

Deal School Curriculum

Grades 3 - 5 Computer Science and Design Thinking

Desired Outcomes

Computing Systems: People interact with a wide variety of computing devices that collect, store, analyze, and act upon information in ways that can affect human capabilities both positively and negatively. The physical components (hardware) and instructions (software) that make up a computing system communicate and process information in digital form.

Enduring Understandings

- 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.

Essential Questions

- In what ways does technology make life easier?
- How do the basic operations help me use technology more efficiently?

Learners will know...

- 8.1.5.CS.1: Model how computing devices connect to other components to form a system.
- 8.1.5.CS.2: Model how computer software and hardware work together as a system to accomplish tasks.
- 8.1.5.CS.3: Identify potential solutions for simple hardware and software problems using common troubleshooting strategies.

Learners will be able to...

- By the end of 5th grade learners will be able to model how computing devices connect to other components to form a system.
- By the end of 5th grade learners will be able to model how computer software and hardware work together as a system to accomplish tasks.
- By the end of 5th grade learners will be able to identify potential solutions for simple hardware and software problems using common troubleshooting strategies.

Assessment Evidence

Summative:

ePortfolios
Project Presentations
Computed based pre and post tests

Formative:

Daily Journals
Quick Checks
Project Specific Rubrics
Exit Slips
Student Self-Assessment
Peer review
Pre-Assessments

Alternative Assessment:

Class Discussion
Teacher Observation
Class Participation
ePortfolios

Suggested Learning Plan

Students come to the lab 3 days a week for a 60 day cycle and then rotate to other related arts classes.

The structure of the daily lesson will be in the format of a 44-minute period.

- 10 minutes – Do/Now summary and whole group instruction
- 30 minutes – Independent work with teacher monitoring and guidance
- 4 minutes – Wrap up/review

List of Core Instructional and Supplemental Materials

SeeSaw
Brain Pop
Typing Club
Google Apps
Scratch

Deal School Curriculum

Grades 3 - 5 Computer Science & Design Thinking

Desired Outcomes

Networks and the Internet: Computing devices typically do not operate in isolation. Networks connect computing devices to share information and resources and are an increasingly integral part of computing. Networks and communication systems provide greater connectivity in the computing world.

Enduring Understandings

- 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).

Essential Questions

- What is a computer network?
- How do computer networks provide greater connectivity in the computing world?
- Why is network security important?

Learners will know...

8.1.5.NI.1: Develop models that successfully transmit and receive information using both wired and wireless methods.

8.1.5.NI.2: Describe physical and digital security measures for protecting sensitive personal information.

Learners will be able to...

- By the end of 5th grade learners will be able to develop models that successfully transmit and receive information using both wired and wireless methods.
- By the end of 5th grade learners will be able to describe physical and digital security measures for protecting sensitive personal information.

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Impacts of Computing: Computing affects many aspects of the world in both positive and negative ways at local, national, and global levels. Individuals and communities influence computing through their behaviors and cultural and social interactions, and, in turn, computing influences new cultural practices.

Enduring Understandings

- The development and modification of computing technology is driven by people’s needs and wants and can affect individuals differently.

Essential Questions

- How are computers impacting our society?
- How can I use technology to solve problems and create innovative solutions?
- How can technology help people collaborate and communicate effectively?

	<p>Learners will know....</p> <p>8.1.5.IC.1: Identify computing technologies that have impacted how individuals live and work and describe the factors that influenced the changes.</p> <p>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.</p>
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<p>Learners will be able to...</p> <ul style="list-style-type: none"> ● By the end of 5th grade learners will be able to identify computing technologies that have impacted how individuals live and work and describe the factors that influenced the changes. ● By the end of 5th grade learners will be able to identify possible ways to improve the accessibility and usability of computing technologies to address the diverse needs and wants of users.
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Assessment Evidence

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Data & Analysis: Computing systems exist to process data. The amount of digital data generated in the world is rapidly expanding, so the need to process data effectively is increasingly important. Data is collected and stored so that it can be analyzed to better understand the world and make more accurate predictions.

Enduring Understandings

- 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.

Essential Questions

- How can technology help people collaborate and communicate effectively?
- How does technology help people communicate globally?
- How does the automation of data help the human experience?

Learners will know...

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.

Learners will be able to...

- By the end of 5th grade learners will be able to collect, organize, and display data in order to highlight relationships or support a claim.
- By the end of 5th grade learners will be able to compare the amount of storage space required for different types of data.
- By the end of 5th grade learners will be able to organize and present collected data visually to communicate insights gained from different views of the data.
- By the end of 5th grade learners will be able to organize and present climate change data visually to highlight relationships or support a claim.
- By the end of 5th grade learners will be able to propose cause and effect relationships, predict outcomes, or communicate ideas using data.

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Grades 3 - 5 Computer Science and Design Thinking

Desired Outcomes

Algorithms & Programming: An algorithm is a sequence of steps designed to accomplish a specific task. Algorithms are translated into programs, or code, to provide instructions for computing devices. Algorithms and programming control all computing systems, empowering people to communicate with the world in new ways and solve compelling problems.

Enduring Understandings

- Different algorithms can achieve the same result.
- Some algorithms are more appropriate for a specific use than others.
- Programming languages provide variables, which are used to store and modify data.
- A variety of control structures are used to change the flow of program execution (e.g., sequences, events, loops, conditionals).
- Programs can be broken down into smaller parts to facilitate their design, implementation, and review. Programs can

Essential Questions

- How does computer programming and computational thinking affect human activity and career life?
- What is the difference between a Program and an App?
- What is an algorithm?
- How is algorithmic thinking developed?

Learners will know....

8.1.5.AP.1: Compare and refine multiple algorithms for the same task and determine which is the most appropriate.

also be created by incorporating smaller portions of programs that already exist.

- Individuals develop programs using an iterative process involving design, implementation, testing, and review.

8.1.5.AP.2: Create programs that use clearly named variables to store and modify data.

8.1.5.AP.3: Create programs that include sequences, events, loops, and conditionals.

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.

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.

Learners will be able to...

- By the end of 5th grade learners will be able to compare and refine multiple algorithms for the same task and determine which is the most appropriate.
- By the end of 5th grade learners will be able to create programs that use clearly named variables to store and modify data.
- By the end of 5th grade learners will be able to create programs that include sequences, events, loops, and conditionals.
- By the end of 5th grade learners will be able to break down problems into smaller, manageable sub-problems to facilitate program development.
- By the end of 5th grade learners will be able to modify, remix, or incorporate pieces of existing programs into one's own work to add additional features or create a new program.
- By the end of 5th grade learners will be able to develop programs using an iterative process, implement the program design, and test the program to ensure it works as intended.

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Common Sense Education
Scratch
Code.org
Google CS First
Google Applied Digital Skills
Vidcode
Kahn Academy

Pacing Guide

[Grades 3 and 4](#)

[Grade 5](#)

21st CENTURY LIFE AND CAREERS

Career Awareness, Exploration and Preparation

9.2.4.A.1 Identify reasons why people work, different types of work, and how work can help a person achieve personal and professional goals.

9.2.4.A.2 Identify various life roles and civic and work-related activities in the school, home, and community.

9.2.4.A.3 Investigate both traditional and nontraditional careers and relate information to personal likes and dislikes.

9.2.4.A.4 Explain why knowledge and skills acquired in the elementary grades lay the foundation for future academic and career success.

Career Education

CRP1, CRP2, CRP3, CRP4, CRP5, CRP6,
CRP7, CRP8, CRP9, CRP10, CRP11, CRP12
[Career Ready Practices](#)

Accommodations and Modifications

Gifted and Talented

- Provide appropriate challenge for wide ranging skills and development areas.
- Participate in inquiry and project-based learning units of study.

English Language Learners

- Pair visual prompts with verbal presentations
- Provide students with visual models, sentence stems, concrete objects, and hands on materials.

Students with IEPs/504

- Review student individual educational plan and/or 504 plan
- Establish procedures for accommodations and modifications for assessments as per IEP/504
- Modify classroom environment to support academic and physical needs of the students as per IEP/504

At Risk Learners

- Differentiated instruction
- Basic Skills
- Provide instructional interventions in the general education classroom

Interdisciplinary Connections/Cross Curricular Opportunities

3.9.K.1.NJSLSA.L1

Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.

3.9.K.1.NJSLSA.L2	Demonstrate command of the conventions of standard English capitalization punctuation and spelling when writing.
3.7.K.1.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.
3.7.K.2.NJSLSA.SL5	Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations.
3.5.K.2.NJSLSA.W6	Use technology including the Internet to produce and publish writing and to interact and collaborate with others.
6.1.4.B.3	Explain how and when it is important to use digital geographic tools, political maps, and globes to measure distances and to determine time zones and locations using latitude and longitude.

Integration of Technology

Students will use ipads and/or laptops during class.

Deal School Curriculum

STEAM Enduring Understandings

What does it mean to be creative?
 What can our imagination be used for?
 How can our imagination be used to solve a problem?
 What does it mean to be innovative?
 How can we come up with new ideas to solve a problem?

STEAM Essential Questions

What does it mean to be a problem- solver?
 What can we learn from our mistakes?
 What must you know about a problem before you can develop a solution?
 How can making mistakes be an important part of learning?
 Why is it important to know the resources you have to solve a problem?
 What are some advantages to planning before starting a project?

Grade 3-5 Computer Science and Design Thinking

Disciplinary Concepts and Core Ideas: Engineering Design

Desired Outcomes

Engineering Design

People design for enjoyment and to solve problems, extend human capabilities, satisfy needs and wants, and improve the human condition. Engineering Design, a systematic approach to creating solutions to technological problems and finding ways to meet people's needs and desires, allows for the effective and efficient development of products and systems.

Enduring Understandings

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.

Engineering design requirements include desired features and limitations that need to be considered.

Essential Questions

How does technology change thinking?

In what ways does technology make life easier?

What encourages innovation and technology?

Learners will know...

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.

Learners will be able to....

- By the end of fifth grade students will be able to explain the functions of a system and its subsystems.
- By the end of fifth grade students will be able to 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.
- By the end of fifth grade students will be able to follow step by step directions to assemble a product or solve a problem, using appropriate tools to accomplish the task.

Assessment Evidence

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Code.org
Scratch
Lego Mindstorms
iPads
Digital cameras

Deal School Curriculum

Grade 3-5 Computer Science and Design Thinking

Disciplinary Concepts and Core Ideas: Interaction of Technology and Humans

Desired Outcomes

Interaction of Technology and Humans

Societies influence technological development. Societies are characterized by common elements such as shared values, differentiated roles, and cultural norms, as well as by entities such as community institutions, organizations, and businesses. Interaction of Technology and Humans concerns the ways society drives the improvement and creation of new technologies, and how technologies both serve and change society.

