

- 9.4.2.CT.1 Gather information about an issue, such as climate change, and collaboratively brainstorm ways to solve the problem (e.g., K-2-ETS1-1, 6.3.2.GeoGI.2).
- 9.4.2.CT.2 Identify possible approaches and resources to execute a plan (e.g., 1.2.2.CR1b, 8.2.2.ED.3).
- 9.4.2.CT.3 Use a variety of types of thinking to solve problems (e.g., inductive, deductive).
- 9.4.2.DC.7 Describe actions peers can take to positively impact climate change (e.g., 6.3.2.CivicsPD.1).

Practices

- CLKSP1 Act as a responsible and contributing community member and employee.
- CLKSP3 Consider the environmental, social, and economic impacts of decisions.
- CLKSP4 Demonstrate creativity and innovation.
- CLKSP5 Utilize critical thinking to make sense of problems and persevere in solving them.
- CLKSP6 Model integrity, ethical leadership and effective management.

Social Emotional Learning Competencies

- **Self-Awareness**: ability to recognize one's emotions and know one's strengths and limitations
    - Connections:
        - Reflecting on one's learning (Oral, Thumbs Up, Thumbs Down, Pictures, etc.)
        - Feelings chart
        - Movement breaks
        - Headphones for lower volume
        - Privacy boards when working independently

- **Self-Management**: ability to regulate and control one's emotions and behaviors, particularly in stressful situations
    - Connections:
        - Visit the mindfulness/cool down corner in the classroom for self-soothing activities (Squishy ball, sand timer, fidget popper, etc.)
        - Take a drawing break
        - Look at book

        - Have visual prompt for teacher assistance

- **Social Awareness**: ability to take the perspective of others, demonstrate empathy, acknowledge and appreciate similarities and differences, and understand how one's actions influence and are influenced by others
    - Connections:
        - Engage in discussions with peers
        - Including others when noticing they are left out (in social play situations when practicing rules)
        - Engaging in discussion around *The Golden Rule* when developing rules and problem solving throughout the unit.

- **Relationship Skills**: refers to one's ability to demonstrate prosocial skills and behaviors in order to develop meaningful relationships and resolve interpersonal conflicts
    - Connections:
        - Provide opportunities to have turn and talks
        - Engage in discussions around the importance of discussing problems to work collaboratively to create solutions and develop expectations of how interact and engage with peers
        - Use a problem box to address problems in the classroom

- **Responsible Decision-Making**: refers to the ability to use multiple pieces of information to make ethical and responsible decisions
    - Connections:
        - Developing and following rules in the classroom community
        - Following directions

Grade 2

Project Idea: Students are a part of building a new community. Before the town can be built, the underground infrastructure needs to be completed. Students will focus on ensuring there is a clean water supply for all members of the community. Students will discuss wants and needs to be sure clean water is available to all who need it.

Problem Statement: Keeping water clean and flowing in a community is a necessity for all.

Launch: In library students will participate in a read aloud and discussion : We are Water Protectors
In STEAM - Students will prepare for an activity in how solids melt. Pull out ice cube trays filled with dirty ice. Discuss why the water would freeze like that?

Disciplinary Concept	Core Idea	Performance Expectations
Data & Analysis	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.
Data & Analysis	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 computing device.
Data & Analysis	Data can be used to make predictions about the world.	8.1.2.DA.4: Make predictions based on data using charts or graphs.
Algorithms & Programming	Individuals develop and follow directions as part of daily life. A sequence of steps can be expressed as an algorithm that a computer can process.	8.1.2.AP.1: Model daily processes by creating and following algorithms to complete tasks.
Algorithms & Programming	Real world information can be stored and manipulated in programs as data (e.g., numbers, words, colors, images).	8.1.2.AP.3: Create programs with sequences and simple loops to accomplish tasks.

Algorithms & Programming	Computers follow precise sequences of steps that automate tasks.	8.1.2.AP.4: Break down a task into a sequence of steps.
Algorithms & Programming	People work together to develop programs for a purpose, such as expressing ideas or addressing problems. The development of a program involves identifying a sequence of events, goals, and expected outcomes, and addressing errors (when necessary).	8.1.2.AP.5: Describe a program's sequence of events, goals, and expected outcomes. 8.1.2.AP.6: Debug errors in an algorithm or program that includes sequences and simple loops.
Nature of Technology	Innovation and the improvement of existing technology involves creative thinking.	8.2.2.NT.1: Model and explain how a product works after taking it apart, identifying the relationship of each part, and putting it back together. 8.2.2.NT.2: Brainstorm how to build a product, improve a designed product, fix a product that has stopped working, or solve a simple problem.
Effects of Technology on the Natural World	The use of technology developed for the human designed world can affect the environment, including land, water, air, plants, and animals.Technologies that use natural sources can have negative effects on the environment, its quality, and inhabitants. Reusing and recycling materials can save money while preserving natural resources and avoiding damage to the environment.	8.2.2.ETW.1: Classify products as resulting from nature or produced as a result of technology. 8.2.2.ETW.2: Identify the natural resources needed to create a product. 8.2.2.ETW.3: Describe or model the system used for recycling technology. 8.2.2.ETW.4: Explain how the disposal of or reusing a product affects the local and global environment.
Engineering Design	Engineering design is a creative process for meeting human needs or wants that can result in multiple	8.2.2.ED.1: Communicate the function of a product or device.

	solutions.	8.2.2.ED.2: Collaborate to solve a simple problem, or to illustrate how to build a product using the design process. 8.2.2.ED.3: Select and use appropriate tools and materials to build a product using the design process.
Engineering Design	Limitations (constraints) must be considered when engineering designs.	8.2.2.ED.4: Identify constraints and their role in the engineering design process.
Interactions of Technology and Humans	Human needs and desires determine which new tools are developed.	8.2.2.ITH.1: Identify products that are designed to meet human wants or needs. 8.2.2.ITH.2: Explain the purpose of a product and its value.
Interactions of Technology and Humans	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. 8.2.2.ITH.4: Identify how various tools reduce work and improve daily tasks. 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.

UNIT 4: Build our Community - Water Resources
Grade 2

Essential Questions

- How do we as community members keep our water clean and flowing into our homes and business

Student Learning Objectives

Students will be able to:

- Collect and present data, including climate change data, in various visual formats.
- Store, copy, search, retrieve, modify, and delete data using a computing device.
- Make predictions based on data using charts or graphsModel daily processes by creating and following algorithms to complete tasks.
- Create programs with sequences and simple loops to accomplish tasks.
- Break down a task into a sequence of steps.
- Describe a program's sequence of events, goals, and expected outcomes.
- Debug errors in an algorithm or program that includes sequences and simple loops by
- Model and explain how a product works after taking it apart, identifying the relationship of each part, and putting it back together.
- Brainstorm how to build a product, improve a designed product, fix a product that has stopped working, or solve a simple problem.
- Classify products as resulting from nature or produced as a result of technology.
- Identify the natural resources needed to create a product.
- Describe or model the system used for recycling technology.
- Explain how the disposal of or reusing a product affects the local and global environment.
- Communicate the function of a product or device.
- Collaborate to solve a simple problem, or to illustrate how to build a product using the design process.
- Select and use appropriate tools and materials to build a product using the design process.
- Identify constraints and their role in the engineering design process.
- Identify products that are designed to meet human wants or needs.
- Explain the purpose of a product and its value.
- Identify how technology impacts or improves life.
- Identify how various tools reduce work and improve daily tasks.
- Design a solution to a problem affecting the community in a collaborative team and explain the intended impact

of the solution.

Modifications	
English Language Learners	● Feelings chart ● Pantomime actions and words to provide clarification ● Provide opportunities for students to turn and talk. ● Include hands-on activities. ● Model fluency, intonation, and inflection while reading aloud. ● Model productive and engaging partner talk. ● Stop often to monitor and check for understanding. ● Allow handheld translator. ● Consult with ESL teacher
Special Education	● Use preferential seating. ● Ask students to recall what they already learned in ways that activate their prior knowledge and allow them to build on that knowledge. ● Provide direct instruction and reinforce vocabulary with pictures. ● Include hands-on activities. ● Model fluency, intonation, and inflection while reading aloud. ● Model productive and engaging partner talk. ● Model text to word connections. ● Offer different seating options.
At-Risk	● Limit the amount of information per page ● Use preferential seating. ● Ask students to recall what they already learned in ways that activate their prior knowledge and allow them to build on that knowledge. ● Provide direct instruction and reinforce vocabulary with pictures. ● Provide opportunities for students to turn and talk.

	● Include hands-on activities. ● Model fluency, intonation, and inflection while reading aloud. ● Model productive and engaging partner talk. ● Use of timers ● Frequent check-ins
Gifted and Talented	● Engaging partner talk ● Problem solving ● Share solutions ● Brainstorming ● Provide additional opportunities to record their ideas
504	● Use preferential seating. ● Ask students to recall what they already learned in ways that activate their prior knowledge and allow them to build on that knowledge. ● Provide direct instruction and reinforce vocabulary with pictures. ● Provide opportunities for students to turn and talk. ● Include hands-on activities. ● Model fluency, intonation, and inflection while reading aloud. ● Model productive and engaging partner talk. ● Provide audio books or headphones when available. ● Include visual supports like large or personalized texts for better viewing. ● Offer different seating options. ● Model text to word connections.

Suggested Learning Activities Directly Connected to Student Learning Objectives

Students will be able to:

- Collect and present data, including climate change data, in various visual formats, store, copy, search, retrieve, modify, and delete data using a computing device, and make predictions based on data using charts or graphs by:
    - Looking at data on climate change in our area over the years

- Comparing and Contrasting NJ Data to US Data
- Predicting what will happen to our climate if we stay on our current course

- Model daily processes by creating and following algorithms to complete tasks, create programs with sequences and simple loops to accomplish tasks, break down a task into a sequence of steps, describe a program's sequence of events, goals, and expected outcomes and debug errors in an algorithm or program that includes sequences and simple loops by:
  - Programming Dash to map out the route that the pipelines will run
    - https://portal.makewonder.com/#/curriculum/complex-parameters
    - https://portal.makewonder.com/#/curriculum/event-handlers-part-1
    - https://portal.makewonder.com/#/curriculum/event-handlers-part-2
    - https://portal.makewonder.com/#/curriculum/multiple-loops
- Model and explain how a product works after taking it apart, identifying the relationship of each part, and putting it back together, brainstorm how to build a product, improve a designed product, fix a product that has stopped working, or solve a simple problem, classify products as resulting from nature or produced as a result of technology, identify the natural resources needed to create a product, describe or model the system used for recycling technology, explain how the disposal of or reusing a product affects the local and global environment, communicate the function of a product or device, collaborate to solve a simple problem, or to illustrate how to build a product using the design process, select and use appropriate tools and materials to build a product using the design process, identify constraints and their role in the engineering design process, identify products that are designed to meet human wants or needs, explain the purpose of a product and its value, identify how technology impacts or improves life, identify how various tools reduce work and improve daily tasks and design a solution to a problem affecting the community in a collaborative team and explain the intended impact of the solution.by designing a water filtration system in small groups, then choosing the design system they believe works best as the model for the town that is being built.
  - Water Filtration System Design
    - Student Project: Make a Water Filter | NASA/JPL Edu
    - Educator Guide: Water Filtration Challenge | NASA/JPL Edu
    - Homemade Water Filter Science Project | LoveToKnow
    - https://kids.nationalgeographic.com/books/article/water-wonders
    - The Dirty Water Project: Design-Build-Test Your Own Water Filters - Activity - TeachEngineering
  - Reservoirs

- https://www.durhamnc.gov/DocumentCenter/View/39583/Move-Like-a-Watershed-Lesson-Plan-
- Virtual Presentation by Veolia

- Natural Resources and Effects of Humans on them
  - Water Quality
  - How Clean is Our Water?
  - Watershed Tourist — Department of Ecosystem Science and Management

Facilitation Questions to Refer to Throughout Project **COMPREHENSION:** **Ask questions that ensure students understand content and skills needed to solve the problem.** **APPLICATION:** **Ask questions that ensure the ability of students to apply learning to new situations.** **CONNECTION:** **Ask questions that ensure the ability of students to apply learning to their lives.** **SYNTHESIS:** **Ask questions that encourage students to create new information from existing data.** **METACOGNITION:** **Ask questions which prompt students to think about their own thinking process.**	**COMPREHENSION** ● What is water? ● Where does the water that we use each day come from? ● What are different sources of water? ● How do we filter water? ● What minerals might we find in water? ● Why is freshwater important? ● Why does water taste different when it comes from different places? ● Why does water vary depending on where it is from? **APPLICATION** ● Is the community's need for water met? Is it just any type of water? (prompt to get the students to identify it must be clean) ● Imagine that one of the businesses in the community is using too much water? What would happen to the o ● ther members of the community? ● Describe what might happen if the water supply gets polluted? **CONNECTION**

	● Why is it important to keep our water supply clean? ● How can we continue to keep water clean for our community? Does our sewer system have an impact on our water systems? If so, explain and how we can prevent future problems. ● Have you ever experienced problems at your own home/school? (low pressure, brown water ect.) **SYNTHESIS** ● What might we have to do as a community if we experience a drought? ● Is there areas in our life that we use water abundantly that is not necessary for everyday living? **METACOGNITION** ● How will you change your behavior or encourage others to change theirs to protect our water and ensure that it remains clean for the future?

Evidence of Learning - Assessment

Formative:
- Teacher observations
- Discussion questions

Summative:
- Completed Project
- Reflection Journal

Core Instructional Materials

PVC Pipe
PVC Elbows

Plastic Pool
Rulers
Marbles
Filters - Coffee and cheese cloth
Cardboard

Digital Resources

- Student Project: Make a Water Filter | NASA/JPL Edu
- Educator Guide: Water Filtration Challenge | NASA/JPL Edu
- Homemade Water Filter Science Project | LoveToKnow
- https://kids.nationalgeographic.com/books/article/water-wonders
- The Dirty Water Project: Design-Build-Test Your Own Water Filters - Activity - TeachEngineering
- https://www.durhamnc.gov/DocumentCenter/View/39583/Move-Like-a-Watershed-Lesson-Plan-Water Quality
- How Clean is Our Water?
- Watershed Tourist — Department of Ecosystem Science and Management

Interdisciplinary Connections

Language Arts:

Writing:

In Unit 4: Opinion: Persuasive Letters and Other Texts, students will research the importance of clean water for all as a shared writing experience.

- W.2.1. Write opinion pieces in which they introduce the topic or book they are writing about, state an opinion, supply reasons that support the opinion, use linking words (e.g., because, and, also) to connect opinion and reasons, and provide a conclusion.
- W.2.5. With guidance and support from adults and peers, focus on a topic and strengthen writing as needed through self-reflection, revising and editing.
- W.2.6. With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers.

Science:

In Unit 3: Life Science: Interdependent Relationships in Ecosystems, students will learn about how living things need access to clean water to survive.

- ESS2.C: The Roles of Water in Earth's Surface Processes
    - Water is found in the ocean, rivers, lakes, and ponds. Water exists as solid ice and in liquid form. (2-ESS2-3)

- ETS1.C: Optimizing the Design Solution
    - Because there is always more than one possible solution to a problem, it is useful to compare and test designs. (secondary to 2-ESS2-1)

- Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena
    - Scientists search for cause and effect relationships to explain natural events.(2-PS1-4)

Math:

In Unit 3: Measurement and Data, students will learn how to choose an appropriate measurement tool and use it correctly to accurately measure materials. This will come into play when students begin planning for the construction of the pipes to carry water to buildings in the community.

- Measurement and Data
    - 2.MD A. Measure and estimate lengths in standard units.
    - Measure the length of an object by selecting and using appropriate tools such as rulers,
- yardsticks, meter sticks, and measuring tapes.

Social Studies:

In Unit 1, students will identify needs within a community and engage in a discussion around issues the community may have that warrants addressing. Through this discussion, conversations for clean water for all will take place as something that all communities need. When learning about the roles and responsibilities of leaders in the community, students will identify who is the contact person for ensuring safe and clean water and what steps the community takes to ensure this.

- 6.1.2.CivicsPI.1: Describe roles and responsibilities of community and local government leaders (e.g., mayor, town council).
- 6.1.2.CivicsPI.5: Describe how communities work to accomplish common tasks, establish responsibilities, and fulfill roles of authority.

- 6.3.2.GeoGI.2: Collect data and consider sources from multiple perspectives to become informed about an environmental issue and identify possible solutions.

Library:
I. INQUIRE Build new knowledge by inquiring, thinking critically, identifying problems, and developing strategies for solving problems.
III. COLLABORATE Work effectively with others to broaden perspectives & work toward common goals.
V. EXPLORE Discover & innovate in a growth mindset developed through experience & reflection.

NJSLS Career Readiness, Life Literacies, and Key Skills

9.4.2.CI.1: Demonstrate openness to new ideas and perspectives (e.g., 1.1.2.CR1a, 2.1.2.EH.1, 6.1.2.CivicsCM.2).
9.4.2.CI.2: Demonstrate originality and inventiveness in work (e.g., 1.3A.2CR1a)
9.4.2.CT.1: Gather information about an issue, such as climate change, and collaboratively brainstorm ways to solve the problem (e.g., K-2-ETS1-1, 6.3.2.GeoGI.2).
9.4.2.CT.2: Identify possible approaches and resources to execute a plan (e.g., 1.2.2.CR1b, 8.2.2.ED.3).
9.4.2.CT.3: Use a variety of types of thinking to solve problems (e.g., inductive, deductive).
9.4.2.DC.3: Explain how to be safe online and follow safe practices when using the internet (e.g., 8.1.2.NI.3, 8.1.2.NI.4).

Practices

- CLKSP1 Act as a responsible and contributing community member and employee.
- CLKSP3 Consider the environmental, social, and economic impacts of decisions.
- CLKSP4 Demonstrate creativity and innovation.
- CLKSP5 Utilize critical thinking to make sense of problems and persevere in solving them.
- CLKSP6 Model integrity, ethical leadership and effective management.

Social Emotional Learning Competencies

- **Self-Awareness**: ability to recognize one's emotions and know one's strengths and limitations
    - Connections:
        - Reflecting on one's learning (Oral, Thumbs Up, Thumbs Down, Pictures, etc.)
        - Feelings chart

        - Movement breaks
        - Headphones for lower volume
        - Privacy boards when working independently

- **<u>Self-Management</u>**: ability to regulate and control one's emotions and behaviors, particularly in stressful situations
    - Connections:
        - Visit the mindfulness/cool down corner in the classroom for self-soothing activities (Squishy ball, sand timer, fidget popper, etc.)
        - Take a drawing break
        - Look at book
        - Have visual prompt for teacher assistance

- **<u>Social Awareness</u>**: ability to take the perspective of others, demonstrate empathy, acknowledge and appreciate similarities and differences, and understand how one's actions influence and are influenced by others
    - Connections:
        - Engage in discussions with peers
        - Including others when noticing they are left out (in social play situations when practicing rules)
        - Engaging in discussion around *The Golden Rule* when developing rules and problem solving throughout the unit.

- **<u>Relationship Skills</u>**: refers to one's ability to demonstrate prosocial skills and behaviors in order to develop meaningful relationships and resolve interpersonal conflicts
    - Connections:
        - Provide opportunities to have turn and talks
        - Engage in discussions around the importance of discussing problems to work collaboratively to create solutions and develop expectations of how interact and engage with peers

        - Use a problem box to address problems in the classroom

- **<u>Responsible Decision-Making</u>**: refers to the ability to use multiple pieces of information to make ethical and responsible decisions
    - Connections:
        - Developing and following rules in the classroom community
        - Following directions

New Jersey Student Learning Standards for Computer Science and Design Thinking
UNIT 5- Weather-proof the Roof - Extreme Weather and Climate Change
Grade 3

Project Idea: Due to Climate Change communities are facing structural problems, when new buildings are constructed they must now consider any extreme weather that they have recently or may experience. The students will use their knowledge of community and weather to build the structures needed for the school community project. Students will look at plans, decide if modifications are needed and what community members need to be advised or involved.
Problem Statement: Extreme weather has changed the needs of communities, builders need to now look at climate change and how it can affect the structures they are erecting.
Launch: Students will be put into 4 groups to engage in a STEAM challenge. Each group will be given different materials to construct a house. We will then have a surprise storm to see how their houses withstand the weather.

Disciplinary Concept	Core Idea	Performance Expectations
Impacts of Computing	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 influenced the changes. 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.
Data & Analysis	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. 8.1.5.DA.4: Organize and present climate change data visually to highlight relationships or support a claim.
Data & Analysis	Many factors influence the accuracy of inferences and predictions.	8.1.5.DA.5: Propose cause and effect relationships, predict outcomes, or communicate ideas using data.
Engineering Design	Engineering design requirements include desired features and limitations that need to be considered.	8.2.5.ED.1: Explain the functions of a system and its Subsystems. 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 or models. 8.2.5.ED.3: Follow step by step directions to assemble a product or solve a problem, using appropriate tools to accomplish the task.
Interactions of Technology and Humans	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 influence the development and function of a product

		and a system.
Interaction of Technology and Humans	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. 8.2.5.ITH.3: Analyze the effectiveness of a new product or system and identify the positive and/or negative consequences resulting from its use. 8.2.5.ITH.4: Describe a technology/tool that has made the way people live easier or has led to a new business or career.
Nature of Technology	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. 8.2.5.NT.2: Identify new technologies resulting from the demands, values, and interests of individuals, businesses, industries, and societies. 8.2.5.NT.3: Redesign an existing product for a different purpose in a collaborative team. 8.2.5.NT.4: Identify how improvement in the understanding of materials science impacts technologies.
Effects of Technology on the Natural World	The use of technology developed for the human designed world can affect the environment, including	8.2.5.ETW.1: Describe how resources such as material, energy, information,

	land, water, air, plants, and animals. Technologies that use natural sources can have negative effects on the environment, its quality, and inhabitants. Reusing and recycling materials can save money while preserving natural resources and avoiding damage to the environment.	time, tools, people, and capital are used in products or systems. 8.2.5.ETW.2: Describe ways that various technologies are used to reduce improper use of resources. 8.2.5.ETW.3: Explain why human-designed systems, products, and environments need to be constantly monitored, maintained, and improved. 8.2.5.ETW.4: Explain the impact that resources, such as energy and materials used to develop technology, have on the environment. 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.l of or reusing a product affects the local and global environment.

UNIT 5: Weatherproof the Roof - Extreme Weather and Climate Change Grade 3
Essential Questions ● How do we build structurally safe buildings and houses for our community so that it can withstand extreme weather?

Student Learning Objectives

Students will be able to:

- Identify computing technologies that have impacted how individuals live and work and describe the factors that influenced the changes.
- Identify possible ways to improve the accessibility and usability of computing technologies to address the diverse needs and wants of users.
- Organize and present collected data visually to communicate insights gained from different views of the data.
- Organize and present climate change data visually to highlight relationships or support a claim.
- Propose cause and effect relationships, predict outcomes, or communicate ideas using data
- Explain the functions of a system and its Subsystems.
- Collaborate with peers to collect information, brainstorm to solve a problem, and evaluate all possible solutions to provide the best results with supporting sketches or models.
- Follow step by step directions to assemble a product or solve a problem, using appropriate tools to accomplish the task.
- Explain how societal needs and wants influence the development and function of a product and a system.
- Evaluate how well a new tool has met its intended purpose and identify any shortcomings it might have.
- Analyze the effectiveness of a new product or system and identify the positive and/or negative consequences resulting from its use.
- Describe a technology/tool that has made the way people live easier or has led to a new business or career.
- Troubleshoot a product that has stopped working and brainstorm ideas to correct the problem.
- Identify new technologies resulting from the demands, values, and interests of individuals, businesses, industries, and societies.
- Redesign an existing product for a different purpose in a collaborative team.
- Identify how improvement in the understanding of materials science impacts technologies.
- Describe how resources such as material, energy, information, time, tools, people, and capital are used in products or systems.
- Describe ways that various technologies are used to reduce improper use of resources.
- Explain why human-designed systems, products, and environments need to be constantly monitored, maintained, and improved.
- Explain the impact that resources, such as energy and materials used to develop technology, have on the environment.

- 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.l of or reusing a product affects the local and global environment.

Suggested Learning Activities Directly Connected to Student Learning Objectives

- Identify computing technologies that have impacted how individuals live and work and describe the factors that influenced the changes, identify possible ways to improve the accessibility and usability of computing technologies to address the diverse needs and wants of users, and describe a technology/tool that has made the way people live easier or has led to a new business or career.
    - By discussing how technology is now being used to build houses using data (3D houses, Modular homes, Cool and Green Roofs,
        - 10 Incredible Custom Home Building Technology In 2021
        - 3D Homes
- Organize and present collected data visually to communicate insights gained from different views of the data, organize and present climate change data visually to highlight relationships or support a claim, propose cause and effect relationships, predict outcomes, or communicate ideas using data, analyze the effectiveness of a new product or system and identify the positive and/or negative consequences resulting from its use, explain how societal needs and wants influence the development and function of a product and a system and evaluate how well a new tool has met its intended purpose and identify any shortcomings it might have
    - By looking at the data from various climate websites and then making a flipgrid predicting the effects of climate change in NJ in the next 25 years
        - **Climate Change Scenarios Projection Map**
        - **https://www.climate.gov/maps-data**
        - **Climate Impact Map**
        - **STEAM Flipgrid**
- Explain the functions of a system and its Subsystems, collaborate with peers to collect information, brainstorm to solve a problem, and evaluate all possible solutions to provide the best results with supporting sketches or models, follow step by step directions to assemble a product or solve a problem, using appropriate tools to accomplish the task, troubleshoot a product that has stopped working and brainstorm ideas to correct the problem, identify new technologies resulting from the demands, values, and interests of individuals, businesses, industries, and societies, redesign an existing product for a different purpose in a collaborative team, identify how

improvement in the understanding of materials science impacts technologies, describe how resources such as material, energy, information, time, tools, people, and capital are used in products or systems, describe ways that various technologies are used to reduce improper use of resources, explain why human-designed systems, products, and environments need to be constantly monitored, maintained, and improved, explain the impact that resources, such as energy and materials used to develop technology, have on the environment and 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.l of or reusing a product affects the local and global environment.