Enduring Understandings

Societal needs and wants determine which new tools are developed to address real-world problems.

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.

Essential Questions

- What are the cultural, social, economic, and political effects of technology?
- What are the effects of technology on the environment?
- What is the role of society in the development and use of technology?
- What is the influence of technology on history?

Learners will know...

8.2.5.ITH.1: Explain how societal needs and wants influence the development and function of a product and a system.

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.

Learners will be able to....

- By the end of fifth grade students will be able to explain how societal needs and wants influence the development and function of a product and a system.
- By the end of fifth grade students will be able to evaluate how well a new tool has met its intended purpose and identify any shortcomings it might have.
- By the end of fifth grade students will be able to analyze the effectiveness of a new product or system and identify the positive and/or negative consequences resulting from its use.

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Grade 3-5 Computer Science and Design Thinking

Disciplinary Concepts and Core Ideas: Nature of Technology

Desired Outcomes

Nature of Technology

Human population, patterns and movement focus on the size, composition, distribution, and movement of human populations and how they are fundamental and active features on Earth's surface. This includes understanding that the expansion and redistribution of the human population affects patterns of settlement, environmental changes, and resource use. Patterns and movements of population also relate to physical phenomena including climate variability, landforms, and locations of various natural hazards and their effects on population size, composition, and distribution.

Enduring Understandings

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.

Essential Questions

What are the attributes of design?

In what way can we apply engineering design?

What is the role of troubleshooting research and development, invention and innovation and experimentation in problem solving?

What are the benefits of the design process?

How does the design process help with technology learning and creation?

Learners will know...

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.

Learners will be able to....

- By the end of fifth grade students will be able to troubleshoot a product that has stopped working and brainstorm ideas to correct the problem.
- By the end of fifth grade students will be able to identify new technologies resulting from the demands, values, and interests of individuals, businesses, industries, and societies.
- By the end of fifth grade students will be able to redesign an existing product for a different purpose in a collaborative team.

- By the end of fifth grade students will be able to identify how improvement in the understanding of materials science impacts technologies.

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Grade 3-5 Computer Science and Design Thinking

Disciplinary Concepts and Core Ideas: Effects of Technology on the Natural World

Desired Outcomes

Effects of Technology on the Natural World

Many of engineering and technology's impacts on society and the environment are widely regarded as desirable. However, other impacts are regarded as less desirable. Effects of Technology on the Natural World concerns the positive and negative ways that technologies affect the natural world.

Enduring Understandings

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.

Essential Questions

How can we apply the design process?

How do we use and maintain technological products and systems?

How do we assess the impact of products and systems?

How do resources help us learn, design, and create technology?

Learners will know...

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.

Learners will be able to....

- By the end of fifth grade students will be able to describe how resources such as material, energy, information, time, tools, people, and capital are used in products or systems.
- By the end of fifth grade students will be able to describe ways that various technologies are used to reduce improper use of resources.
- By the end of fifth grade students will be able to explain why human-designed systems, products, and environments need

<p>8.2.5.ETW.4: Explain the impact that resources, such as energy and materials used to develop technology, have on the environment.</p> <p>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.</p>	<p>to be constantly monitored, maintained, and improved.</p> <ul style="list-style-type: none"> ● By the end of fifth grade students will be able to explain the impact that resources, such as energy and materials used to develop technology, have on the environment. ● By the end of fifth grade students will be able to 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.
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Disciplinary Concepts and Core Ideas: Ethics & Culture

Desired Outcomes

Ethics & Culture

Ethics and Culture concerns the profound effects that technologies have on people, how those effects can widen or narrow disparities, and the responsibility that people have for the societal consequences of their technological decisions.

Enduring Understandings

Technological choices and opportunities vary due to factors such as differences in economic resources, location, and cultural values.

Essential Questions

In what ways does technology make life easier?

How does innovation and technological change influence our lives?

Why do humans create innovations and advancements in technology?

Learners will know...

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.

Learners will be able to....

- By the end of fifth grade students will be able to analyze how technology has contributed to or reduced inequities in local and global communities and determine its short- and long-term effects.

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Pacing Guide

[Grades 3 & 4 Pacing Guide - STEAM](#)

[Grades 5 & 6 Pacing Guide - STEAM](#)

21st CENTURY LIFE AND CAREERS

Career Awareness, Exploration and Preparation

9.2.4.A.4 Explain why knowledge and skills acquired in the elementary grades lay the foundation for future academic and career success.



Career Education

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CRP7, CRP8, CRP9, CRP10, CRP11, CRP12

[Career Ready Practices](#)

Accommodations and Modifications

Gifted and Talented

- Provide appropriate challenge for wide ranging skills and development areas.
- Participate in inquiry and project-based learning units of study.

English Language Learners

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- Provide students with visual models, sentence stems, concrete objects, and hands on materials.

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- Modify classroom environment to support academic and physical needs of the students as per IEP/504

At Risk Learners:

- Differentiated instruction
- Basic Skills
- Provide instructional interventions in the general education classroom

Interdisciplinary Connections/Cross Curricular Opportunities

ELA/Literacy

WHST.6-8.4. Produce clear and coherent writing in which the development, organization, voice, and style are appropriate to task, purpose, and audience.

WHST.6-8.10. Write routinely over extended time frames (time for research, reflection, metacognition/self correlation, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

RST.6-8.3. Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

RST.6-8.7. Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).

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.SL2. Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.

NJSLSA.SL3. Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric.

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.

3.9.K.1.NJSLSA.L1

Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.

3.9.K.1.NJSLSA.L2

Demonstrate command of the conventions of standard English capitalization punctuation and spelling when writing.

3.7.K.1.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.

3.7.K.2.NJSLSA.SL5

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

3.5.K.2.NJSLSA.W6

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

6.1.4.B.3

Explain how and when it is important to use digital geographic tools, political maps, and globes to measure distances and to determine time zones and locations using latitude and longitude.

Science Connections	Mathematics
<p>Engineering Design</p> <p>3-5-ETS1-1 Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.</p> <p>3-5-ETS1-2. Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design problem.</p> <p>3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.</p>	<p>MP.2 Reason abstractly and quantitatively.</p> <p>MP.4 Model with mathematics.</p> <p>MP.5 Use appropriate tools strategically.</p> <p>6.SP.A.1 Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers.</p> <p>8.G.A.1. Verify experimentally the properties of rotations, reflections, and translations:</p> <p>8.G.A.2. Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.</p>

<p>MS-ETS1- 1 Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.</p> <p>MS-ETS1-2. Evaluate competing design solution using a systematic process to determine how well they meet the criteria and constraints of the problem.</p> <p>MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.</p> <p>MS-ETS1-4. Develop a model to generate data to test ideas about designed systems, including those representing inputs and outputs.</p> <p>3-5-ETS1-1 Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.</p> <p>3-5-ETS1-2 Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design problem.</p> <p>to a problem based on how well each is likely to meet the criteria and constraints of the problem.</p> <p>3-5-ETS1-3 Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.</p>	<p>8.G.A.3. Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.</p> <p>8.G.A.4. Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.</p> <p>8.G.B.2. Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.</p> <p>8.G.B.3. Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.</p> <p>8.G.B.4. Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.</p> <p>8.G.C.9. Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.</p>
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Integration of Technology

Students will use ipads and/or laptops during class.

Additional Tech Resources/ Learning Launcher Categories:

- Circuitry**
MaKey MaKey
Snap Circuits - Electricity and Electronics
- Computer Graphics**
Doodle 4 Google
Illustrator

Photoshop
Photoshop Elements
Punch Home Design Suite
SketchUp - 3D Modeling
Tinkercad

Digital Communications

ACID Music Studio - Sound Engineering
CrazyTalk
CrazyTalk Animator
Frames - Stop Motion Animation
GarageBand - Sound Engineering
Google Arts & Culture
Google Sites
PowerPoint
STEM Career Exploration
Storyboarding
Video Production

Express Challenges

Digital Communications
Mechanics and Structures
Scientific Data and Analysis
Software Engineering

STEAM Challenges

Orientation
Circuitry
Computer Graphics
Digital Communications
Mechanics and Structures
Robotics and Control Technology
Scientific Data and Analysis
Software Engineering
Sustainability

Mechanics and Structures

Bridge Designer
fischertechnik Mechanic + Static
fischertechnik Mechanic + Static 2
K'Nex
Zometool

Orientation

Online ePortfolio
Orientation Collection

Robotics and Control Technology

Lego Mindstorms EV3 Robotics
Scientific Data and Analysis
ArcGIS Online - Geographic Information Systems

Astronomy with MicroObservatory
Extreme Weather and Monster Storms
Geographic Information Systems (GIS) - GIS Websites
Google Earth
Lasers
Vernier Scientific Sensors
Vernier Structures Tester
Software Engineering
Scratch v2 - Computer Programming
Stencyl - Game Design
TouchDevelop
Sustainability
Hydrogen Fuel Cells
Introduction to Alternative Energy and Other Topics
Solar Energy

Deal School Curriculum	
Grade 6 - 8	
Computer Science and Design Thinking	
Desired Outcomes	
<p><u>Computing Systems:</u> People interact with a wide variety of computing devices that collect, store, analyze, and act upon information in ways that can affect human capabilities both positively and negatively. The physical components (hardware) and instructions (software) that make up a computing system communicate and process information in digital form.</p>	
Enduring Understandings	Essential Questions
<ul style="list-style-type: none"> ● The study of human computer interaction can improve the design of devices and extend the abilities of humans. ● Software and hardware determine a computing system’s capability to store and process information. The design or selection of a computing system involves multiple considerations and potential trade-offs. ● Troubleshooting a problem is more effective when knowledge of the specific device along with a systematic process is used to identify the source of a problem. 	<ul style="list-style-type: none"> ● In what ways does technology make life easier? ● How do the basic operations help me use technology more efficiently?
	Learners will know...
	<p><u>8.1.8.CS.1:</u> Recommend improvements to computing devices in order to improve the ways users interact with the devices.</p> <p><u>8.1.8.CS.2:</u> Design a system that combines hardware and software components to process data.</p> <p><u>8.1.8.CS.3:</u> Justify design decisions and explain potential system trade-offs.</p> <p><u>8.1.8.CS.4:</u> Systematically apply troubleshooting strategies to identify and resolve hardware and software problems in computing systems.</p>
Learners will be able to...	
<ul style="list-style-type: none"> ● By the end of 8th grade learners will be able to recommend improvements to computing devices in order to improve the ways users interact with the devices. ● By the end of 8th grade learners will be able to design a system that combines hardware and software components to process data. ● By the end of 8th grade learners will be able to justify design decisions and explain potential system trade-offs. 	