- By participating in the design challenges of
  - Extreme Weather Unit with Weatherproof the Roof Activity
  - Designing and Erect Buildings in the Town of ?

Facilitation Questions to Refer to Throughout Project **COMPREHENSION:** **Ask questions that ensure students understand content and skills needed to solve the problem.** **APPLICATION:** **Ask questions that ensure the ability of students to apply learning to new situations.** **CONNECTION:** **Ask questions that ensure the ability of students to apply learning to their lives.** **SYNTHESIS:** **Ask questions that encourage students to create new**	**Comprehension:** ● What is climate change? ● What is extreme weather? **Application:** ● What evidence did the team find to support the idea that the shape of a roof can reduce the impact of high winds? ● What evidence did the team find to support the idea that metal rods placed along the house and into the ground can reduce the impact of lightning? **Connection:** ● Why is it important to know the weight and shape of roofs? ● Who in the community would we go to with

information from existing data. **METACOGNITION:** **Ask questions which prompt students to think about their own thinking process.**	changes in plans? ● Why is it important to have looked at the climate data before beginning to build or modify a structure? ● **Synthesis:** ● If you have a big/small population, how large or small might you have to build your community buildings? ● What might happen to your map if the buildings' sizes change? **Metacognition:** ● What do you find the most challenging about using others' plans/creating plans for someone else? ● When creating your group's project, how did you plan, use your materials and was anything left out or added later? ● What did you enjoy the most when you were designing your community? ● Reflecting on the design process, which step was most challenging and why? How did you grow from it?

Evidence of Learning - Assessment

Formative:

- Teacher observations

- Discussion questions
- STEAM Notebook
- Plan Approval

Summative:
- Rubric
- Presentation

Core Instructional Materials
Cardboard
Wood
Project Handout
Playdoh
Clay
Sticks
Wood
Plastic Wrap
Bottle Caps
Rulers

Digital Resources
Climate Change Scenarios Projection Map
https://www.climate.gov/maps-data
Climate Impact Map
Extreme weatherproof homes
Six of the Country's Most Weather-Resistant Homes | Builder Magazine
Slides for Weatherproof the Roof
Extreme Weather books
- I Survived True Stories
  - Five Epic Disasters
  - Tornado Terror

National Center for Atmospheric Research SkySci for Kids

- Hurricanes are Changing
- Meet A Tornado
- All About Blizzards

https://www.generationgenius.com/activities/extreme-weather-for-kids/
Earth's Atmosphere

Interdisciplinary Connections

Language Arts:

Through their research, students will learn that decisions community members make with regard to materials used for buildings have a direct impact on climate change. As part of this project, students will write a letter to the local government, persuading them to use solar power in community buildings. This will take place during Unit 6: Opinion: Persuasive Writing

Writing

W.3.1 Write opinion pieces on topics or texts, supporting a point of view with reasons.

Speaking and Listening:

SL.3.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly.

Science:

In Unit 3: Earth and Space systems: Weather and Climate, students will learn about extreme weather. Through discussions around this topic, students will gain an understanding of the need to ensure community buildings are constructed to withstand the elements. Students will research materials of structures and framing, including types of roofs that can sustain high winds, etc. Through classroom discussions students will propose ideas and evaluate each other's responses through the design process. When students visit the library, they will spend time researching examples of hurricanes, tornadoes and other extreme weather conditions to fully understand the impact of extreme weather.

● A variety of natural hazards result from natural processes. Humans cannot eliminate natural hazards but can take steps to reduce their impacts. (3-ESS3-1) (Note: This Disciplinary Core Idea is also addressed by 4-ESS3-2.)

● Cause and effect relationships are routinely identified, tested, and used to explain change. (3-ESS3-1)

● Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s).
○ Make a claim about the merit of a solution to a problem by citing relevant evidence about how it meets the criteria and constraints of the problem. (3-ESS3-1)

Math:
In Unit 5: Measurement and Data, students will learn about area and perimeter. They will use this knowledge as they construct their buildings for the community.

3.M.D. C. Geometric measurement: understand concepts of area and relate area to multiplication and to addition.
5. Recognize area as an attribute of plane figures and understand concepts of area measurement.
a. A square with side length 1 unit, called “a unit square,” is said to have “one square unit” of area, and can be used to measure area.
b. A plane figure which can be covered without gaps or overlaps by n unit squares is said to have an area of n square units.
6. Measure areas by counting unit squares (square cm, square m, square in, square ft, and nonstandard units).
7. Relate area to the operations of multiplication and addition.
a. Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths.
b. Multiply side lengths to find areas of rectangles with whole number side lengths in the

context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning.
c. Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths a and b + c is the sum of a × b and a × c. Use area models to represent the distributive property in mathematical reasoning.
d. Recognize area as an additive. Find areas of rectilinear figures by decomposing them into non overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems.

D. Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.

8. Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.

Social Studies:

In Unit 2: Rights and Responsibilities of Community Members, students will learn more about leaders in the community and the roles they play in ensuring the community is safe. During this project, students will be referred back to the prior learning. Through discussions, students will review the buildings they have constructed and engage in a discussion around leaders in the community, their responsibilities, and the qualities leaders should possess. For example, students will brainstorm who in the community to go to if modifications need to be made to an existing project (i.e. zoning board for expansion).

6.1.5.CivicsCM.4: Examine the responsibilities of differing positions of authority and identify criteria that are likely to make leaders qualified for those positions.

Library

I. INQUIRE Build new knowledge by inquiring, thinking critically, identifying problems, and developing strategies for solving problems.
III. COLLABORATE Work effectively with others to broaden perspectives & work toward common goals.
V. EXPLORE Discover & innovate in a growth mindset developed through experience & reflection.

NJSLS Career Readiness, Life Literacies, and Key Skills

9.1.5.EG.1: Explain and give examples of what is meant by the term “tax.”
9.1.5.EG.2: Describe how tax monies are spent
9.1.5. EG.5: Identify sources of consumer protection and assistance
9.1.5.FI.1: Identify various types of financial institutions and the services they offer including banks, credit unions, and credit card companies.
9.1.5.RMI.1: Identify risks that individuals and households face.
9.1.5.RMI.2: Justify reasons to have insurance.
9.1.8.CP.1: Compare prices for the same goods or services.
9.2.5.CAP.1: Evaluate personal likes and dislikes and identify careers that might be suited to personal likes.
9.2.5.CAP.3: Identify qualifications needed to pursue traditional and non-traditional careers and occupations.
9.2.5.CAP.4: Explain the reasons why some jobs and careers require specific training, skills, and certification (e.g., life guards, child care, medicine, education) and examples of these requirements.
9.2.5.CAP.8: Identify risks that individuals and households face.
9.2.5.CAP.9: Justify reasons to have insurance.
9.4.5.CI.1: Use appropriate communication technologies to collaborate with individuals with diverse perspectives about a local and/or global climate change issue and deliberate about possible solutions (e.g., W.4.6, 3.MD.B.3,7.1.NM.IPERS.6).
9.4.5.CI.2: Investigate a persistent local or global issue, such as climate change, and collaborate with individuals with diverse perspectives to improve upon current actions designed to address the issue (e.g., 6.3.5.CivicsPD.3, W.5.7)
9.4.5.CI.3: Participate in a brainstorming session with individuals with diverse perspectives to expand one’s thinking about a topic of curiosity (e.g., 8.2.5.ED.2, 1.5.5.CR1a).
9.4.5.CI.4: Research the development process of a product and identify the role of failure as a part of the creative process (e.g., W.4.7, 8.2.5.ED.6).
9.4.5.CT.3: Describe how digital tools and technology may be used to solve problems.
9.4.5.CT.4: Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global (e.g., 6.1.5.CivicsCM.3

Practices

- CLKSP1 Act as a responsible and contributing community member and employee.
- CLKSP3 Consider the environmental, social, and economic impacts of decisions.
- CLKSP4 Demonstrate creativity and innovation.
- CLKSP5 Utilize critical thinking to make sense of problems and persevere in solving them.

- CLKSP6 Model integrity, ethical leadership and effective management.

Social Emotional Learning Competencies

- **Self-Awareness**: ability to recognize one's emotions and know one's strengths and limitations
    - Connections:
        - Reflecting on one's learning (Oral, Thumbs Up, Thumbs Down, Pictures, etc.)
        - Feelings chart
        - Movement breaks
        - Headphones for lower volume
        - Privacy boards when working independently

- **Self-Management**: ability to regulate and control one's emotions and behaviors, particularly in stressful situations
    - Connections:
        - Visit the mindfulness/cool down corner in the classroom for self-soothing activities (Squishy ball, sand timer, fidget popper, etc.)
        - Take a drawing break
        - Look at book
        - Have visual prompt for teacher assistance

- **Social Awareness**: ability to take the perspective of others, demonstrate empathy, acknowledge and appreciate similarities and differences, and understand how one's actions influence and are influenced by others
    - Connections:
        - Engage in discussions with peers
        - Including others when noticing they are left out (in social play situations when practicing rules)
        - Engaging in discussion around *The Golden Rule* when developing rules and problem solving throughout the unit.

- **<u>Relationship Skills</u>**: refers to one's ability to demonstrate prosocial skills and behaviors in order to develop meaningful relationships and resolve interpersonal conflicts
    - Connections:
        - Provide opportunities to have turn and talks
        - Engage in discussions around the importance of discussing problems to work collaboratively to create solutions and develop expectations of how interact and engage with peers
        - Use a problem box to address problems in the classroom

- **<u>Responsible Decision-Making</u>**: refers to the ability to use multiple pieces of information to make ethical and responsible decisions
    - Connections:
        - Developing and following rules in the classroom community
        - Following directions

New Jersey Student Learning Standards for Computer Science and Design Thinking
UNIT 6- Survivor Nations!
Grade 4

Project Idea: This project addresses the need for clean natural resources, shelter and food in nations. We will connect to real world nations that struggle with basic needs. Students will form nations and settle in areas across the United States, they will build shelter, plant gardens, and provide fresh water to their community. They will compete for the ultimate survival. Throughout the project, communities may meet with obstacles. To overcome the challenges, community members will need to collaborate to survive.
Problem Statement: In order to survive and thrive, Native Americans needed to have their basic needs met. These included food, water and shelter. Meeting basic needs is essential for survival.
Project Launch:

- **Each homeroom will pull a geographical location for their class, somewhere within the United States.**

Students will then collaborate with classmates to determine names for their nations.

- **Students will then choose an area within the location and map out where they are settling. For example, if it is the Northeast, they must choose exactly where they will settle in the Northeast and why they chose that area and create a map of their area.**
- **Students will research indigenous people from the area as well as natural resources available.**
- **With their peers, students will consider the following:**
    - **Think about what land is like in modern day.**
        - **What can we learn from the way the indigenous people of the area lived?**
        - **How can we use this knowledge in the present day?**
        - **In the library, students will be introduced to *Long Walk to Water* by Linda Sue Park as a read aloud that will spark a discussion around resources and brainstorm ideas around what they will do if resources are not available?**

In STEAM Lab, student's will create their community flag and totem pole (monument) to represent their nation.

Disciplinary Concept	Core Idea	Performance Expectations
Impacts of Computing	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 influenced the changes. 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.
Data and Analysis	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. 8.1.5.DA.4: Organize and present climate change data visually to highlight relationships or support a claim.
Data and Analysis	Many factors influence the accuracy of inferences and predictions.	8.1.5.DA.5: Propose cause and effect relationships, predict outcomes, or communicate ideas using data.
Algorithms and Programming	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. 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.
Algorithms and Programming	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.
Engineering Design	Engineering design is a systematic and creative process of communicating and collaborating to meet a design challenge. Often, several design solutions exist, each better in some way than the others.	8.2.5.ED.1: Explain the functions of a system and its Subsystems. 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 or models. 8.2.5.ED.3: Follow step by step directions to assemble a product or solve a problem, using appropriate tools to accomplish the task.
Engineering Design	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). 8.2.5.ED.5: Describe how specifications and limitations impact the engineering design process. 8.2.5.ED.6: Evaluate and test alternative solutions to a problem using the constraints and trade- offs identified in the design process.
Interaction of Technology and Humans	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 influence the development and function of a product and a system.
Interactions of Technology and Humans	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. 8.2.5.ITH.3: Analyze the effectiveness of a new product or system and identify the positive and/or negative

		consequences resulting from its use. 8.2.5.ITH.4: Describe a technology/tool that has made the way people live easier or has led to a new business or career.
Effects of Technology on the Natural World	The technology developed for the human designed world can have unintended consequences for the environment. Technology must be continually developed and made more efficient to reduce the need for non-renewable resources.	8.2.5.ETW.1: Describe how resources such as material, energy, information, time, tools, people, and capital are used in products or systems. 8.2.5.ETW.2: Describe ways that various technologies are used to reduce improper use of resources. 8.2.5.ETW.3: Explain why human-designed systems, products, and environments need to be constantly monitored, maintained, and improved. 8.2.5.ETW.4: Explain the impact that resources, such as energy and materials used to develop technology, have on the environment. 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.
Ethics & Culture	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.