- By the end of 8th grade learners will be able to systematically apply troubleshooting strategies to identify and resolve hardware and software problems in computing systems.

Assessment Evidence

Summative:

ePortfolios
Project Presentations
Computed based pre and post tests

Formative:

Daily Journals
Quick Checks
Project Specific Rubrics
Exit Slips
Student Self-Assessment
Peer review
Pre-Assessments

Alternative Assessment:

Class Discussion
Teacher Observation
Class Participation
ePortfolios

Suggested Learning Plan

Students come to the lab 3 times a week for a 60 day cycle period and then rotate to other subjects or elective classes.

The structure of the daily lesson will be in the format of a 44-minute period.

- 10 minutes – Do/Now summary and whole group instruction
- 30 minutes – Independent work with teacher monitoring and guidance
- 4 minutes – Wrap up/review

Suggested Learning Resources

SeeSaw
Brain Pop
Typing Club
Google Apps
Common Sense Education
Scratch
Code.org

Grade 6 - 8 Computer Science and Design Thinking

Desired Outcomes

Networks and the Internet: Computing devices typically do not operate in isolation. Networks connect computing devices to share information and resources and are an increasingly integral part of computing. Networks and communication systems provide greater connectivity in the computing world.

Enduring Understandings	Essential Questions
<ul style="list-style-type: none"> ● Protocols, packets and addressing are the key components for reliable delivery of information across networks. ● The information sent and received across networks can be protected from unauthorized access and modification in a variety of ways. ● The evolution of malware leads to understanding the key security measures and best practices needed to proactively address the threat to digital data. 	<ul style="list-style-type: none"> ● What is a computer network? ● How do computer networks provide greater connectivity in the computing world? ● Why is network security important? <p>Learners will know....</p> <p>8.1.8.NI.1: Model how information is broken down into smaller pieces, transmitted as addressed packets through multiple devices over networks and the Internet, and reassembled at the destination.</p> <p>8.1.8.NI.2: Model the role of protocols in transmitting data across networks and the Internet and how they enable secure and errorless communication.</p> <p>8.1.8.NI.3: Explain how network security depends on a combination of hardware, software, and practices that control access to data and systems.</p> <p>8.1.8.NI.4: Explain how new security measures have been created in response to key malware events.</p>
<p>Learners will be able to...</p> <ul style="list-style-type: none"> ● By the end of 8th grade learners will be able to model how information is broken down into smaller pieces, transmitted as addressed packets through multiple devices over networks and the Internet, and reassembled at the destination. ● By the end of 8th grade learners will be able to model the role of protocols in transmitting data across networks and the Internet and how they enable secure and errorless communication. 	

- By the end of 8th grade learners will be able to explain how network security depends on a combination of hardware, software, and practices that control access to data and systems.
- By the end of 8th grade learners will be able to explain how new security measures have been created in response to key malware events.

Assessment Evidence

Summative:

ePortfolios
 Project Presentations
 Computed based pre and post tests

Formative:

Daily Journals
 Quick Checks
 Project Specific Rubrics
 Exit Slips
 Student Self-Assessment
 Peer review
 Pre-Assessments

Alternative Assessment:

Class Discussion
 Teacher Observation
 Class Participation
 ePortfolios

Suggested Learning Plan

Students come to the lab 3 times a week for a 60 day cycle period and then rotate to other subjects or elective classes.

The structure of the daily lesson will be in the format of a 44-minute period.

- 10 minutes – Do/Now summary and whole group instruction
- 30 minutes – Independent work with teacher monitoring and guidance
- 4 minutes – Wrap up/review

Suggested Learning Resources

SeeSaw
 Brain Pop
 Typing Club
 Google Apps
 Common Sense Education
 Scratch
 Code.org
 E-Pals
 Google Hangouts

Deal School Curriculum	
Grade 6 - 8	
Computer and Design Thinking	
Desired Outcomes	
<i>Impacts of Computing: Computing affects many aspects of the world in both positive and negative ways at local, national, and global levels. Individuals and communities influence computing through their behaviors and cultural and social interactions, and, in turn, computing influences new cultural practices.</i>	
Enduring Understandings	Essential Questions
<ul style="list-style-type: none"> ● Advancements in computing technology can change individuals' behaviors. ● Society is faced with trade offs due to the increasing globalization and automation that computing brings. 	<ul style="list-style-type: none"> ● How are computers impacting our society? ● How can I use technology to solve problems and create innovative solutions? ● How can technology help people collaborate and communicate effectively?
	Learners will know....
	<p>8.1.8.IC.1: Compare the trade-offs associated with computing technologies that affect an individual's everyday activities and career options.</p> <p>8.1.8.IC.2: Describe issues of bias and accessibility in the design of existing technologies.</p>
Learners will be able to...	
<ul style="list-style-type: none"> ● By the end of 8th grade learners will be able to compare the trade-offs associated with computing technologies that affect an individual's everyday activities and career options. ● By the end of 8th grade learners will be able to describe issues of bias and accessibility in the design of existing technologies. 	
Assessment Evidence	
<p>Summative: ePortfolios Project Presentations Computed based pre and post tests</p> <p>Formative: Daily Journals</p>	

<p>Quick Checks Project Specific Rubrics Exit Slips Student Self-Assessment Peer review Pre-Assessments</p> <p>Alternative Assessment: Class Discussion Teacher Observation Class Participation ePortfolios</p>
Suggested Learning Plan
<p>Students come to the lab 3 times a week for a 60 day cycle period and then rotate to other subjects or elective classes.</p> <p>The structure of the daily lesson will be in the format of a 44-minute period.</p> <ul style="list-style-type: none"> ● 10 minutes – Do/Now summary and whole group instruction ● 30 minutes – Independent work with teacher monitoring and guidance ● 4 minutes – Wrap up/review
Suggested Learning Resources
<p>SeeSaw Brain Pop Typing Club Google Apps Common Sense Education Scratch Code.org</p>

Deal School Curriculum	
Grade 6 - 8 Computer Science and Design Thinking	
Desired Outcomes	
<p><i>Data & Analysis:</i> Computing systems exist to process data. The amount of digital data generated in the world is rapidly expanding, so the need to process data effectively is increasingly important. Data is collected and stored so that it can be analyzed to better understand the world and make more accurate predictions.</p>	
Enduring Understandings	Essential Questions
<ul style="list-style-type: none"> ● People use digital devices and tools to automate the collection, use, and transformation of data. 	<ul style="list-style-type: none"> ● How can technology help people collaborate and communicate effectively?

<ul style="list-style-type: none"> ● The manner in which data is collected and transformed is influenced by the type of digital device(s) available and the intended use of the data. ● Data is represented in many formats. Software tools translate the low-level representation of bits into a form understandable by individuals. Data is organized and accessible based on the application used to store it. ● The purpose of cleaning data is to remove errors and make it easier for computers to process. ● Computer models can be used to simulate events, examine theories and inferences, or make predictions. 	<ul style="list-style-type: none"> ● How does technology help people communicate globally? ● How does the automation of data help the human experience? <p>Learners will know....</p> <p>8.1.8.DA.1: Organize and transform data collected using computational tools to make it usable for a specific purpose.</p> <p>8.1.8.DA.2: Explain the difference between how the computer stores data as bits and how the data is displayed.</p> <p>8.1.8.DA.3: Identify the appropriate tool to access data based on its file format.</p> <p>8.1.8.DA.4: Transform data to remove errors and improve the accuracy of the data for analysis.</p> <p>8.1.8.DA.5: Test, analyze, and refine computational models.</p> <p>8.1.8.DA.6: Analyze climate change computational models and propose refinements.</p>
<p>Learners will be able to...</p> <ul style="list-style-type: none"> ● By the end of 8th grade learners will be able to transform data to remove errors and improve the accuracy of the data for analysis. ● By the end of 8th grade learners will be able to test, analyze, and refine computational models. ● By the end of 8th grade learners will be able to analyze climate change computational models and propose refinements. 	
<p>Assessment Evidence</p>	
<p>Summative: ePortfolios Project Presentations Computed based pre and post tests</p> <p>Formative: Daily Journals Quick Checks Project Specific Rubrics Exit Slips</p>	

Student Self-Assessment Peer review Pre-Assessments Alternative Assessment: Class Discussion Teacher Observation Class Participation ePortfolios
Suggested Learning Plan
Students come to the lab 3 times a week for a 60 day cycle period and then rotate to other subjects or elective classes. The structure of the daily lesson will be in the format of a 44-minute period. <ul style="list-style-type: none"> ● 10 minutes – Do/Now summary and whole group instruction ● 30 minutes – Independent work with teacher monitoring and guidance ● 4 minutes – Wrap up/review
Suggested Learning Resources
SeeSaw Brain Pop Typing Club Google Apps Common Sense Education Scratch Code.org Google Be Internet Awesome Vidcode Kahn Academy

Grade 6 - 8 Computer Science and Design Thinking	
Desired Outcomes	
<p><i>Algorithms & Programming:</i> An algorithm is a sequence of steps designed to accomplish a specific task. Algorithms are translated into programs, or code, to provide instructions for computing devices. Algorithms and programming control all computing systems, empowering people to communicate with the world in new ways and solve compelling problems.</p>	
Enduring Understandings	Essential Questions
<ul style="list-style-type: none"> ● Individuals design algorithms that are reusable in many situations. ● Algorithms that are readable are easier to follow, test, and debug. 	<ul style="list-style-type: none"> ● How does computer programming and computational thinking affect human activity and career life? ● What is the difference between a Program and an App?