UNIT 6: Survivor Nations!(Grade 4)
Essential Question: How can a community be formed and thrive so that basic needs of shelter, food and water are met?
Student Learning Objectives Students will be able to: ● Identify computing technologies that have impacted how individuals live and work and describe the factors that influenced the changes. ● Identify possible ways to improve the accessibility and usability of computing technologies to address the diverse needs and wants of users. ● Organize and present collected data visually to communicate insights gained from different views of the data. ● Organize and present climate change data visually to highlight relationships or support a claim. ● Propose cause and effect relationships, predict outcomes, or communicate ideas using data. ● Break down problems into smaller, manageable sub-problems to facilitate program development. ● Modify, remix, or incorporate pieces of existing programs into one's own work to add additional features or create a new program ● Develop programs using an iterative process, implement the program design, and test the program to ensure it works as intended ● Explain the functions of a system and its subsystems. ● Collaborate with peers to collect information, brainstorm to solve a problem, and evaluate all possible solutions to provide the best results with supporting sketches or models. ● Follow step by step directions to assemble a product or solve a problem, using appropriate tools to accomplish the task. ● Explain factors that influence the development and function of products and systems (e.g., resources, criteria, desired features, constraints). ● Describe how specifications and limitations impact the engineering design process. ● Evaluate and test alternative solutions to a problem using the constraints and trade- offs identified in the design

process.

- Explain how societal needs and wants influence the development and function of a product and a system.
- Evaluate how well a new tool has met its intended purpose and identify any shortcomings it might have.
- Analyze the effectiveness of a new product or system and identify the positive and/or negative consequences resulting from its use.
- Describe a technology/tool that has made the way people live easier or has led to a new business or career.
- Describe how resources such as material, energy, information, time, tools, people, and capital are used in products or systems.
- Describe ways that various technologies are used to reduce improper use of resources.
- Explain why human-designed systems, products, and environments need to be constantly monitored, maintained, and improved.
- Explain the impact that resources, such as energy and materials used to develop technology, have on the environment.
- 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.
- Analyze how technology has contributed to or reduced inequities in local and global communities and determine its short- and long-term effects.

Modifications	
English Language Learners	● Feelings chart ● Pantomime actions and words to provide clarification ● Provide opportunities for students to turn and talk. ● Include hands-on activities. ● Model fluency, intonation, and inflection while reading aloud. ● Model productive and engaging partner talk. ● Stop often to monitor and check for understanding. ● Allow handheld translator. ● Consult with ESL teacher
Special Education	● Use preferential seating.

	● Ask students to recall what they already learned in ways that activate their prior knowledge and allow them to build on that knowledge. ● Provide direct instruction and reinforce vocabulary with pictures. ● Include hands-on activities. ● Model fluency, intonation, and inflection while reading aloud. ● Model productive and engaging partner talk. ● Model text to word connections. ● Offer different seating options.
At-Risk	● Limit the amount of information per page ● Use preferential seating. ● Ask students to recall what they already learned in ways that activate their prior knowledge and allow them to build on that knowledge. ● Provide direct instruction and reinforce vocabulary with pictures. ● Provide opportunities for students to turn and talk. ● Include hands-on activities. ● Model fluency, intonation, and inflection while reading aloud. ● Model productive and engaging partner talk. ● Use of timers ● Frequent check-ins
Gifted and Talented	● Engaging partner talk ● Problem solving ● Share solutions ● Brainstorming ● Provide additional opportunities to record their ideas
504	● Use preferential seating. ● Ask students to recall what they already learned in ways that activate their prior knowledge and allow them to build on that knowledge. ● Provide direct instruction and reinforce vocabulary with pictures.

	● Provide opportunities for students to turn and talk. ● Include hands-on activities. ● Model fluency, intonation, and inflection while reading aloud. ● Model productive and engaging partner talk. ● Provide audio books or headphones when available. ● Include visual supports like large or personalized texts for better viewing. ● Offer different seating options. ● Model text to word connections.

Suggested Learning Activities Directly Connected to Student Learning Objectives

- Identify computing technologies that have impacted how individuals live and work and describe the factors that influenced the changes, identify possible ways to improve the accessibility and usability of computing technologies to address the diverse needs and wants of users, organize and present collected data visually to communicate insights gained from different views of the data, organize and present climate change data visually to highlight relationships or support a claim, propose cause and effect relationships, predict outcomes, or communicate ideas using data.
    - By observing climate over periods of time and predicting the long term effects. They will make observations and or take measurements to provide evidence of the effects of weathering or the rate of erosion by wind, or vegetation.
- Break down problems into smaller, manageable sub-problems to facilitate program development, modify, remix, or incorporate pieces of existing programs into one's own work to add additional features or create a new program, develop programs using an iterative process, implement the program design, and test the program to ensure it works as intended, explain the functions of a system and its subsystems, collaborate with peers to collect information, brainstorm to solve a problem, and evaluate all possible solutions to provide the best results with supporting sketches or models and follow step by step directions to assemble a product or solve a problem, using appropriate tools to accomplish the task.
    - By comparing and contrasting layers of sand, silt and clay in the soil, recording them in their journals using diagrams and labels that they will then put into spreadsheets to graph and analyze for patterns.
- Explain factors that influence the development and function of products and systems (e.g., resources, criteria,

desired features, constraints), describe how specifications and limitations impact the engineering design process, and evaluate and test alternative solutions to a problem using the constraints and trade-offs identified in the design process.
    - By finding the best soil, irrigation, and housing for their nation. They will choose and plant their crops by analyzing climate data.
    - Explain how societal needs and wants influence the development and function of a product and a system.
    - Evaluate how well a new tool has met its intended purpose and identify any shortcomings it might have.
    - Analyze the effectiveness of a new product or system and identify the positive and/or negative consequences resulting from its use.
    - Describe a technology/tool that has made the way people live easier or has led to a new business or career.
    - By analyzing physical maps and technologies that are available to them or then need to produce in order for the nation to survive. Gather and analyze information on energy resources and fossil fuels
    - Understand that plants and animals have both internal and external structures
    - Describe, explain, and engage in arguments from evidence that plant and animal structures serve various functions in growth, survival, behavior and reproduction.
    - Identify the internal and external parts of a flower
    - Create a model of a flower with labels
    - Explain the process of flower reproduction
    - Explore and identify unique external structures on plants
    - Define adaptation and identify the purpose of external feature adaptations
    - Compare adaptations of plants in different biomes

- Describe how resources such as material, energy, information, time, tools, people, and capital are used in products or systems, describe ways that various technologies are used to reduce improper use of resources, explain why human-designed systems, products, and environments need to be constantly monitored, maintained, and improved, explain the impact that resources, such as energy and materials used to develop technology, have on the environment, 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 an analyze how technology has contributed to or reduced inequities in local and global communities and determine its short- and long-term effects.
    - By discussing soil degradation and its effect on the environment. Gathering and analyzing informations on

energy resources and fossil fuels. Explaining whether a selected energy resource is renewable

Facilitation Questions to Refer to Throughout Project **COMPREHENSION:** **Ask questions that ensure students understand content and skills needed to solve the problem.** **APPLICATION:** **Ask questions that ensure the ability of students to apply learning to new situations.** **CONNECTION:** **Ask questions that ensure the ability of students to apply learning to their lives.** **SYNTHESIS:** **Ask questions that encourage students to create new information from existing data.** **METACOGNITION:** *Ask questions which prompt students to t**hink about their own thinking process.***	**Comprehension:** ● What are the basic needs for survival? ● Describe your environment and the resources that you will find? **Application:** ● How might you decide that something is safe to eat or drink? ● How might you choose the place to settle in your region? ● What is required for a society to thrive? ● How would you keep order in your community? **Connection:** ● What might you have to think about in order to adapt to your new surroundings? ● What resources can you use in your environment to help you survive? ● What might happen if your community is not near a water source? What might you have to do in order to survive? **Synthesis:** ● How can you modify the resources that your chosen indigenous community utilized in order to survive in modern times?

	● Utilizing what you know about the climate, how might you modify your community resources? (crops, home design, usage of materials…hot seasons, cool seasons) ● What might you have to do if members of a different community had to seek shelter/safety with your nation? ● What would you do if you lost an essential resource of your community? ● What might you have to do if another nation/community diverted your water source/ essential resources? **Metacognition:** ● How were you able to communicate with other nations to help you survive? ● How did you work together as a group? ● What if you really had to work together in a survival situation? ● What might you have to improve on? What worked out well? ● How did the diversity amongst the tribes play a key role in shared skills and ultimately survival? ***Discussion Questions:** ***Analyst** ● What if you were the only person left in your area? ● How hard would it be to survive?

	● What challenges might you have to face? ***Catalyst** ● How did you work together as a group? ● What if you really had to work together in a survival situation? ● What might you have to improve on? ● What worked out well?

Evidence of Learning - Assessment

Formative:
- Teacher observations
- Discussion questions
- Rubric Check
- Approved Plans
- Teacher Check-In
- Google Doc - Self Assessment/Exit Ticket

Summative:
- Student Journal
- Presentation - Market
- Rubric

Core Instructional Materials
Library Read-alouds:
A Long Walk to Water by Linda Sue Park
The Lemonade War by Jacqueline Davies

Google Earth/Maps
National Geographic Atlas of the World

ELA Read-alouds:
Odder by Katherine Applegate
Willodeen by Katherine Applegate
Weslandia by Paul Fleischman

Social Studies Read-alouds:
The Birchbark House by Louise Erdrich

STEAM
Green Our Planet Lesson Guides

Informational Reading Resources:
Newsela articles with quizzes and short-answer writing activities
Scholastic News issues with text-dependent questions and activities (Print & Online)

Digital Resources

Totem Poles (4th) | Art with Mrs. Nguyen
Totem Pole PowerPoint
https://greenourplanet.mn.co/spaces/9329162/content
Financial Institutions and Business Lesson 1: Part 1 (pdf)
Dig-In Copy of ES Financial Institutions Lessons 1 and 2 with embedded Films and Notes - 9.30.20.pptx

Interdisciplinary Connections
Language Arts:
Teachers will read excerpts from the Birchbark House that will directly relate to their project. "[In this] story of a young Ojibwa girl, Omakayas, living on an island in Lake Superior around 1847, Louise Erdrich is reversing the narrative perspective used in most children's stories about nineteenth-century Native Americans. Instead of looking out at 'them' as dangers or curiosities, Erdrich, drawing on her family's history, wants to tell about 'us', from the inside. The Birchbark

House establishes its own ground, in the vicinity of Laura Ingalls Wilder's 'Little House' books"

Reading

RL.4.1. Refer to details and examples in a text and make relevant connections when explaining what the text says explicitly and when drawing inferences from the text.
RL.4.2. Determine a theme of a story, drama, or poem from details in the text; summarize the text.
RL.4.3. Describe in depth a character, setting, or event in a story or drama, drawing on specific details in the text (e.g., a character's thoughts, words, or actions).

Speaking and Listening

SL.4.1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 4 topics and texts, building on others' ideas and expressing their own clearly.
A. Explicitly draw on previously read text or material and other information known about the topic to explore ideas under discussion.
B. Follow agreed-upon rules for discussions and carry out assigned roles.
C. Pose and respond to specific questions to clarify or follow up on information, and make comments that contribute to the discussion and link to the remarks of others.
D. Review the key ideas expressed and explain their own ideas and understanding in light of the discussion.
SL.4.2. Paraphrase portions of a text read aloud or information presented in diverse media and formats (e.g.,visually, quantitatively, and orally).
SL.4.3. Identify the reasons and evidence a speaker provides to support particular points.

Progress Indicators for Informational Text

Key Ideas and Details

RI.4.1. Refer to details and examples in a text and make relevant connections when explaining what the text says explicitly and when drawing inferences from the text.
RI.4.2. Determine the main idea of a text and explain how it is supported by key details; summarize the text.
RI.4.3. Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text.