<ul style="list-style-type: none"> ● Programmers create variables to store data values of different types and perform appropriate operations on their values. ● Control structures are selected and combined in programs to solve more complex problems. ● Programs use procedures to organize code and hide implementation details. Procedures can be repurposed in new programs. Defining parameters for procedures can generalize behavior and increase reusability. ● Individuals design and test solutions to identify problems taking into consideration the diverse needs of the users and the community. 	<ul style="list-style-type: none"> ● What is an algorithm? ● How is algorithmic thinking developed?
	<p>Learners will know....</p> <p>8.1.8.AP.1: Design and illustrate algorithms that solve complex problems using flowcharts and/or pseudocode.</p> <p>8.1.8.AP.2: Create clearly named variables that represent different data types and perform operations on their values.</p> <p>8.1.8.AP.3: Design and iteratively develop programs that combine control structures, including nested loops and compound conditionals.</p> <p>8.1.8.AP.4: Decompose problems and sub-problems into parts to facilitate the design, implementation, and review of programs.</p> <p>8.1.8.AP.5: Create procedures with parameters to organize code and make it easier to reuse.</p> <p>8.1.8.AP.6: Refine a solution that meets users' needs by incorporating feedback from team members and users.</p> <p>8.1.8.AP.7: Design programs, incorporating existing code, media, and libraries, and give attribution.</p> <p>8.1.8.AP.8: Systematically test and refine programs using a range of test cases and users.</p> <p>8.1.8.AP.9: Document programs in order to make them easier to follow, test, and debug</p>
<p>Learners will be able to...</p>	

- By the end of 8th grade learners will be able to design and illustrate algorithms that solve complex problems using flowcharts and/or pseudocode.
- By the end of 8th grade learners will be able to create clearly named variables that represent different data types and perform operations on their values.
- By the end of 8th grade learners will be able to design and iteratively develop programs that combine control structures, including nested loops and compound conditionals.
- By the end of 8th grade learners will be able to decompose problems and sub-problems into parts to facilitate the design, implementation, and review of programs.
- By the end of 8th grade learners will be able to create procedures with parameters to organize code and make it easier to reuse.
- By the end of 8th grade learners will be able to refine a solution that meets users' needs by incorporating feedback from team members and users.
- By the end of 8th grade learners will be able to design programs, incorporating existing code, media, and libraries, and give attribution.
- By the end of 8th grade learners will be able to systematically test and refine programs using a range of test cases and users.
- By the end of 8th grade learners will be able to document programs in order to make them easier to follow, test, and debug.

Assessment Evidence

Summative:

ePortfolios
 Project Presentations
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Formative:

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 Student Self-Assessment
 Peer review
 Pre-Assessments

Alternative Assessment:

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 ePortfolios

Suggested Learning Plan

Students come to the lab 3 times a week for a 60 day cycle period and then rotate to other subjects or elective classes.

The structure of the daily lesson will be in the format of a 44-minute period.

- 10 minutes – Do/Now summary and whole group instruction
- 30 minutes – Independent work with teacher monitoring and guidance
- 4 minutes – Wrap up/review

Suggested Learning Resources

SeeSaw
Brain Pop
Typing Club
Google Apps
Common Sense Education
Scratch
Code.org
Vidcode
Kahn Academy

Pacing Guide

[Grade 6](#)

[Grades 7 & 8](#)

21st CENTURY LIFE AND CAREERS

Career Awareness, Exploration and Preparation

9.2.4.A.4 Explain why knowledge and skills acquired in the elementary grades lay the foundation for future academic and career success.

Career Education

CRP1, CRP2, CRP3,
CRP4, CRP5, CRP6,
CRP7, CRP8, CRP9,
CRP10, CRP11,
CRP12

[Career Ready Practices](#)

Accommodations and Modifications

Gifted and Talented

- Provide appropriate challenges for wide ranging skills and development areas.
- Participate in inquiry and project-based learning units of study.

English Language Learners

- Pair visual prompts with verbal presentations
- Provide students with visual models, sentence stems, concrete objects, and hands on materials.

Students with IEPs/504

- Review student individual educational plan and/or 504 plan
- Establish procedures for accommodations and modifications for assessments as per IEP/504
- Modify classroom environment to support academic and physical needs of the students as per IEP/504

At Risk Learners

- Differentiated instruction
- Basic Skills
- Provide instructional interventions in the general education classroom

LGBTQ+ and Students with Disabilities

- [Celebrating Pride Month in Tech](#)
- [LGBTQ figures who shaped tech history](#)
- [10 inspiring LGBTQ+ tech leaders](#)
- [Re-Thinking Disability in Tech](#)
- [Queer Spaces: LGBTQ Voices and Resources for Architects and Designers](#)
- [Garden State Equality Education Resources](#)
- [Pride in STEM](#)

Interdisciplinary Connections/Cross Curricular Opportunities

3.9.K.1.NJSLSA.L1	Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
3.9.K.1.NJSLSA.L2	Demonstrate command of the conventions of standard English capitalization punctuation and spelling when writing.
3.7.K.1.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.
3.5.K.2.NJSLSA.W6	Use technology including the Internet to produce and publish writing and to interact and collaborate with others.
3.10.5.2.L.5.3	Use knowledge of language and its conventions when writing, speaking

	reading or listening. A.Expand combine and reduce sentences for meaning reader listener interest and style. B.Compare and contrast the varieties of English (e.g. dialects registers) used in stories, dramas or poems.
MS-ETS1-4.	Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.
1.3.8.A.4	Use media arts and technology in the creation and performance of short original choreographic compositions.
Integration of Technology	
Students will use ipads and/or laptops during class.	

Deal School Curriculum
STEAM Enduring Understandings
<p>What does it mean to be creative? What can our imagination be used for? How can our imagination be used to solve a problem? What does it mean to be innovative? How can we come up with new ideas to solve a problem?</p>
STEAM Essential Questions
<p>What does it mean to be a problem- solver? What can we learn from our mistakes? What must you know about a problem before you can develop a solution? How can making mistakes be an important part of learning? Why is it important to know the resources you have to solve a problem? What are some advantages to planning before starting a project?</p>
Grade 6 - 8
Computer Science and Design Thinking
Desired Outcomes
<p>Engineering Design People design for enjoyment and to solve problems, extend human capabilities, satisfy needs and wants, and improve the human condition. Engineering Design, a systematic approach to creating solutions to technological problems and finding ways to meet people’s needs and desires, allows for the effective and efficient development of products and systems.</p>

Enduring Understandings	Essential Questions
<p>Engineering design is a systematic, creative, and iterative process used to address local and global problems.</p> <p>The process includes generating ideas, choosing the best solution, and making, testing, and redesigning models or prototypes.</p> <p>Engineering design requirements and specifications involve making trade-offs between competing requirements and desired design features.</p>	<ul style="list-style-type: none"> ● How does technology change thinking? ● In what ways does technology make life easier? ● What encourages innovation and technology? ● How does technology connect people and civilizations? ● In what ways does technology make life easier? ● How can innovation help some and hurt others? ● How does technology improve the human condition?
Learners will know...	Learners will be able to....
<p>8.2.8.ED.1: Evaluate the function, value, and aesthetics of a technological product or system, from the perspective of the user and the producer.</p> <p>8.2.8.ED.2: Identify the steps in the design process that could be used to solve a problem.</p> <p>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).</p> <p>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.</p> <p>8.2.8.ED.5: Explain the need for optimization in a design process.</p> <p>8.2.8.ED.6: Analyze how trade-offs can impact the design of a product.</p> <p>8.2.8.ED.7: Design a product to address a real-world problem and document the</p>	<ul style="list-style-type: none"> ● By the end of eighth grade students will be able to evaluate the function, value, and aesthetics of a technological product or system, from the perspective of the user and the producer. ● By the end of eighth grade students will be able to identify the steps in the design process that could be used to solve a problem. ● By the end of eighth grade students will be able to develop a proposal for a solution to a real-world problem that includes a model (e.g., physical prototype, graphical/technical sketch). ● By the end of eighth grade students will be able to 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.

<p>iterative design process, including decisions made as a result of specific constraints and trade-offs (e.g., annotated sketches).</p>	<ul style="list-style-type: none"> ● By the end of eighth grade students will be able to analyze how trade-offs can impact the design of a product. ● By the end of eighth grade students will be able to design a product to address a real-world problem and document the iterative design process, including decisions made as a result of specific constraints and trade-offs (e.g., annotated sketches).
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Assessment Evidence

<p>Summative: ePortfolios Project Presentations Computed based pre and post tests</p> <p>Formative: Daily Journals Quick Checks Project Specific Rubrics Exit Slips Student Self-Assessment Peer review Pre-Assessments</p> <p>Alternative Assessment: Class Discussion Teacher Observation Class Participation ePortfolios</p>
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Suggested Learning Plan

<p>The structure of the daily lesson will be in the format of a 44 minute period.</p> <ul style="list-style-type: none"> ● 10 minutes – Do/Now summary and whole group instruction ● 30 minutes – Independent work with teacher monitoring and guidance ● 4 minutes – Wrap up/review

Suggested Learning Resources

<p>Animationish Seesaw Google APPS</p>
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Google Sketchup Google Earth Brain Pop Code.org Scratch Lego Mindstorms iPads Digital cameras Code.org
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<h2>Deal School Curriculum</h2> <h3>Grade 6 - 8</h3> <h3>Computer Science and Design Thinking</h3>	
Desired Outcomes	
<p>Interaction of Technology and Humans Societies influence technological development. Societies are characterized by common elements such as shared values, differentiated roles, and cultural norms, as well as by entities such as community institutions, organizations, and businesses. Interaction of Technology and Humans concerns the ways society drives the improvement and creation of new technologies, and how technologies both serve and change society.</p>	
Enduring Understandings	Essential Questions
<p>Economic, political, social and cultural aspects of society drive development of new technological products, processes, and systems.</p> <p>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.</p> <p>New needs and wants may create strains on local economies and workforces. Improvements in technology are intended to make the completion of tasks easier, safer, and/or more efficient.</p>	<p>How does technology change thinking? How does technology affect artistic achievement? In what ways does technology make life easier? How does innovation and technological change influence our lives?</p>
Learners will know...	Learners will be able to....
<p>8.2.8.ITH.1: Explain how the development and use of technology influences economic, political, social, and cultural issues.</p>	<ul style="list-style-type: none"> ● By the end of eighth grade students will be able to explain how the development and use of technology influences economic,

<p>8.2.8.ITH.2: Compare how technologies have influenced society over time.</p> <p>8.2.8.ITH.3: Evaluate the impact of sustainability on the development of a designed product or system.</p> <p>8.2.8.ITH.4: Identify technologies that have been designed to reduce the negative consequences of other technologies and explain the change in impact.</p> <p>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.</p>	<p>political, social, and cultural issues.</p> <ul style="list-style-type: none"> ● By the end of eighth grade students will be able to compare how technologies have influenced society over time. ● By the end of eighth grade students will be able to evaluate the impact of sustainability on the development of a designed product or system. ● By the end of eighth grade students will be able to identify technologies that have been designed to reduce the negative consequences of other technologies and explain the change in impact. ● By the end of eighth grade students will be able to compare the impacts of a given technology on different societies, noting factors that may make a technology appropriate and sustainable in one society but not in another.
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Assessment Evidence

<p>Summative: ePortfolios Project Presentations Computed based pre and post tests</p> <p>Formative: Daily Journals Quick Checks Project Specific Rubrics Exit Slips Student Self-Assessment Peer review Pre-Assessments</p>

<p>Alternative Assessment: Class Discussion Teacher Observation Class Participation ePortfolios</p>
Suggested Learning Plan
<p>The structure of the daily lesson will be in the format of a 44 minute period.</p> <ul style="list-style-type: none"> ● 10 minutes – Do/Now summary and whole group instruction ● 30 minutes – Independent work with teacher monitoring and guidance ● 4 minutes – Wrap up/review
Suggested Learning Resources
<p>Animationish Seesaw Google APPS Google Sketchup Google Earth Brain Pop Code.org Scratch Lego Mindstorms iPads Digital cameras</p>

Deal School Curriculum	
Grade 6 - 8	
Computer Science and Design Thinking	
Desired Outcomes	
<p>Nature of Technology Human population, patterns and movement focus on the size, composition, distribution, and movement of human populations and how they are fundamental and active features on Earth’s surface. This includes understanding that the expansion and redistribution of the human population affects patterns of settlement, environmental changes, and resource use. Patterns and movements of population also relate to physical phenomena including climate variability, landforms, and locations of various natural hazards and their effects on population size, composition, and distribution.</p>	
Enduring Understandings	Essential Questions
Technology advances through the processes of innovation and invention	How is survival dependent on innovation/technology?