Research to Build and Present Knowledge

W.4.7. Conduct short research projects that build knowledge through investigation of different aspects of a topic.
W.4.8. Recall relevant information from experiences or gather relevant information from print and digital sources; take

notes and categorize information, and provide a list of sources.
W.4.9. Draw evidence from literary or informational texts to support analysis, reflection, and research.
A. Apply grade 4 Reading standards to literature (e.g., “Describe in depth a character, setting, or event in a story or drama, drawing on specific details in the text [e.g., a character’s thoughts, words, or actions].”).
B. Apply grade 4 Reading standards to informational texts (e.g., “Explain how an author uses reasons and evidence to support particular points in a text”).

Progress Indicators for Writing
Text Types and Purposes
W.4.2. Write informative/explanatory texts to examine a topic and convey ideas and information clearly.
A. Introduce a topic clearly and group related information in paragraphs and sections; include formatting (e.g., headings), illustrations, and multimedia when useful to aiding comprehension.
B. Develop the topic with facts, definitions, concrete details, text evidence , or other information and examples related to the topic.
C. Link ideas within paragraphs and sections of information using words and phrases (e.g., another, for example, also, because).
D. Use precise language and domain-specific vocabulary to inform about or exp

Range of Writing
W.4.10. Write routinely over extended time frames (time for research, reflection, metacognition/self-correction and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

Science:
In Unit 1, students will learn about natural resources. As they begin to think about their nations, they will return to this learning to explore the available natural resources in the geographical space they were provided.

- **ETS1.A: Defining Engineering Problems**
    - Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account. (secondary to 4-PS3-4)
- **ESS3.A: Natural Resources**

    - Energy and fuels that humans use are derived from natural sources, and their use affects the environment in multiple ways. Some resources are renewable over time, and others are not. (4-ESS3-1)
- **ESS2.E: Biogeology**
  Living things affect the physical characteristics of their regions. (4- ESS2-1)
- **ESS2.A: Earth Materials and systems**
  Rainfall helps to shape the land and affects the types of living things found in a region. Water, ice, wind, living organisms, and gravity break rocks, soils, and sediments into smaller particles and move them around. (4-ESS2-1

Math:

- 4 MD.A. 1. Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. For example, know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12], (2, 24], (3, 36],

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Social Studies:
In Unit 1: The World Around Us, students will learn about various types of maps and how to read them. This skill will be needed for our project to gather information about the geographical area the students were provided for their project.

- 6.1.5.GeoSV.1: Identify the maps or types of maps most appropriate for specific purposes, (e.g., to locate physical and/or human features in a community, to determine the shortest route from one town to another town, to compare the number of people living at two or more locations).

In Unit 2: Regional Diversity, students learn about the land of our state and the US and how resources have been impacted due to various reasons. This prior knowledge is essential for students to gain an understanding of what they will need to survive in their “nations”.

- 6.1.5.GeoPP2.: Describe how landforms, climate and weather, and availability of resources have impacted where and how people live and work in different regions of New Jersey and the United States.

In Unit 3: The First People, students will learn about why groups immigrated to the US and the challenges they encountered. Students will think deeply about the challenges, particularly surrounding what is needed for survival when

working on this project.

- 6.1.5.HistoryUP.1: Describe the reasons various groups, voluntarily and involuntarily, immigrated to New Jersey and America, and cite evidence from multiple perspectives to describe the challenges they encountered.

In Unit 4: Influences on NJ and the World, students will think about the impact of human activity on the physical environment in the area they are inhabiting for this project.

- 6.1.5.GeoHE.1: Use a variety of sources from multiple perspectives, including aerial photographs or satellite images to describe how human activity has impacted the physical environment during different periods of time in New Jersey and the United States.

Library:
I. INQUIRE Build new knowledge by inquiring, thinking critically, identifying problems, and developing strategies for solving problems.
III. COLLABORATE Work effectively with others to broaden perspectives & work toward common goals.
IV. CURATE Make meaning for oneself & others by collecting, organizing, and sharing resources of personal relevance.
V. EXPLORE Discover & innovate in a growth mindset developed through experience & reflection.
VI. ENGAGE Demonstrate safe, legal, and ethical creating & sharing of knowledge products independently while engaging in a community of practice & an interconnected world.

NJSLS Career Readiness, Life Literacies, and Key Skills

The students will be trading and selling between the nations for their project. We will discuss how trade, bartering and spending can affect their entire nation. As they prepare for their market, they will prepare advertisements and discuss truth in advertising.
9.1.5.CP.1: Identify the advantages of maintaining a positive credit history
9.1.5.EG.1: Explain and give examples of what is meant by the term “tax.”
9.1.5.EG.2: Describe how tax monies are spent
9.1.5.EG.3: Explain the impact of the economic system on one’s personal financial goals.
9.1.5. EG.4: Describe how an individual’s financial decisions affect society and contribute to the overall economy.
9.1.5.FP.1: Illustrate the impact of financial traits on financial decisions.
9.1.5.FP.2: Identify the elements of being a good steward of money.
9.1.5.FP.5: Illustrate how inaccurate information is disseminated through various external influencers including the media, advertisers/marketers, friends, educators, and family members.

Practices

- CLKSP1 Act as a responsible and contributing community member and employee.
- CLKSP3 Consider the environmental, social, and economic impacts of decisions.
- CLKSP4 Demonstrate creativity and innovation.
- CLKSP5 Utilize critical thinking to make sense of problems and persevere in solving them.
- CLKSP6 Model integrity, ethical leadership and effective management.

Social Emotional Learning Competencies

- **Self-Awareness**: ability to recognize one's emotions and know one's strengths and limitations
    - Connections:
        - Reflecting on one's learning (Oral, Thumbs Up, Thumbs Down, Pictures, etc.)
        - Feelings chart
        - Movement breaks
        - Headphones for lower volume
        - Privacy boards when working independently

- **Self-Management**: ability to regulate and control one's emotions and behaviors, particularly in stressful situations
    - Connections:
        - Visit the mindfulness/cool down corner in the classroom for self-soothing activities (Squishy ball, sand timer, fidget popper, etc.)
        - Take a drawing break
        - Look at book
        - Have visual prompt for teacher assistance

- **Social Awareness**: ability to take the perspective of others, demonstrate empathy, acknowledge and appreciate similarities and differences, and understand how one's actions influence and are influenced by others

- Connections:
  - Engage in discussions with peers
  - Including others when noticing they are left out (in social play situations when practicing rules)
  - Engaging in discussion around *The Golden Rule* when developing rules and problem solving throughout the unit.

- **Relationship Skills**: refers to one's ability to demonstrate prosocial skills and behaviors in order to develop meaningful relationships and resolve interpersonal conflicts
  - Connections:
    - Provide opportunities to have turn and talks
    - Engage in discussions around the importance of discussing problems to work collaboratively to create solutions and develop expectations of how interact and engage with peers
    - Use a problem box to address problems in the classroom

- **Responsible Decision-Making**: refers to the ability to use multiple pieces of information to make ethical and responsible decisions
  - Connections:
    - Developing and following rules in the classroom community
    - Following directions

New Jersey Student Learning Standards for Computer Science & Design Thinking
UNIT 7 - Hunger Games
Project Idea: Humans and their decisions impact the world we live in. How can we be sure we are conserving natural resources and thinking about the earth in our decisions around agriculture. As our population grows, how do we conserve natural resources and ensure we are able to produce healthy crops for our community. Students will be researching data to understand the growing needs of our population. Introduction will be the ecosystem/life science unit and then students will return to this learning as they begin the project
Problem Statement: We need to think of alternate ways to grow crops as we are seeing the limitations of natural

resources and land.
Project Launch: Lessons will begin with a discussion about what humans and animals need to live (food, water, shelter). Students will then be provided maps of our area over the years as well as data regarding population. As students review these materials they will begin to interpret the data realizing that there is more and more building on land that was once used to farm. How can we continue to grow food while the amount of land available continues to decrease?

Grade 5

Disciplinary Concept	Core Idea	Performance Expectations
Data & Analysis	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.
Data & Analysis	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.
Data & Analysis	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. 8.1.5.DA.4: Organize and present climate change data visually to highlight relationships or support a claim.
Data & Analysis	Many factors influence the accuracy of inferences and predictions.	8.1.5.DA.5: Propose cause and effect relationships, predict outcomes, or communicate ideas using data.
Engineering Design	Engineering design is a systematic and creative process of communicating and collaborating to meet	8.2.5.ED.1: Explain the functions of a system and its subsystems.

	a design challenge. Often, several design solutions exist, each better in some way than the others.	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 or models. 8.2.5.ED.3: Follow step by step directions to assemble a product or solve a problem, using appropriate tools to accomplish the task.
Engineering Design	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). 8.2.5.ED.5: Describe how specifications and limitations impact the engineering design process. 8.2.5.ED.6: Evaluate and test alternative solutions to a problem using the constraints and trade- offs identified in the design process.
Interaction of Technology and Humans	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 influence the development and function of a product and a system.
Interaction of Technology and Humans	A new tool may have favorable or unfavorable results as well as both positive and negative effects on society.	8.2.5.ITH.2: Evaluate how well a new tool has met its intended purpose and identify any shortcomings it might

	Technology spurs new businesses and careers.	have. 8.2.5.ITH.3: Analyze the effectiveness of a new product or system and identify the positive and/or negative consequences resulting from its use. 8.2.5.ITH.4: Describe a technology/tool that has made the way people live easier or has led to a new business or career.
Effects of Technology on the Natural World	The technology developed for the human designed world can have unintended consequences for the environment. Technology must be continually developed and made more efficient to reduce the need for non-renewable resources.	8.2.5.NT.1: Troubleshoot a product that has stopped working and brainstorm ideas to correct the problem. 8.2.5.NT.2: Identify new technologies resulting from the demands, values, and interests of individuals, businesses, industries, and societies. 8.2.5.NT.3: Redesign an existing product for a different purpose in a collaborative team. 8.2.5.NT.4: Identify how improvement in the understanding of materials science impacts technologies.
Nature of Technology	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. 8.2.5.NT.2: Identify new technologies resulting from the demands, values, and interests of individuals,

		businesses, industries, and societies. 8.2.5.NT.3: Redesign an existing product for a different purpose in a collaborative team. 8.2.5.NT.4: Identify how improvement in the understanding of materials science impacts technologies
Ethics & Culture	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.

UNIT 7: Hunger Games(Grade 5)
Essential Questions How can we conserve resources so that we are able to continue to grow crops for the expanding populations without harming the environment?
Student Learning Objectives ● Collect, organize, and display data in order to highlight relationships or support a claim. ● Compare the amount of storage space required for different types of data. ● Organize and present collected data visually to communicate insights gained from different views of the data. ● Organize and present climate change data visually to highlight relationships or support a claim. ● Propose cause and effect relationships, predict outcomes, or communicate ideas using data. ● Explain the functions of a system and its subsystems. ● Collaborate with peers to collect information, brainstorm to solve a problem, and evaluate all possible solutions to provide the best results with supporting sketches or models. ● Follow step by step directions to assemble a product or solve a problem, using appropriate tools to accomplish the task.

- Explain factors that influence the development and function of products and systems (e.g., resources, criteria, desired features, constraints).
- Describe how specifications and limitations impact the engineering design process.
- Evaluate and test alternative solutions to a problem using the constraints and trade- offs identified in the design process.
- Explain how societal needs and wants influence the development and function of a product and a system.
- Evaluate how well a new tool has met its intended purpose and identify any shortcomings it might
- have.
- Analyze the effectiveness of a new product or system and identify the positive and/or negative consequences resulting from its use.
- Describe a technology/tool that has made the way people live easier or has led to a new business or career.
- Troubleshoot a product that has stopped working and brainstorm ideas to correct the problem.
- Identify new technologies resulting from the demands, values, and interests of individuals, businesses, industries, and societies.
- Redesign an existing product for a different purpose in a collaborative team.
- Identify how improvement in the understanding of materials science impacts technologies
- Analyze how technology has contributed to or reduced inequities in local and global communities and determine its short- and long-term effects.

Modifications	
English Language Learners	● Feelings chart ● Pantomime actions and words to provide clarification ● Provide opportunities for students to turn and talk. ● Include hands-on activities. ● Model fluency, intonation, and inflection while reading aloud. ● Model productive and engaging partner talk. ● Stop often to monitor and check for understanding. ● Allow handheld translator. ● Consult with ESL teacher

Special Education	● Use preferential seating. ● Ask students to recall what they already learned in ways that activate their prior knowledge and allow them to build on that knowledge. ● Provide direct instruction and reinforce vocabulary with pictures. ● Include hands-on activities. ● Model fluency, intonation, and inflection while reading aloud. ● Model productive and engaging partner talk. ● Model text to word connections. ● Offer different seating options.
At-Risk	● Limit the amount of information per page ● Use preferential seating. ● Ask students to recall what they already learned in ways that activate their prior knowledge and allow them to build on that knowledge. ● Provide direct instruction and reinforce vocabulary with pictures. ● Provide opportunities for students to turn and talk. ● Include hands-on activities. ● Model fluency, intonation, and inflection while reading aloud. ● Model productive and engaging partner talk. ● Use of timers ● Frequent check-ins
Gifted and Talented	● Engaging partner talk ● Problem solving ● Share solutions ● Brainstorming ● Provide additional opportunities to record their ideas
504	● Use preferential seating. ● Ask students to recall what they already learned in ways that activate their prior knowledge and allow them to build on that knowledge.