<p>which relies upon the imaginative and inventive nature of people. Sometimes a technology developed for one purpose is adapted to serve other purposes. Engineers use a systematic process of creating or modifying technologies that is fueled and constrained by physical laws, cultural norms, and economic resources. Scientists use systematic investigation to understand the natural world.</p>	<p>What are the attributes of design?</p> <p>In what way can we apply engineering design?</p> <p>What is the role of troubleshooting research and development, invention and innovation and experimentation in problem solving?</p> <p>What are the benefits of the design process?</p> <p>How does the design process help with technology learning and creation?</p>
<p>Learners will know...</p>	<p>Learners will be able to....</p>
<p>8.2.8.NT.1: Examine a malfunctioning tool, product, or system and propose solutions to the problem.</p> <p>8.2.8.NT.2: Analyze an existing technological product that has been repurposed for a different function.</p> <p>8.2.8.NT.3: Examine a system, consider how each part relates to other parts, and redesign it for another purpose.</p> <p>8.2.8.NT.4: Explain how a product designed for a specific demand was modified to meet a new demand and led to a new product.</p>	<ul style="list-style-type: none"> ● By the end of eighth grade students will be able to examine a malfunctioning tool, product, or system and propose solutions to the problem. ● By the end of eighth grade students will be able to analyze an existing technological product that has been repurposed for a different function. ● By the end of eighth grade students will be able to examine a system, consider how each part relates to other parts, and redesign it for another purpose. ● By the end of eighth grade students will be able to explain how a product designed for a specific demand was modified to meet a new demand and led to a new product.
<p>Assessment Evidence</p>	
<p>Summative: ePortfolios Project Presentations</p>	

Computed based pre and post tests

Formative:

Daily Journals
Quick Checks
Project Specific Rubrics
Exit Slips
Student Self-Assessment
Peer review
Pre-Assessments

Alternative Assessment:

Class Discussion
Teacher Observation
Class Participation
ePortfolios

Suggested Learning Plan

The structure of the daily lesson will be in the format of a 44 minute period.

- 10 minutes – Do/Now summary and whole group instruction
- 30 minutes – Independent work with teacher monitoring and guidance
- 4 minutes – Wrap up/review

Suggested Learning Resources

Animationish
Seesaw
Google APPS
Google Sketchup
Google Earth
Brain Pop
Code.org
Scratch
Lego Mindstorms
iPads
Digital cameras

Deal School Curriculum

Grade 6 - 8

Computer Science and Design Thinking

Desired Outcomes

Effects of Technology on the Natural World

<p>Many of engineering and technology's impacts on society and the environment are widely regarded as desirable. However, other impacts are regarded as less desirable. Effects of Technology on the Natural World concerns the positive and negative ways that technologies affect the natural world.</p>	
<p>Enduring Understandings</p>	<p>Essential Questions</p>
<p>Resources need to be utilized wisely to have positive effects on the environment and society. Some technological decisions involve tradeoffs between environmental and economic needs, while others have positive effects for both the economy and environment.</p>	<ul style="list-style-type: none"> ● How can we apply the design process? ● How do we use and maintain technological products and systems? ● How do we assess the impact of products and systems?
<p>Learners will know...</p>	<p>Learners will be able to...</p>
<p>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.</p> <p>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).</p> <p>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.</p> <p>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.</p>	<ul style="list-style-type: none"> ● By the end of eighth grade students will be able to illustrate how a product is upcycled into a new product and analyze the short- and long-term benefits and costs. ● By the end of eighth grade students will be able to analyze the impact of modifying resources in a product or system (e.g., materials, energy, information, time, tools, people, capital). ● By the end of eighth grade students will be able to analyze the design of a product that negatively impacts the environment or society and develop possible solutions to lessen its impact. ● By the end of eighth grade students will be able to compare the environmental effects of two alternative technologies devised to address climate change issues and use data to justify which choice is best.
<p>Assessment Evidence</p>	
<p>Summative: ePortfolios</p>	

Project Presentations
Computed based pre and post tests

Formative:

Daily Journals
Quick Checks
Project Specific Rubrics
Exit Slips
Student Self-Assessment
Peer review
Pre-Assessments

Alternative Assessment:

Class Discussion
Teacher Observation
Class Participation
ePortfolios

Suggested Learning Plan

The structure of the daily lesson will be in the format of a 44 minute period.

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Google Sketchup
Google Earth
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Code.org
Scratch
Lego Mindstorms
iPads
Digital cameras

Deal School Curriculum

Grade 6 - 8

Computer Science and Design Thinking

Desired Outcomes

Ethics & Culture

Ethics and Culture concerns the profound effects that technologies have on people, how those effects can widen or narrow disparities, and the responsibility that

people have for the societal consequences of their technological decisions.	
Enduring Understandings	Essential Questions
Technological disparities have consequences for public health and prosperity.	<p>In what ways does technology make life easier?</p> <p>How does innovation and technological change influence our lives?</p> <p>Why do humans create innovations and advancements in technology?</p> <p>How are computers impacting our society?</p>
Learners will know...	Learners will be able to....
<p>8.2.8.EC.1: Explain ethical issues that may arise from the use of new technologies.</p> <p>8.2.8.EC.2: Examine the effects of ethical and unethical practices in product design and development.</p>	<ul style="list-style-type: none"> ● By the end of eighth grade students will be able to explain ethical issues that may arise from the use of new technologies. ● By the end of eighth grade students will be able to examine the effects of ethical and unethical practices in product design and development.
Assessment Evidence	
<p>Summative: ePortfolios Project Presentations Computed based pre and post tests</p> <p>Formative: Daily Journals Quick Checks Project Specific Rubrics Exit Slips Student Self-Assessment Peer review Pre-Assessments</p> <p>Alternative Assessment: Class Discussion Teacher Observation Class Participation ePortfolios</p>	
Suggested Learning Plan	

The structure of the daily lesson will be in the format of a 44 minute period.

- 10 minutes – Do/Now summary and whole group instruction
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- 4 minutes – Wrap up/review

Suggested Learning Resources

Animationish
Google Apps
Osmo
Code.org
Seesaw
Google APPS
Google Sketchup
Google Earth
Brain Pop
Scratch
Lego Mindstorms
iPads
Digital cameras

Pacing Guide

[Grades 5 & 6 Pacing Guide - STEAM](#)

[Grades 7 & 8 Pacing Guide - STEAM](#)

[Grade 8 Pacing Guide- STEAM](#)

21st CENTURY LIFE AND CAREERS

Personal Financial Literacy

9.1.8.A.2 Relate how career choices, education choices, skills, entrepreneurship, and economic conditions affect income.

9.1.8.A.3 Differentiate among ways that workers can improve earning power through the acquisition of new knowledge and skills.

Career Awareness, Exploration and Preparation

only GRADES 7/8

9.2.8.B.1 Research careers within the 16 Career Clusters® and determine attributes of career success.

9.2.8.B.3 Evaluate communication, collaboration, and leadership skills that can be developed through school, home, work, and extracurricular activities for use in a career.

Career Education

CRP1, CRP2, CRP3, CRP4, CRP5, CRP6,
CRP7, CRP8, CRP9, CRP10, CRP11, CRP12
[Career Ready Practices](#)

Accommodations and Modifications

Gifted and Talented

- Provide appropriate challenge for wide ranging skills and development areas.
- Participate in inquiry and project-based learning units of study.

English Language Learners

- Pair visual prompts with verbal presentations
- Provide students with visual models, sentence stems, concrete objects, and hands on materials.

Students with IEPs/504

- Review student individual educational plan and/or 504 plan
- Establish procedures for accommodations and modifications for assessments as per IEP/504
- Modify classroom environment to support academic and physical needs of the students as per IEP/504

At Risk Learners:

- Differentiated instruction
- Basic Skills
- Provide instructional interventions in the general education classroom

LGBTQ+ and Students with Disabilities

- [Celebrating Pride Month in Tech](#)
- [LGBTQ figures who shaped tech history](#)
- [10 inspiring LGBTQ+ tech leaders](#)
- [Queer Spaces: LGBTQ Voices and Resources for Architects and Designers](#)
- [Garden State Equality Education Resources](#)
- [Pride in STEM](#)
- [Re-Thinking Disability in Tech](#)

Interdisciplinary Connections/Cross Curricular Opportunities

ELA/Literacy -

WHST.6-8.1. Write arguments focused on discipline-specific content. A. Introduce claim(s) about a topic or issue, acknowledge and distinguish the claim(s) from alternate or opposing claims, and organize the reasons and evidence logically. B. Support claim(s) with logical reasoning and

Mathematics -

MP.2 Reason abstractly and quantitatively.
MP.4 Model with mathematics.
MP.5 Use appropriate tools strategically.
6.SP.A.1 Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers.

relevant, accurate data and evidence that demonstrate an understanding of the topic or text, using credible sources. C. Use words, phrases, and clauses to create cohesion and clarify the relationships among claim(s), counterclaims, reasons, and evidence. D. Establish and maintain a formal/academic style, approach, and form. E. Provide a concluding statement or section that follows from and supports the argument presented.

WHST.6-8.2. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. A. Introduce a topic and organize ideas, concepts, and information using text structures (e.g. definition, classification, comparison/contrast, cause/effect, etc.) and text features (e.g. headings, graphics, and multimedia) when useful to aiding comprehension. B. Develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples. C. Use appropriate and varied transitions to create cohesion and clarify the relationships among ideas and concepts. D. Use precise language and domain-specific vocabulary to inform about or explain the topic. E. Establish and maintain a formal/academic style, approach, and form. F. Provide a concluding statement or section that follows from and supports the information or explanation presented.

WHST.6-8.4. Produce clear and coherent writing in which the development, organization, voice, and style are appropriate to task, purpose, and audience.

WHST.6-8.10. Write routinely over extended time frames (time for research, reflection, metacognition/self correlation, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

RST.6-8.3. Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

RST.6-8.7. Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).

7.G.A.1. Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.

7.G.A.2. Draw (with technology, with ruler and protractor, as well as freehand) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.

7.G.B.6. Solve real-world and mathematical problems involving area, volume and surface area of two and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.

Science Connections

SCI.6-8.MS-ETS1- 1 Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

MS-ETS1-2. Evaluate competing design solution using a systematic process to determine how well they meet the criteria and constraints of the problem.

MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.

MS-ETS1-4. Develop a model to generate data to test ideas about designed systems, including those representing inputs and outputs.

for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

Integration of Technology

Students will use ipads and/or laptops during class.

Additional Tech Resources/ Learning Launcher Categories:

Circuitry

MaKey MaKey

Snap Circuits - Electricity and Electronics

Computer Graphics

Doodle 4 Google

Illustrator

Photoshop

Photoshop Elements

Punch Home Design Suite

SketchUp - 3D Modeling

Tinkercad

Digital Communications

ACID Music Studio - Sound Engineering

CrazyTalk

CrazyTalk Animator

Frames - Stop Motion Animation

GarageBand - Sound Engineering

Google Arts & Culture

Google Sites

PowerPoint

STEM Career Exploration

Storyboarding

Video Production

Express Challenges

Digital Communications

Mechanics and Structures

Scientific Data and Analysis

Software Engineering

Liftoff Challenges

Orientation

Circuitry

Computer Graphics

Digital Communications

Mechanics and Structures

Robotics and Control Technology

Scientific Data and Analysis

Software Engineering

Sustainability

Mechanics and Structures

Bridge Designer

fischertechnik Mechanic + Static

fischertechnik Mechanic + Static 2

K'Nex

Zometool

Orientation

Online ePortfolio

Orientation Collection

Robotics and Control Technology

Lego Mindstorms EV3 Robotics

Scientific Data and Analysis

ArcGIS Online - Geographic Information Systems

Astronomy with MicroObservatory

Extreme Weather and Monster Storms

Geographic Information Systems (GIS) - GIS Websites

Google Earth

Lasers

Vernier Scientific Sensors

Vernier Structures Tester

Software Engineering

Scratch v2 - Computer Programming

Stencyl - Game Design

TouchDevelop

Sustainability

Hydrogen Fuel Cells

Introduction to Alternative Energy and Other Topics

Solar Energy

Grade K – 2 Deal School Curriculum Computer Science and Design Thinking

Disciplinary Concepts and Core Ideas: Computing Systems

Desired Outcomes

Computing Systems: People interact with a wide variety of computing devices that collect, store, analyze and act upon information in ways that can affect human capabilities both positively and negatively. The physical components (hardware) and instructions (software) that make up a computing system communicate and process information in digital form.

Enduring Understandings	Essential Questions
<ul style="list-style-type: none"> ● 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. 	<ul style="list-style-type: none"> ● In what ways does technology make life easier? ● How do the basic operations help me use technology more efficiently? ● How should technology be used? ● When can you expect technology to be effective?
	<p>Learners will know....</p> <p>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.</p> <p>8.1.2.CS.2: Explain the functions of common software and hardware components of computing systems.</p> <p>8.1.2.CS.3: Describe basic hardware and software problems using accurate terminology.</p>
	<p>Learners will be able to...</p> <ul style="list-style-type: none"> ● By the end of 2nd Grade students will be able to select and operate computing devices that perform a variety of tasks accurately and quickly based on user needs and preferences. ● By the end of 2nd Grade students will be able to explain the functions of common software and hardware components of computing systems.

- By the end of 2nd Grade students will be able to describe basic hardware and software problems using accurate terminology.

Assessment Evidence

Summative:

ePortfolios
 Project Presentations
 Computed based pre and post tests

Formative:

Daily Journals
 Quick Checks
 Project Specific Rubrics
 Exit Slips
 Student Self-Assessment
 Peer review
 Pre-Assessments

Alternative Assessment:

Class Discussion
 Teacher Observation
 Class Participation
 ePortfolios

Suggested Learning Plan

Students will visit the lab once a week for the school year.

The structure of the daily lesson will be in the format of a 44-minute period.

- 10 minutes – Do/Now summary and whole group instruction
- 30 minutes – Independent work with teacher monitoring and guidance
- 4 minutes – Wrap up/review

List of Core Instructional and Supplemental Materials

SeeSaw
 Brain Pop Jr.
 Google Apps
 ABCYa.com

Students will use ipads and/or laptops during class.

Deal School Curriculum	
Grade K - 2 Computer Science and Design Thinking	
Disciplinary Concepts and Core Ideas: Networks and the Internet	
Desired Outcomes	
<p><i>Networks and the Internet:</i> Computing devices typically do not operate in isolation. Networks connect computing devices to share information and resources and are an increasingly integral part of computing. Networks and communication systems provide greater connectivity in the computing world.</p>	
Enduring Understandings	Essential Questions
<ul style="list-style-type: none"> ● Computer networks can be used to connect individuals to other individuals, places, information, and ideas. The Internet enables individuals to connect with others worldwide. ● 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. 	<ul style="list-style-type: none"> ● What is a computer network? ● How do computer networks provide greater connectivity in the computing world? ● Why is network security important?
	<p style="text-align: center;">Learners will know....</p> <p>8.1.2.NI.1: Model and describe how individuals use computers to connect to other individuals, places, information, and ideas through a network.</p> <p>8.1.2.NI.2: Describe how the Internet enables individuals to connect with others worldwide.</p> <p>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.</p> <p>8.1.2.NI.4: Explain why access to devices need to be secured.</p>
Learners will be able to...	
<ul style="list-style-type: none"> ● By the end of 2nd grade learners will be able to model and describe how individuals use computers to connect to other individuals, places, information, and ideas through a network. 	

- By the end of 2nd grade learners will be able to describe how the Internet enables individuals to connect with others worldwide.
- By the end of 2nd grade learners will be able to create a password that secures access to a device. Explain why it is important to create unique passwords that are not shared with others.
- By the end of 2nd grade learners will be able to explain why access to devices need to be secured.

Assessment Evidence

Summative:

ePortfolios
 Project Presentations
 Computed based pre and post tests

Formative:

Daily Journals
 Quick Checks
 Project Specific Rubrics
 Exit Slips
 Student Self-Assessment
 Peer review
 Pre-Assessments

Alternative Assessment:

Class Discussion
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 ePortfolios

Suggested Learning Plan

Students come to the lab once a week for the school year.

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- 4 minutes – Wrap up/review

List of Core Instructional and Supplemental Materials

SeeSaw
 Brain Pop Jr.
 Google Apps
 Common Sense Education

Scratch Jr.
Code.org

Deal School Curriculum

Grade K - 2 Computer Science and Design Thinking

Disciplinary Concepts and Core Ideas: Impacts of Computing

Desired Outcomes

Impacts of Computing: Computing affects many aspects of the world in both positive and negative ways at local, national, and global levels. Individuals and communities influence computing through their behaviors and cultural and social interactions, and, in turn, computing influences new cultural practices.

Enduring Understandings

- Computing technology has positively and negatively changed the way individuals live and work (e.g., entertainment, communication, productivity tools).

Essential Questions

- How are computers impacting our society?
- How can I use technology to solve problems and create innovative solutions?
- How can technology help people collaborate and communicate effectively?

Learners will be able to...

8.1.2.IC.1: Compare how individuals live and work before and after the implementation of new computing technology.

Learners will be able to...

- By the end of 2nd grade students will be able to compare how individuals live and work before and after the implementation of new computing technology.

Assessment Evidence

Summative:

ePortfolios
Project Presentations
Computed based pre and post tests

Formative:

Daily Journals
Quick Checks
Project Specific Rubrics
Exit Slips

Student Self-Assessment Peer review Pre-Assessments Alternative Assessment: Class Discussion Teacher Observation Class Participation ePortfolios
Suggested Learning Plan
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List of Core Instructional and Supplemental Materials
SeeSaw Brain Pop Jr. Google Apps Common Sense Education

Deal School Curriculum	
Grade K - 2 Computer Science and Design Thinking	
Disciplinary Concepts and Core Ideas: Data & Analysis	
Desired Outcomes	
<p><u>Data and Analysis:</u> Computing systems exist to process data. The amount of digital data generated in the world is rapidly expanding, so the need to process data effectively is increasingly important. Data is collected and stored so that it can be analyzed to better understand the world and make more accurate predictions.</p>	
Enduring Understandings	Essential Questions
<ul style="list-style-type: none"> ● Individuals collect, use, and display data about individuals and the world around them. 	<ul style="list-style-type: none"> ● How can technology help people collaborate and communicate effectively? ● How does technology help people communicate globally?