	• Provide direct instruction and reinforce vocabulary with pictures. • Provide opportunities for students to turn and talk. • Include hands-on activities. • Model fluency, intonation, and inflection while reading aloud. • Model productive and engaging partner talk. • Provide audio books or headphones when available. • Include visual supports like large or personalized texts for better viewing. • Offer different seating options. • Model text to word connections.

Student Learning Objectives with Learning Activities

- Collect, organize, and display data in order to highlight relationships or support a claim, compare the amount of storage space required for different types of data, organize and present collected data visually to communicate insights gained from different views of the data, organize and present climate change data visually to highlight relationships or support a claim and propose cause and effect relationships, predict outcomes, or communicate ideas using data
    - By looking at data and creating a table that displays the changes in population, land usage and climate over a period of time
        - **Digital Resources**
        - **Population growth (annual %) - United States**
        - **Population Clock**
        - **Map of Croplands in the United States | U.S. Geological Survey**
        - **Farmland Information Center**
- Explain the functions of a system and its subsystems, collaborate with peers to collect information, brainstorm to solve a problem, and evaluate all possible solutions to provide the best results with supporting sketches or models, follow step by step directions to assemble a product or solve a problem, using appropriate tools to accomplish the task, and explain factors that influence the development and function of products and systems (e.g., resources, criteria, desired features, constraints).
    - By beginning to assemble and create the classroom hydroponics systems

        - Lesson 1
            - www.padlet.com
            - www.flipgrid.com
            - Introduction to Hydroponic systems (Grade
        - Lesson 3
            - Commercial Hydroponics (Grade 5, Lesson 3

- Describe how specifications and limitations impact the engineering design process, evaluate and test alternative solutions to a problem using the constraints and trade- offs identified in the design process and explain how societal needs and wants influence the development and function of a product and a system
    - By designing the indoor farm system and testing and charting ph balance and materials needed.
        - Lesson 6
            - Farmer Tip #1 - How to Make a Planting Schedule - Upstart University
        - Lesson 8
            - Transplanting Seedlings (Grade 5, Lesson 8... - VideoLink
        - Lesson 9
            - Mixture or Solution (Grade 5, Lesson 9 fro... - VideoLink
            - http://studyjams.scholastic.com/studyjams/jams/science/matter/mixtures.htm
- Evaluate how well a new tool has met its intended purpose and identify any shortcomings it might have, analyze the effectiveness of a new product or system and identify the positive and/or negative consequences resulting from its use, describe a technology/tool that has made the way people live easier or has led to a new business or career, troubleshoot a product that has stopped working and brainstorm ideas to correct the problem, identify new technologies resulting from the demands, values, and interests of individuals, businesses, industries, and societies and redesign an existing product for a different purpose in a collaborative team.
    - By tracking, monitoring and charting plant growth and troubleshooting problems that arise such as mold, system blockages, light outages etc in their systems.
    - Best Harvest Strategies (Grade 5, Lesson 1... - VideoLink
    - Jigsaw Strategy | Education World
    - The Jigsaw Method
    - How to Harvest a Vertical Farm
    - Harvest Article

- Identify how improvement in the understanding of materials science impacts technologies, and analyze how technology has contributed to or reduced inequities in local and global communities and determine its short- and long-term effects.
    - By having discussions and then making a flyer or pamphlet to distribute at the Farmer's Market on the use of hydroponics for farming
        - Lesson 3
            - Commercial Hydroponics (Grade 5, Lesson 3
        - Lesson 4
            - Urban Agriculture & Hydroponics Business (... - VideoLink
            - The Big Idea: Hydroponic and Vertical Farming
            - https://www.youtube.com/watch?v=XFk1cJvSJYQ&t=8s
            - How to Start a Hydroponic Farm Business | TRUiC
            - https://www.plenty.ag/category/press/
            - https://aerofarms.com/
        - Lesson 5
            - What is an Entrepreneur?
            - Qualities of a Successful Entrepreneur | Rebel Business School
            - Farmers Market #3 Preparing for the Market (Grade5, Lesson11 Green Our Planet Hydroponic Curriculum)
            - https://www.youtube.com/watch?v=3WT-Web9aUs
            - https://www.youtube.com/watch?v=dVLGwbWvYkg
            - Teach Students Money & Math With a Snowman Activity | Scholastic

Facilitation Questions to Refer to Throughout Project **COMPREHENSION:** **Ask questions that ensure students understand content and skills needed to solve the problem.** **APPLICATION:**	**Comprehension:** • What will communities have to do if you don't have enough land to grow crops? • How do we conserve resources so that we can use them for longer/create more? • What are some challenges that our food-system faces?

Ask questions that ensure the ability of students to apply learning to new situations. **CONNECTION:** **Ask questions that ensure the ability of students to apply learning to their lives.** **SYNTHESIS:** **Ask questions that encourage students to create new information from existing data.** **METACOGNITION:** **Ask questions which prompt students to think about their own thinking process.**	• What do plants need to grow? • What should we grow and why? • What are the benefits of growing a hydroponic garden? • What are the impacts (both positive and negative) of growing crops in the more traditional ways? • Where does our food come from & how is it distributed? • How do crops grow? • In what ways do humans impact their environment? • In what ways has technology impacted food production? (think about design process) • How do we get nutrients from hydroponically grown food? **Application:** • How could hydroponics support life/communities around the world? • How is food supply affected by climate change? • How is food supply affected by population growth? **Connection:** • Have you ever grown fruit/vegetables/plants in a garden? **Synthesis:** • What might we have to do if our population increases/decreases?

	● How can we accommodate an evolving society? (rural to suburban/urban) ● What might you have to do if you wanted to create a small community which used hydroponics as a main source of food? **Metacognition:** ● In what ways might we be able to decrease food waste? ***Discussion Questions** ● Why do you think that it is important to plan where/how we use and utilize our natural resources?

Evidence of Learning - Assessment

Formative:

- Teacher observations
- Discussion questions
- Notebook Check
- Data Charts
- Planting/Water Chart Check

Summative:

- STEAM Notebook
- Business plan
- End project - Farmers Market

Core Instructional Materials
Hydroponics Curriculum - Green Our Planet (insert link here)

Digital Resources
Population growth (annual %) - United States
Population Clock
Map of Croplands in the United States | U.S. Geological Survey
Farmland Information Center
Lesson 1
www.padlet.com
www.flipgrid.com
Introduction to Hydroponic systems (Grade
Lesson 3
Commercial Hydroponics (Grade 5, Lesson 3
Lesson 4
Urban Agriculture & Hydroponics Business (... - VideoLink
The Big Idea: Hydroponic and Vertical Farming
https://www.youtube.com/watch?v=XFk1cJvSJYQ&t=8s
How to Start a Hydroponic Farm Business | TRUiC
https://www.plenty.ag/category/press/
https://aerofarms.com/
Lesson 5
What is an Entrepreneur?
Qualities of a Successful Entrepreneur | Rebel Business School
Lesson 6
Farmer Tip #1 - How to Make a Planting Schedule - Upstart University
Lesson 8
Transplanting Seedlings (Grade 5, Lesson 8... - VideoLink
Lesson 9
Mixture or Solution (Grade 5, Lesson 9 fro... - VideoLink
http://studyjams.scholastic.com/studyjams/jams/science/matter/mixtures.htm

Lessons 10 & 11
Farmers Market #3 Preparing for the Market (Grade5, Lesson11 Green Our Planet Hydroponic Curriculum)
https://www.youtube.com/watch?v=3WT-Web9aUs
https://www.youtube.com/watch?v=dVLGwbWvYkg
Teach Students Money & Math With a Snowman Activity | Scholastic
Lesson 12
Best Harvest Strategies (Grade 5, Lesson 1... - VideoLink
Jigsaw Strategy | Education World
The Jigsaw Method
How to Harvest a Vertical Farm
Harvest Article

Interdisciplinary Connections

Language Arts:

Students will include reporting on the "Hunger Games" STEAM project as one of the choices for their journalism project in unit 7. Groups may choose to report on the experience of this project or the Farmer's Market experience. In the library, students will use their knowledge of nonfiction text structure to create pamphlets/fliers or videos explaining what they learned about the changes in population, limits on land/natural resources for growing food, and their contribution to battling hunger.

Writing:

W.5.2. Write informative/explanatory texts to examine a topic and convey ideas and information clearly.

A. Introduce a topic clearly to provide a focus and group related information logically; include text features such as headings, illustrations, and multimedia when useful to aiding comprehension.

B. Develop the topic with facts, definitions, concrete details, quotations, or other information and examples related to the topic.

C. Link ideas within paragraphs and sections of information using words, phrases, and clauses (e.g., in contrast, especially).

D. Use precise language and domain-specific vocabulary to inform about or explain the topic.

E. Provide a conclusion related to the information of explanation presented.

W.5.5. With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.

W.5.6. With some guidance and support from adults and peers, use technology, including the Internet, to produce and publish writing as well as to interact and collaborate with others; demonstrate sufficient command of keyboarding skills to type a minimum of two pages in a single sitting.

W.5.7. Conduct short research projects that use several sources to build knowledge through investigation of different perspectives of a topic.

W.5.8. Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work and provide a list of sources.

Reading:
In the STEAM lab students will learn about hydroponics. Students will compare and contrast traditional farming to hydroponics.

RI.5.3. Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text.

RI.5.4. Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 5 topic or subject area.

RI.5.6. Analyze multiple accounts of the same event or topic, noting important similarities and differences in the point of view they represent.

RI.5.9 Integrate and reflect on (e.g. practical knowledge, historical/cultural context, and background knowledge) information from several texts on the same topic in order to write or speak about the subject knowledgeable.

Science:
In Unit 1: Life Science - Matter and Energy in Organisms and Ecosystems, students will learn about plans and their connection to the ecosystem. Students will use this knowledge as they engage in discussions around the global problem of world hunger and how this is a problem in the United States as well. Prior to this launch, students will learn about how plants grow and help to sustain all life.
PS3.D: Energy in Chemical Processes and Everyday Life

The energy released [from] food was once energy from the sun that was captured by plants in the chemical process that forms plant matter (from air and water). (5-PS3-1)

LS1.C: Organization for Matter and Energy Flow in Organisms
Food provides animals with the materials they need for body repair and growth and the energy they need to maintain body warmth and for motion. (secondary to 5-PS3-1)
Plants acquire their material for growth chiefly from air and water. (5-LS1-1)

LS2.A: Interdependent Relationships in Ecosystems
The food of almost any kind of animal can be traced back to plants. Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants. Some organisms, such as fungi and bacteria, break down dead organisms (both plants or plants parts and animals) and therefore operate as "decomposers." Decomposition eventually restores (recycles) some materials back to the soil. Organisms can survive only in environments in which their particular needs are met. A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. Newly introduced species can damage the balance of an ecosystem. (5-LS2-1)

LS2.B: Cycles of Matter and Energy Transfer in Ecosystems
Matter cycles between the air and soil and among plants, animals, and microbes as these organisms live and die. Organisms obtain gasses, and water, from the environment, and release waste matter (gas, liquid, or solid) back into the environment. (5-LS2-1)

Math:
Students will determine where to house their hydroponics or other type of gardening. They will need to determine the area and volume for that location. Additionally students will need to calculate costs for projects. Finally, students will review and analyze statistical data regarding population and land usage.

5.NF.B.4b Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.
5.NF.B.6 Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual

fraction models or equations to represent the problem.
5.NBT.B.7 Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

Social Studies:
In UNIT 3 - Conflict, students will learn about climate change and its impact on the United States and the world. Students will work in Social Studies and Language Arts to create a pamphlet to hand out at the Farmer's Market or create a video to be shown at the event to share about the importance of working together to learn that hunger impacts all communities and how we can make a positive impact on the lives of others by designing a plan to provide a sustainable food source for a community.

6.3.5.GeoHE.1: Plan and participate in an advocacy project to inform others about the impact of climate change at the local or state level and propose possible solutions.

Library

I. INQUIRE Build new knowledge by inquiring, thinking critically, identifying problems, and developing strategies for solving problems.
III. COLLABORATE Work effectively with others to broaden perspectives & work toward common goals.
IV. CURATE Make meaning for oneself & others by collecting, organizing, and sharing resources of personal relevance.
V. EXPLORE Discover & innovate in a growth mindset developed through experience & reflection.
VI. ENGAGE Demonstrate safe, legal, and ethical creating & sharing of knowledge products independently while engaging in a community of practice & an interconnected world.