<ul style="list-style-type: none"> ● 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. 	<ul style="list-style-type: none"> ● How does the automation of data help the human experience? <p>Learners will be able to....</p> <p>8.1.2.DA.1: Collect and present data, including climate change data, in various visual formats.</p> <p>8.1.2.DA.2: Store, copy, search, retrieve, modify, and delete data using a computing device.</p> <p>8.1.2.DA.3: Identify and describe patterns in data visualizations.</p> <p>8.1.2.DA.4: Make predictions based on data using charts or graphs.</p>
<p>Learners will be able to...</p> <ul style="list-style-type: none"> ● By the end of 2nd grade learners will be able to collect and present data, including climate change data, in various visual formats. ● By the end of 2nd grade learners will be able to store, copy, search, retrieve, modify, and delete data using a computing device. ● By the end of 2nd grade learners will be able to identify and describe patterns in data visualizations. ● By the end of 2nd grade learners will be able to make predictions based on data using charts or graphs. 	
<p>Assessment Evidence</p>	
<p>Summative: ePortfolios Project Presentations Computed based pre and post tests</p> <p>Formative: Daily Journals Quick Checks Project Specific Rubrics Exit Slips Student Self-Assessment Peer review Pre-Assessments</p>	

<p>Alternative Assessment: Class Discussion Teacher Observation Class Participation ePortfolios</p>
Suggested Learning Plan
<p>Students will visit the lab once a week for the school year.</p> <p>The structure of the daily lesson will be in the format of a 44-minute period.</p> <ul style="list-style-type: none"> ● 10 minutes – Do/Now summary and whole group instruction ● 30 minutes – Independent work with teacher monitoring and guidance ● 4 minutes – Wrap up/review
List of Core Instructional and Supplemental Materials
<p>SeeSaw Brain Pop Jr. Google Apps Common Sense Education</p>

Deal School Curriculum	
Grade K - 2 Computer Science and Design Thinking	
Disciplinary Concepts and Core Ideas: Algorithms and Programming	
Desired Outcomes	
<p><i>Algorithms & Programming:</i> An algorithm is a sequence of steps designed to accomplish a specific task. Algorithms are translated into programs, or code, to provide instructions for computing devices. Algorithms and programming control all computing systems, empowering people to communicate with the world in new ways and solve compelling problems.</p>	
Enduring Understandings	Essential Questions
<ul style="list-style-type: none"> ● 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. 	<ul style="list-style-type: none"> ● How does computer programming and computational thinking affect human activity and career life? ● What is the difference between a Program and an App?

<ul style="list-style-type: none"> ● Real world information can be stored and manipulated in programs as data (e.g., numbers, words, colors, images). ● Computers follow precise sequences of steps that automate tasks. ● Complex tasks can be broken down into simpler instructions, some of which can be broken down even further. ● 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). 	<ul style="list-style-type: none"> ● What is an algorithm? ● How is algorithmic thinking developed?
	<p>Learners will be able to....</p> <p>8.1.2.AP.1: Model daily processes by creating and following algorithms to complete tasks.</p> <p>8.1.2.AP.2: Model the way programs store and manipulate data by using numbers or other symbols to represent information.</p> <p>8.1.2.AP.3: Create programs with sequences and simple loops to accomplish tasks.</p> <p>8.1.2.AP.4: Break down a task into a sequence of steps.</p> <p>8.1.2.AP.5: Describe a program's sequence of events, goals, and expected outcomes.</p> <p>8.1.2.AP.6: Debug errors in an algorithm or program that includes sequences and simple loops.</p>
<p>Learners will be able to...</p> <ul style="list-style-type: none"> ● By the end of 2nd grade students will be able to model daily processes by creating and following algorithms to complete tasks. ● By the end of 2nd grade students will be able to model the way programs store and manipulate data by using numbers or other symbols to represent information. ● By the end of 2nd grade students will be able to create programs with sequences and simple loops to accomplish tasks. ● By the end of 2nd grade students will be able to break down a task into a sequence of steps. ● By the end of 2nd grade students will be able to describe a program's sequence of events, goals, and expected outcomes. ● By the end of 2nd grade students will be able to debug errors in an algorithm or program that includes sequences and simple loops. 	

Assessment Evidence

Summative:

ePortfolios
 Project Presentations
 Computed based pre and post tests

Formative:

Daily Journals
 Quick Checks
 Project Specific Rubrics
 Exit Slips
 Student Self-Assessment
 Peer review
 Pre-Assessments

Alternative Assessment:

Class Discussion
 Teacher Observation
 Class Participation
 ePortfolios

Suggested Learning Plan

Students will visit the lab once a week for the school year.

The structure of the daily lesson will be in the format of a 44-minute period.

- 10 minutes – Do/Now summary and whole group instruction
- 30 minutes – Independent work with teacher monitoring and guidance
- 4 minutes – Wrap up/review

List of Core Instructional and Supplemental Materials

SeeSaw
 Brain Pop Jr.
 Google Apps
 Scratch Jr.
 Code.org
 Ozobots
 Dash Robots
 Wonder App
 Osmo
 Kodable

Assessment Evidence

Summative:

ePortfolios
 Project Presentations
 Computed based pre and post tests

Formative:

Daily Journals
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 Pre-Assessments

Alternative Assessment:

Class Discussion
 Teacher Observation
 Class Participation
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Suggested Learning Plan

The structure of the daily lesson will be in the format of a 44-minute period.

- 10 minutes – Do/Now summary and whole group instruction
- 30 minutes – Independent work with teacher monitoring and guidance
- 4 minutes – Wrap up/review

List of Core Instructional and Supplemental Materials

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 Brain Pop Jr.
 Google Apps
 Kodable
 Code.org
 Scratch

Pacing Guide

[Kindergarten Pacing Guide](#)

First Grade Pacing Guide	
Second Grade Pacing Guide	
21st CENTURY LIFE AND CAREERS	
Career Awareness, Exploration and Preparation 9.2.4.A.4 Explain why knowledge and skills acquired in the elementary grades lay the foundation for future academic and career success. <ul style="list-style-type: none"> ● 	
Career Education	
CRP1, CRP2, CRP3, CRP4, CRP5, CRP6, CRP7, CRP8, CRP9, CRP10, CRP11, CRP12 Career Ready Practices	
Accommodations and Modifications	
Gifted and Talented <ul style="list-style-type: none"> ● Provide appropriate challenges for wide ranging skills and development areas. ● Participate in inquiry and project-based learning units of study. English Language Learners <ul style="list-style-type: none"> ● Pair visual prompts with verbal presentations ● Provide students with visual models, sentence stems, concrete objects, and hands on materials. Students with IEPs/504 <ul style="list-style-type: none"> ● Review student individual educational plan and/or 504 plan ● Establish procedures for accommodations and modifications for assessments as per IEP/504 ● Modify classroom environment to support academic and physical needs of the students as per IEP/504 At Risk Learners <ul style="list-style-type: none"> ● Differentiated instruction ● Basic Skills ● Provide instructional interventions in the general education classroom 	
Interdisciplinary Connections/Cross Curricular Opportunities	
3.9.K.1.NJSLSA.L1	Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.

3.9.K.1.NJSLSA.L2	Demonstrate command of the conventions of standard English capitalization punctuation and spelling when writing.
3.7.K.1.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.
3.7.K.2.NJSLSA.SL5	Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations.
3.5.K.2.NJSLSA.W4	Produce clear and coherent writing in which the development organization and style are appropriate to task purpose and audience.
3.10.1.1.L.1.1	Demonstrate command of the conventions of standard English grammar and usage when writing or speaking. A.Print all upper- and lowercase letters. B.Use common proper and possessive nouns. C.Use singular and plural nouns with matching verbs in basic sentences (e.g. He hops We hop). D.Use personal possessive and indefinite pronouns (e.g. I me my they them their anyone everything). E.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). F.Use frequently occurring adjectives. G.Use frequently occurring conjunctions (e.g. and but or so because). H.Use determiners (e.g. articles demonstratives). I.Use frequently

	occurring prepositions (e.g. during beyond toward). J.Produce and expand complete simple and compound declarative interrogative imperative and exclamatory sentences in response to prompts.
3.8.1.1.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.
3.8.2.2.SL.2.5	Use multimedia add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts and feelings.
NJSLS.MATH.CONTENT.K.G.A.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.
6.1.P.A.3	Demonstrate appropriate behavior when collaborating with others.
6.1.4.B.3	Explain how and when it is important to use digital geographic tools, political maps, and globes to measure distances and to determine time zones and locations using latitude and longitude.
6.1.P.D.4	Learn about and respect other cultures within the classroom and community.
K-2-ETS1-1.	Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.
1.3.2.D.1	Create two- and three-dimensional works of art using the basic elements of color line shape form texture and space as well as a variety of art mediums and application methods.

Integration of Technology

Students will use ipads and/or laptops during class.

Deal School Curriculum

STEAM Enduring Understandings

What does it mean to be creative?
 What can our imagination be used for?
 How can our imagination be used to solve a problem?
 What does it mean to be innovative?
 How can we come up with new ideas to solve a problem?

STEAM Essential Questions

What does it mean to be a problem- solver?
 What can we learn from our mistakes?
 What must you know about a problem before you can develop a solution?
 How can making mistakes be an important part of learning?
 Why is it important to know the resources you have to solve a problem?
 What are some advantages to planning before starting a project?

Grade K - 2 Computer Science and Design Thinking

Disciplinary Concepts and Core Ideas: Engineering Design

Desired Outcomes

Engineering Design

People design for enjoyment and to solve problems, extend human capabilities, satisfy needs and wants, and improve the human condition. Engineering Design, a systematic approach to creating solutions to technological problems and finding ways to meet people's needs and desires, allows for the effective and efficient development of products and systems.

Enduring Understandings

Engineering design is a creative process for meeting human needs or wants that can result in multiple solutions.

Limitations (constraints) must be

Essential Questions

How does technology change thinking?

In what ways does technology make life easier?

considered when engineering designs.	What encourages innovation and technology?
	<p>Learners will know...</p> <p>8.2.2.ED.1: Communicate the function of a product or device.</p> <p>8.2.2.ED.2: Collaborate to solve a simple problem, or to illustrate how to build a product using the design process.</p> <p>8.2.2.ED.3: Select and use appropriate tools and materials to build a product using the design process.</p> <p>8.2.2.ED.4: Identify constraints and their role in the engineering design process.</p>
<p>Learners will be able to...</p> <ul style="list-style-type: none"> ● By the end of second grade students will be able to communicate the function of a product or device. ● By the end of second grade students will be able to collaborate to solve a simple problem, or to illustrate how to build a product using the design process. ● By the end of second grade students will be able to select and use appropriate tools and materials to build a product using the design process. ● By the end of second grade students will be able to identify constraints and their role in the engineering design process. 	
<p>Assessment Evidence</p>	
<p>Summative: ePortfolios Project Presentations Computed based pre and post tests</p> <p>Formative: Daily Journals Quick Checks Project Specific Rubrics</p>	

<p>Exit Slips Student Self-Assessment Peer review Pre-Assessments</p> <p>Alternative Assessment: Class Discussion Teacher Observation Class Participation ePortfolios</p>
Suggested Learning Plan
<p>The structure of the daily lesson will be in the format of a 44 minute period.</p> <ul style="list-style-type: none"> ● 10 minutes – Do/Now summary and whole group instruction ● 30 minutes – Independent work with teacher monitoring and guidance ● 4 minutes – Wrap up/review
List of Core Instructional and Supplemental Materials
<p>Animationish Seesaw Google Sketchup Google Earth Brain Pop Code.org</p>
Deal School Curriculum
Grade K - 2 Computer Science and Design Thinking
Disciplinary Concepts and Core Ideas: Interaction of Technology and Humans
Desired Outcome
<p>Interaction of Technology and Humans Societies influence technological development. Societies are characterized by common elements such as shared values, differentiated roles, and cultural norms, as well as by entities such as community institutions, organizations, and businesses. Interaction of Technology and Humans concerns the ways society drives the improvement and creation of new</p>

technologies, and how technologies both serve and change society.	
<p>Enduring Understandings</p> <ul style="list-style-type: none"> ● Human needs and desires determine which new tools are developed. ● Technology has changed the way people live and work. ● Various tools can improve daily tasks and quality of life. 	<p>Essential Questions</p> <p>What encourages innovation and technology?</p> <p>How does innovation and technological change influence our lives?</p> <p>How do resources help us learn, design, and create technology?</p>
	<p>Learners will know...</p>
	<p>8.2.2.ITH.1: Identify products that are designed to meet human wants or needs.</p> <p>8.2.2.ITH.2: Explain the purpose of a product and its value.</p> <p>8.2.2.ITH.3: Identify how technology impacts or improves life.</p> <p>8.2.2.ITH.4: Identify how various tools reduce work and improve daily tasks.</p> <p>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.</p>
	<p>Learners will be able to...</p> <ul style="list-style-type: none"> ● By the end of second grade students will be able to identify products that are designed to meet human wants or needs. ● By the end of second grade students will be able to explain the purpose of a product and its value. ● By the end of second grade students will be able to identify how technology impacts or improves life. ● By the end of second grade students will be able to identify how various tools reduce work and improve daily tasks.

- By the end of second grade students will be able to design a solution to a problem affecting the community in a collaborative team and explain the intended impact of the solution.

Assessment Evidence

Summative:

ePortfolios
Project Presentations
Computed based pre and post tests

Formative:

Daily Journals
Quick Checks
Project Specific Rubrics
Exit Slips
Student Self-Assessment
Peer review
Pre-Assessments

Alternative Assessment:

Class Discussion
Teacher Observation
Class Participation
ePortfolios

Suggested Learning Plan

The structure of the daily lesson will be in the format of a 44 minute period.

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List of Core Instructional and Supplemental Materials

Animationish
Seesaw
Google Sketchup
Google Earth
Brain Pop
Code.org

Deal School Curriculum	
Grade K - 2 Computer Science and Design Thinking	
Disciplinary Concepts and Core Ideas: Nature of Technology	
Desired Outcomes	
<p>Nature of Technology Human population, patterns and movement focus on the size, composition, distribution, and movement of human populations and how they are fundamental and active features on Earth's surface. This includes understanding that the expansion and redistribution of the human population affects patterns of settlement, environmental changes, and resource use. Patterns and movements of population also relate to physical phenomena including climate variability, landforms, and locations of various natural hazards and their effects on population size, composition, and distribution.</p>	
Enduring Understandings	Essential Questions
<ul style="list-style-type: none"> ● Innovation and the improvement of existing technology involves creative thinking. 	<p>How does technology change thinking?</p> <p>How does innovation and technological change influence our lives?</p> <p>Why do humans create innovations and advancements in technology?</p>
	Learners will know...
	<p>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.</p> <p>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.</p>
Learners will be able to...	
<ul style="list-style-type: none"> ● By the end of second grade students will be able to model and explain how a product works after taking it apart, identifying the relationship of each part, and putting it back together. 	

- By the end of second grade students will be able to brainstorm how to build a product, improve a designed product, fix a product that has stopped working, or solve a simple problem.

Assessment Evidence

Summative:

ePortfolios
 Project Presentations
 Computed based pre and post tests

Formative:

Daily Journals
 Quick Checks
 Project Specific Rubrics
 Exit Slips
 Student Self-Assessment
 Peer review
 Pre-Assessments

Alternative Assessment:

Class Discussion
 Teacher Observation
 Class Participation
 ePortfolios

Suggested Learning Plan

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Deal School Curriculum	
Grade K - 2 Computer Science and Design Thinking	
Disciplinary Concepts and Core Ideas: Effects of Technology on the Natural World	
Desired Outcomes	
<p>Effects of Technology on the Natural World Many of engineering and technology's impacts on society and the environment are widely regarded as desirable. However, other impacts are regarded as less desirable. Effects of Technology on the Natural World concerns the positive and negative ways that technologies affect the natural world.</p>	
Enduring Understandings	Essential Questions
<ul style="list-style-type: none"> ● 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. 	<p>What are the characteristics and scope of technology?</p> <p>What are the core concepts of technology?</p> <p>What are the relationships among technologies and the connections between technology and other fields of study?</p> <p>How do resources help us learn, design, and create technology?</p>
	Learners will know...
	<p>8.2.2.ETW.1: Classify products as resulting from nature or produced as a result of technology.</p> <p>8.2.2.ETW.2: Identify the natural resources needed to create a product.</p> <p>8.2.2.ETW.3: Describe or model the system used for recycling technology.</p> <p>8.2.2.ETW.4: Explain how the disposal of or reusing a product affects the local and global environment.</p>

Learners will be able to...

- By the end of second grade students will be able to classify products as resulting from nature or produced as a result of technology.
- By the end of second grade students will be able to identify the natural resources needed to create a product.
- By the end of second grade students will be able to describe or model the system used for recycling technology.
- By the end of second grade students will be able to explain how the disposal of or reusing a product affects the local and global environment.

Assessment Evidence**Summative:**

ePortfolios
 Project Presentations
 Computed based pre and post tests

Formative:

Daily Journals
 Quick Checks
 Project Specific Rubrics
 Exit Slips
 Student Self-Assessment
 Peer review
 Pre-Assessments

Alternative Assessment:

Class Discussion
 Teacher Observation
 Class Participation
 ePortfolios

Suggested Learning Plan

The structure of the daily lesson will be in the format of a 44 minute period.

- 10 minutes – Do/Now summary and whole group instruction
- 30 minutes – Independent work with teacher monitoring and guidance
- 4 minutes – Wrap up/review

List of Core Instructional and Supplemental Materials

Animationish
 Seesaw

Google Sketchup
 Google Earth
 Brain Pop
 Code.org

Deal School Curriculum

Grade K - 2 Computer Science and Design Thinking

Disciplinary Concepts and Core Ideas: Ethics and Culture

Desired Outcomes

Ethics and Culture concerns the profound effects that technologies have on people, how those effects can widen or narrow disparities, and the responsibility that people have for the societal consequences of their technological decisions.

Enduring Understandings

- The availability of technology for essential tasks varies in different parts of the world.

Essential Questions

In what ways does technology make life easier?

How does innovation and technological change influence our lives?

Why do humans create innovations and advancements in technology?

Learners will know...

8.2.2.EC.1: Identify and compare technology used in different schools, communities, regions, and parts of the world.

Learners will be able to...

- By the end of second grade students will be able to identify and compare technology used in different schools, communities, regions, and parts of the world.

Assessment Evidence

Summative:

ePortfolios
 Project Presentations
 Computed based pre and post tests

Formative:

Daily Journals
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 Student Self-Assessment
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21st CENTURY LIFE AND CAREERS

Career Awareness, Exploration and Preparation

9.2.4.A.4 Explain why knowledge and skills acquired in the elementary grades lay the foundation for future academic and career success.

Career Education

CRP1, CRP2, CRP3,
CRP4, CRP5, CRP6,
CRP7, CRP8, CRP9,
CRP10, CRP11,
CRP12

[Career Ready
Practices](#)

Accommodations and Modifications

Gifted and Talented

- Provide appropriate challenges for wide ranging skills and development areas.
- Participate in inquiry and project-based learning units of study.

English Language Learners

- Pair visual prompts with verbal presentations
- Provide students with visual models, sentence stems, concrete objects, and hands on materials.

Students with IEPs/504

- Review student individual educational plan and/or 504 plan
- Establish procedures for accommodations and modifications for assessments as per IEP/504
- Modify classroom environment to support academic and physical needs of the students as per IEP/504

At Risk Learners

- Differentiated instruction
- Basic Skills
- Provide instructional interventions in the general education classroom

Interdisciplinary Connections/Cross Curricular Opportunities

3.9.K.1.NJSLSA.L1	Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
3.9.K.1.NJSLSA.L2	Demonstrate command of the conventions of standard English capitalization punctuation and spelling when writing.
3.7.K.1.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.
3.7.K.2.NJSLSA.SL5	Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations.
3.5.K.2.NJSLSA.W4	Produce clear and coherent writing in which the development organization and style are appropriate to task purpose and audience.
3.10.1.1.L.1.1	Demonstrate command of the conventions of standard English grammar and usage when writing or speaking. A.Print all upper- and lowercase letters. B.Use common proper and possessive nouns. C.Use singular and plural nouns with matching verbs in basic sentences (e.g. He hops We hop). D.Use personal possessive and indefinite pronouns (e.g. I me my they them their anyone everything). E.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). F.Use frequently occurring adjectives. G.Use frequently occurring conjunctions (e.g. and but or so because). H.Use determiners (e.g. articles demonstratives). I.Use frequently occurring prepositions (e.g. during beyond toward). J.Produce and expand complete simple and compound declarative interrogative imperative and exclamatory sentences in response to prompts.
3.8.1.1.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.
3.8.2.2.SL.2.5	Use multimedia add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas thoughts and feelings.
Science Connections	Mathematics
<p>K-2 Engineering Design Students who demonstrate understanding can:</p> <p>K-2-ETS1-1 Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.</p> <p>K-2-ETS1-2 Develop a simple sketch, drawing or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.</p> <p>K-2-ETS1-3 Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.</p> <p>3-5-ETS1-1 Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.</p> <p>3-5-ETS1-2 Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design problem. to a problem based on how well each is likely to meet the criteria and constraints of the problem.</p> <p>3-5-ETS1-3 Plan and carry out fair tests in which variables are controlled and failure points are considered to identify</p>	<p>MP.2 Reason abstractly and quantitatively. (K-2-ETS1-1), (K-2-ETS1-3)</p> <p>MP.4 Model with mathematics.(K-2-ETS1-1), (K-2-ETS1-3)</p> <p>MP.5 Use appropriate tools strategically.(K-2-ETS1-1), (K-2-ETS1-3)</p> <p>2.MD.D.10 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. (K-2-ETS1-1), (K-2-ETS1-3)</p>

aspects of a model or prototype that can be improved.	
Integration of Technology	
Students will use ipads and/or desktops during class.	
Pacing Guide	
K-2 Pacing Guide STEAM Place- Based Education	