NJSLS Career Readiness, Life Literacies, and Key Skills
When talking about farming, we talk about how farmers' struggle and how some farmers have been paid not to grow crops. This is all based on the needs of the communities, worldwide market and the economy. We will be advertising our farmers market and discussing truth in advertising. Also, we can justify why farmers would have insurance to protect their crops.

9.1.5.CR.1: Compare various ways to give back and relate them to your strengths, interests, and other personal factors.
9.1.5.EG.1: Explain and give examples of what is meant by the term “tax.”
9.1.5.EG.2: Describe how tax monies are spent
9.1.5. EG.4: Describe how an individual’s financial decisions affect society and contribute to the overall economy
9.1.5. EG.5: Identify sources of consumer protection and assistance
9.1.5.FP.3: Analyze how spending choices and decision-making can result in positive or negative consequences
9.1.5.FP.5: Illustrate how inaccurate information is disseminated through various external influencers including the media, advertisers/marketers, friends, educators, and family members.
9.1.5.RMI.2: Justify reasons to have insurance
9.1.5.PB.2: Describe choices consumers have with money (e.g., save, spend, donate).
9.2.5.CAP.6: Compare the characteristics of a successful entrepreneur with the traits of successful employees.
9.2.5.CAP.7: Identify factors to consider before starting a business
9.4.5.CI.1: Use appropriate communication technologies to collaborate with individuals with diverse perspectives about a local and/or global climate change issue and deliberate about possible solutions (e.g., W.4.6, 3.MD.B.3,7.1.NM.IPERS.6).
9.4.5.CI.2: Investigate a persistent local or global issue, such as climate change, and collaborate with individuals with diverse perspectives to improve upon current actions designed to address the issue (e.g., 6.3.5.CivicsPD.3, W.5.7)
9.4.5.CI.3: Participate in a brainstorming session with individuals with diverse perspectives to expand one’s thinking about a topic of curiosity (e.g., 8.2.5.ED.2, 1.5.5.CR1a).
9.4.5.CI.4: Research the development process of a product and identify the role of failure as a part of the creative process (e.g., W.4.7, 8.2.5.ED.6).
9.4.5.CT.1: Identify and gather relevant data that will aid in the problem-solving process (e.g., 2.1.5.EH.4, 4-ESS3-1, 6.3.5.CivicsPD.2).
9.4.5.CT.2: Identify a problem and list the types of individuals and resources (e.g., school, community agencies, governmental, online) that can aid in solving the problem (e.g., 2.1.5.CHSS.1, 4-ESS3-1).
9.4.5.CT.3: Describe how digital tools and technology may be used to solve problems.
9.4.5.CT.4: Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global (e.g., 6.1.5.CivicsCM.3).
9.4.5.IML.2: Create a visual representation to organize information about a problem or issue (e.g., 4.MD.B.4, 8.1.5.DA.3).
9.4.5.IML.3: Represent the same data in multiple visual formats in order to tell a story about the data

9.4.5.TL.2: Sort and filter data in a spreadsheet to analyze findings.
9.4.5.TL.5: Collaborate digitally to produce an artifact (e.g., 1.2.5CR1d).
9.4.5.TL.3: Format a document using a word processing application to enhance text, change page formatting, and include appropriate images, graphics, or symbols.

Practices

- CLKSP1 Act as a responsible and contributing community member and employee.
- CLKSP3 Consider the environmental, social, and economic impacts of decisions.
- CLKSP4 Demonstrate creativity and innovation.
- CLKSP5 Utilize critical thinking to make sense of problems and persevere in solving them.
- CLKSP6 Model integrity, ethical leadership and effective management.

Social Emotional Learning Competencies

- **Self-Awareness**: ability to recognize one's emotions and know one's strengths and limitations
    - Connections:
        - Reflecting on one's learning (Oral, Thumbs Up, Thumbs Down, Pictures, etc.)
        - Feelings chart
        - Movement breaks
        - Headphones for lower volume
        - Privacy boards when working independently

- **Self-Management**: ability to regulate and control one's emotions and behaviors, particularly in stressful situations
    - Connections:
        - Visit the mindfulness/cool down corner in the classroom for self-soothing activities (Squishy ball, sand timer, fidget popper, etc.)
        - Take a drawing break
        - Look at book
        - Have visual prompt for teacher assistance

- **<u>Social Awareness</u>**: ability to take the perspective of others, demonstrate empathy, acknowledge and appreciate similarities and differences, and understand how one's actions influence and are influenced by others
    - Connections:
        - Engage in discussions with peers
        - Including others when noticing they are left out (in social play situations when practicing rules)
        - Engaging in discussion around *The Golden Rule* when developing rules and problem solving throughout the unit.

- **<u>Relationship Skills</u>**: refers to one's ability to demonstrate prosocial skills and behaviors in order to develop meaningful relationships and resolve interpersonal conflicts
    - Connections:
        - Provide opportunities to have turn and talks
        - Engage in discussions around the importance of discussing problems to work collaboratively to create solutions and develop expectations of how interact and engage with peers
        - Use a problem box to address problems in the classroom

- **<u>Responsible Decision-Making</u>**: refers to the ability to use multiple pieces of information to make ethical and responsible decisions
    - Connections:
        - Developing and following rules in the classroom community
        - Following directions

New Jersey Student Learning Standards for Computer Science & Design Thinking
UNIT 8 - STEAM TANK
Grade 6

Project Idea: Students will use the scientific method and engineering design process to innovate or invent a product. Our changing climate is impacting the world, working in small groups, students will design a product this is directly related to climate change. How do we as students invent/innovate a product to address climate change? How can we inform and inspire others in our community to take the needed steps to address climate change?

Project Statement: Students will address climate change and how they can effectively design and make products that help offset our carbon footprints.

Project Launch: Read Aloud and Research Question - "What is Climate Change and Three Ways that Climate Change Affects your Daily Life?" - Climate Change and Energy Technology (Library), Steamtank powerpoint (STEAM) and Scientific Method (Science)

Disciplinary Concept	Core Idea	Performance Expectations
Computing Systems	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.4: Explain how new security measures have been created in response to key malware events.
Engineering Design	Engineering design is a systematic, 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 or prototypes	8.2.8.ED.2: Identify the steps in the design process that could be used to solve a problem 8.2.8.ED.3: Develop a proposal for a solution to a real-world problem that includes a model (e.g., physical prototype, graphical/technical sketch). 8.2.8.ED.4: Investigate a malfunctioning system, identify its

		impact, and explain the step-by-step process used to troubleshoot, evaluate, and test options to repair the product in a collaborative team.
Engineering Design	Engineering design requirements and specifications involve making trade-offs between competing requirements and desired design features.	8.2.8.ED.5: Explain the need for optimization in a design process. 8.2.8.ED.6: Analyze how trade-offs can impact the design of a product. 8.2.8.ED.7: Design a product to address a real-world problem and document the iterative design process, including decisions made as a result of specific constraints and trade-offs (e.g., annotated sketches).
Interactions of Technology and Humans	Economic, political, social and cultural aspects of society drive development of new technological products, processes, and systems.	8.2.8.ITH.1: Explain how the development and use of technology influences economic, political, social, and cultural issues.
Interactions of Technology and Humans	Technology interacts with society, sometimes bringing about changes in a society's economy, politics, and culture, and often leading to the creation of new needs and wants. New needs and wants may create strains on local economies and workforces. Improvements in technology are intended to make	8.2.8.ITH.2: Compare how technologies have influenced society over time. 8.2.8.ITH.3: Evaluate the impact of sustainability on the development of a designed product or system. 8.2.8.ITH.4: Identify technologies that have been designed to reduce the negative consequences of other

	the completion of tasks easier, safer, and/or more efficient.	technologies and explain the change in impact. 8.2.8.ITH.5: Compare the impacts of a given technology on different societies, noting factors that may make a technology appropriate and sustainable in one society but not in another
Effects of Technology on the Natural World	Resources need to be utilized wisely to have positive effects on the environment and society. Some technological decisions involve trade- offs between environmental and economic needs, while others have positive effects for both the economy and environment.	8.2.8.ETW.1: Illustrate how a product is upcycled into a new product and analyze the short- and long-term benefits and costs. 8.2.8.ETW.2: Analyze the impact of modifying resources in a product or system (e.g., materials, energy, information, time, tools, people, capital). 8.2.8.ETW.3: Analyze the design of a product that negatively impacts the environment or society and develop possible solutions to lessen its impact. 8.2.8.ETW.4: Compare the environmental effects of two alternative technologies devised to address climate change issues and use data to justify which choice is best.
Ethics & Culture	Technological disparities have consequences for public health and prosperity.	8.2.8.EC.1: Explain ethical issues that may arise from the use of new technologies.

		8.2.8.EC.2: Examine the effects of ethical and unethical practices in product design and development.

UNIT 8: STEAM TANK (Grade 6)

Essential Question(s)

- How do we as students invent/innovate a product to address climate change? How can we inform and inspire others in our community to take the needed steps to address climate change?

Student Learning Objectives

Students will be able to:

- Explain how new security measures have been created in response to key malware events
- Explain how the development and use of technology influences economic, political, social, and cultural issues.
- Compare how technologies have influenced society over time.
- Evaluate the impact of sustainability on the development of a designed product or system.
- Identify technologies that have been designed to reduce the negative consequences of other technologies and explain the change in impact.
- Compare the impacts of a given technology on different societies, noting factors that may make a technology appropriate and sustainable in one society but not in another
- Illustrate how a product is upcycled into a new product and analyze the short- and long-term benefits and costs.
- Analyze the impact of modifying resources in a product or system (e.g., materials, energy, information, time, tools, people, capital) Develop a proposal for a solution to a real-world problem that includes a model (e.g., physical prototype, graphical/technical sketch).
- 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.
- Explain the need for optimization in a design process.

- Analyze how trade-offs can impact the design of a product.
- Design a product to address a real-world problem and document the iterative design process, including decisions made as a result of specific constraints and trade-offs (e.g., annotated sketches)
- Identify the steps in the design process that could be used to solve a problem
- Develop a proposal for a solution to a real-world problem that includes a model (e.g., physical prototype, graphical/technical sketch
- Analyze the design of a product that negatively impacts the environment or society and develop possible solutions to lessen its impact.
- Compare the environmental effects of two alternative technologies devised to address climate change issues and use data to justify which choice is best.
- Analyze the design of a product that negatively impacts the environment or society and develop possible solutions to lessen its impact.
- Explain ethical issues that may arise from the use of new technologies.
- Examine the effects of ethical and unethical practices in product design and development.
- Explain ethical issues that may arise from the use of new technologies

Modifications	
English Language Learners	● Feelings chart ● Pantomime actions and words to provide clarification ● Provide opportunities for students to turn and talk. ● Include hands-on activities. ● Model fluency, intonation, and inflection while reading aloud. ● Model productive and engaging partner talk. ● Stop often to monitor and check for understanding. ● Allow handheld translator. ● Consult with ESL teacher
Special Education	● Use preferential seating. ● Ask students to recall what they already learned in ways that activate their prior knowledge and allow them to build on that knowledge.

	● Provide direct instruction and reinforce vocabulary with pictures. ● Include hands-on activities. ● Model fluency, intonation, and inflection while reading aloud. ● Model productive and engaging partner talk. ● Model text to word connections. ● Offer different seating options.
At-Risk	● Limit the amount of information per page ● Use preferential seating. ● Ask students to recall what they already learned in ways that activate their prior knowledge and allow them to build on that knowledge. ● Provide direct instruction and reinforce vocabulary with pictures. ● Provide opportunities for students to turn and talk. ● Include hands-on activities. ● Model fluency, intonation, and inflection while reading aloud. ● Model productive and engaging partner talk. ● Use of timers ● Frequent check-ins
Gifted and Talented	● Engaging partner talk ● Problem solving ● Share solutions ● Brainstorming ● Provide additional opportunities to record their ideas
504	● Use preferential seating. ● Ask students to recall what they already learned in ways that activate their prior knowledge and allow them to build on that knowledge. ● Provide direct instruction and reinforce vocabulary with pictures. ● Provide opportunities for students to turn and talk. ● Include hands-on activities.

	● Model fluency, intonation, and inflection while reading aloud. ● Model productive and engaging partner talk. ● Provide audio books or headphones when available. ● Include visual supports like large or personalized texts for better viewing. ● Offer different seating options. ● Model text to word connections.

Suggested Learning Activities Directly Connected to Student Learning Objectives

- Explain how new security measures have been created in response to key malware event, explain how the development and use of technology influences economic, political, social, and cultural issues, compare how technologies have influenced society over time, evaluate the impact of sustainability on the development of a designed product or system, identify technologies that have been designed to reduce the negative consequences of other technologies and explain the change in impact, compare the impacts of a given technology on different societies, noting factors that may make a technology appropriate and sustainable in one society but not in another, illustrate how a product is upcycled into a new product and analyze the short- and long-term benefits and costs and analyze the impact of modifying resources in a product or system (e.g., materials, energy, information, time, tools, people, capital) by:
    - Reviewing the presentation on innovations and inventions and engaging in discussions around changes in technology including the importance of cyber security as advancements are made in the field of technology . **Innovations & Inventions - Melissa Jennings**
- Develop a proposal for a solution to a real-world problem that includes a model (e.g., physical prototype, graphical/technical sketch), 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, explain the need for optimization in a design process, analyze how trade-offs can impact the design of a product and design a product to address a real-world problem and document the iterative design process, including decisions made as a result of specific constraints and trade-offs (e.g., annotated sketches) by:
    - Engaging in lessons through the powerpoint and PDF linked below:
        - Shark-Steam Tank Google
        - Shark Tank Unit
        - STEAM TANK 2023 Playbook

- Identify the steps in the design process that could be used to solve a problem and develop a proposal for a solution to a real-world problem that includes a model (e.g., physical prototype, graphical/technical sketch by
    - Modeling and then completing the Engineering Design Process through a group build using the resources linked below
        - Intro to STEAM Grade 6 Design Process - The Girl Who Never Made Mistakes
- Analyze the design of a product that negatively impacts the environment or society and develop possible solutions to lessen its impact, compare the environmental effects of two alternative technologies devised to address climate change issues and use data to justify which choice is best, analyze the design of a product that negatively impacts the environment or society and develop possible solutions to lessen its impact, explain ethical issues that may arise from the use of new technologies, examine the effects of ethical and unethical practices in product design and development and explain ethical issues that may arise from the use of new technologies by:
    - Reading and discussing climate change and recent natural disasters
        - 5 natural disasters that beg for climate action | Oxfam International
    - Reading and analyzing articles on human population and climate change
        - Climate change
        - https://www.nytimes.com/interactive/2021/04/18/climate/climate-change-future-kids.html
        - https://populationmatters.org/climate-change/
- How to Write a Business Plan
    - https://drive.google.com/drive/u/0/folders/1_YiEh7OQmwlyP7-UsNiFN1anNgnByZAB

Facilitation Questions to Refer to Throughout Project **COMPREHENSION:** **Ask questions that ensure students understand content and skills needed to solve the problem.** **APPLICATION:** **Ask questions that ensure the ability of students to apply learning to new situations.**	**Comprehension** ● What was a catalyst of climate change in the United States? ● How does a community's land and resources shift/drive the economy? ● What are the contributions to climate change? ● What is an innovator? ● What is an inventor?

CONNECTION: **Ask questions that ensure the ability of students to apply learning to their lives.** **SYNTHESIS:** **Ask questions that encourage students to create new information from existing data.** **METACOGNITION:** **Ask questions which prompt students to think about their own thinking process.**	**Application** ● What needs are you addressing through your investigation of inventors/innovators? ● What would you like to either invent/innovate and why? **Connection** ● How has technology changed the way ● How do you reduce/reuse/recycle in your day to day life? ● How does your need connect to climate change in your area/across the world? ● What are the connections that you can make in each subject area? **Synthesis** ● How will you connect your invention to art? ● What groups/unexpected groups of people do you think your invention/innovation will reach? **Metacognition** ● What do you find the most challenging about using others' plans/creating plans for someone else? ● When creating your group's project, how did you plan, use your materials and was anything left out or added later? ● Reflecting on the design process, which step was most challenging and why? How did you grow from it? ****Discussion Questions**

Evidence of Learning - Assessment

Formative:

- Plan approval application
- Teacher observations
- Discussion questions
- Written and verbal responses to reading
- Wrap-up questions
- Two recordings of projects during designing phase

Summative:

- Product Presentation
- Project Rubric
- Cost Worksheet

Core Instructional Materials

Wood
Cardboard
Paint
Markers
Beads
Wire/Elastic
Various building materials
Egg cartons
Soil
Seeds
Planters (inside and outside)

Digital Resources

6th Grade PBL Project

https://www.theweathernetwork.com/en/news/weather/severe/this-day-in-weather-history-january-15-1919-great

-molasses-flood
https://prezi.com/cf7cnlyflihe/its-your-turn/?utm_campaign=share&utm_medium=copy
https://prezi.com/baldm3cmllan/innovations-inventions/?utm_campaign=share&utm_medium=copy
Climate change
https://www.nytimes.com/interactive/2021/04/18/climate/climate-change-future-kids.html
https://drive.google.com/drive/u/0/search?q=Westward%20Expansion
Shark-Steam Tank Google
https://drive.google.com/drive/u/1/folders/1_YiEh7OQmwlyP7-UsNiFN1anNgnByZAB
Climate change - Population Matters
5 natural disasters that beg for climate action | Oxfam International
https://kids.kiddle.co/Patent
https://patents.google.com/

Interdisciplinary Connections

Language Arts:

In reading, students will read and discuss various articles on climate change to better understand its impact.
In writing, students will use what they know about both non-fiction and persuasive writing to create a pitch for their innovation/invention.

Reading

In Unit 4 Nonfiction: Tapping into the Power of Nonfiction, students will be learning how to read nonfiction and develop the skills needed to dissect nonfiction texts both in print and digital formats. Using these skills, they will then read about climate change and its impact on society. At this point, students will revisit the work they did in the STEAM lab and include their own projects and their impact on climate change into these discussions.

RI.6.1. Cite textual evidence and make relevant connections to support analysis of what the text says explicitly as well as inferences drawn from the text.
RI.6.2. Determine a central idea of a text and how it is conveyed through particular details; provide a summary of the text distinct from personal opinions or judgments.

Writing

In the STEAM lab, students will review the application for STEAM tank, understanding the importance of developing strong arguments about the importance of their invention.

W.6.1. Write arguments to support claims with clear reasons and relevant evidence.
A. Introduce claim(s) and organize the reasons and evidence clearly.
B. Support claim(s) with clear reasons and relevant evidence, using credible sources and demonstrating an understanding of the topic or text.
C. Use words, phrases, and clauses to clarify the relationships among claim(s) and reasons.
D. Establish and maintain a formal/academic style, approach, and form.
E. Provide a concluding statement or section that follows from the argument presented.

Math:
In Math in Chapter 2,Fractions and Decimals and Chapter 3 Ratios and Rates , students will be learning to use their math skills to calculate pricing using rates and ratios tables this will be applied to their cost of items in the STEAM Tank. In Chapter 4, their skills will be used for determining their profit based on percents.
In math, students will learn more about unit pricing and percentages to fully understand spending and profit in their business plan.

6.NS.B.2 - Fluently divide multi-digit numbers using the standard algorithm.
6.NS.B.3 - Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.
6.RP.A.2 - Understand the concept of a unit rate a/b associated with a ratio a:b with b ≠0, and use rate language in the context of a ratio relationship. For example, “This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is 3/4 cup of flour for each cup of sugar.” “We paid $75 for 15 hamburgers, which is a rate of $5 per hamburger.”
6.RP.A.3 - Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations
6.RP.A.3.B - Solve unit rate problems including those involving unit pricing and constant speed. For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed? 6.RP.A.3.C- Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent

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Science:
In Unit 1.5 Climate Change, students will learn about natural disasters and human impact on the environment through various readings and class discussions.
● Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects. (MS-ESS3-2)
● Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment. (MS-ESS3-3)
● Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems. (MS-ESS3-4)
● Ask questions to clarify evidence of the factors that have caused (rise in global temperatures) climate change over the past century. (MS-ESS3-5)

Social Studies:
Students will understand the importance of patents and copyright. This is done in the STEAM lab initially. In the classroom, students will continue this learning through discussion of the Industrial Revolution and the new products that were invented.
Students will reflect on how their invention or innovation connects to climate change. Students will then categorize the inventions into broader topics (i.e. recycling). After determining this, students will review local policy on the topic. The culminating activity for social studies will be to write a letter to the local government to propose a new or defend an existing policy.
6.3.8.EconET.2: Assess the impact of government incentives and disincentives on the economy (e.g., patents, protection of private property, taxes).
6.3.8.CivicsPR.4: Use evidence and quantitative data to propose or defend a public policy related to climate change.

Library:
I. INQUIRE Build new knowledge by inquiring, thinking critically, identifying problems, and developing strategies for solving problems.
III. COLLABORATE Work effectively with others to broaden perspectives & work toward common goals.
IV. CURATE Make meaning for oneself & others by collecting, organizing, and sharing resources of personal relevance.
V. EXPLORE Discover & innovate in a growth mindset developed through experience & reflection.
VI. ENGAGE Demonstrate safe, legal, and ethical creating & sharing of knowledge products independently while

engaging in a community of practice & an interconnected world.

NJSLS Career Readiness, Life Literacies, and Key Skills

Career Readiness, Life Literacies and Key Skills

In the STEAM Lab, students will use the engineering design process to brainstorm, build and test a invention/innovation. They wil then work on a sales pitch for their invention/innovation. This pitch will include budgeting, advertising, cost, making connections with society and bettering our environment by looking at ways to curb climate change and use sustainable materials.

9.1.8.CP.1: Compare prices for the same goods or services

9.1.8.FP.6: Compare and contrast advertising messages to understand what they are trying to accomplish.

9.1.8.PB.1: Predict future expenses or opportunities that should be included in the budget planning process.

9.1.8.PB.7: Brainstorm techniques that will help decrease expenses including comparison shopping, negotiating, and day-to-day expense management.

9.4.8.CI.1 Assess data gathered on varying perspectives on causes of climate change (e.g., cross cultural, gender-specific, generational), and determine how the data can best be used to design multiple potential solutions (e.g., RI.7.9, 6.SP.B.5, 7.1.NH.IPERS.6, 8.2.8.ETW.4).

9.4.8.CI.2 Repurpose an existing resource in an innovative way (e.g., 8.2.8.NT.3).

9.4.8.CI.3 Examine challenges that may exist in the adoption of new ideas (e.g., 2.1.8.SSH, 6.1.8.CivicsPD.2).

9.4.8.CI.4 Explore the role of creativity and innovation in career pathways and industries.

9.4.8.CT.1 Evaluate diverse solutions proposed by a variety of individuals, organizations, and/or agencies to a local or global problem, such as climate change, and use critical thinking skills to predict which one(s) are likely to be effective (e.g., MS-ETS1-2).

9.4.8.CT.2 Develop multiple solutions to a problem and evaluate short- and long-term effects to determine the most plausible option (e.g., MS-ETS1-4, 6.1.8.CivicsDP.1).

9.4.8.CT.3 Compare past problem-solving solutions to local, national, or global issues and analyze the factors that led to a positive or negative outcome. 9.4.8.DC.8 Explain how communities use data and technology to develop measures to respond to effects of climate change (e.g., smart cities). 9.4.8.GCA.2 Demonstrate openness to diverse ideas and perspectives through active discussions to achieve a group goal.

Practices

- CLKSP1 Act as a responsible and contributing community member and employee.
- CLKSP3 Consider the environmental, social, and economic impacts of decisions.

- CLKSP4 Demonstrate creativity and innovation.
- CLKSP5 Utilize critical thinking to make sense of problems and persevere in solving them.
- CLKSP6 Model integrity, ethical leadership and effective management.

Social Emotional Learning Competencies

- **Self-Awareness**: ability to recognize one's emotions and know one's strengths and limitations
    - Connections:
        - Reflecting on one's learning (Oral, Thumbs Up, Thumbs Down, Pictures, etc.)
        - Feelings chart
        - Movement breaks
        - Headphones for lower volume
        - Privacy boards when working independently

- **Self-Management**: ability to regulate and control one's emotions and behaviors, particularly in stressful situations
    - Connections:
        - Visit the mindfulness/cool down corner in the classroom for self-soothing activities (Squishy ball, sand timer, fidget popper, etc.)
        - Take a drawing break
        - Look at book
        - Have visual prompt for teacher assistance

- **Social Awareness**: ability to take the perspective of others, demonstrate empathy, acknowledge and appreciate similarities and differences, and understand how one's actions influence and are influenced by others
    - Connections:
        - Engage in discussions with peers
        - Including others when noticing they are left out (in social play situations when practicing rules)

        - Engaging in discussion around *The Golden Rule* when developing rules and problem solving throughout the unit.

- **<u>Relationship Skills</u>**: refers to one's ability to demonstrate prosocial skills and behaviors in order to develop meaningful relationships and resolve interpersonal conflicts
    - Connections:
        - Provide opportunities to have turn and talks
        - Engage in discussions around the importance of discussing problems to work collaboratively to create solutions and develop expectations of how interact and engage with peers
        - Use a problem box to address problems in the classroom

- **<u>Responsible Decision-Making</u>**: refers to the ability to use multiple pieces of information to make ethical and responsible decisions
    - Connections:
        - Developing and following rules in the classroom community
        - Following directions