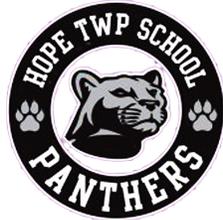


Belvidere Clusterwide Curriculum



Media and Technology

Sixth to Eighth Grade

Updated: Summer 2025

All Belvidere Cluster curriculum and instruction areas are aligned to the New Jersey Student Learning Standards (NJSLS) in accordance with the NJ Department of Education's curriculum implementation requirements.

Curriculum Coordinator: Timm Gast

Authors:

Susan Martino, Hope

Jessica Piazza, Harmony

Adam Tucker, Harmony

Dawn Werkheiser, White

UNITS	Duration	Essential Questions:
Unit 1: Computing Systems	(8 weeks)	<ol style="list-style-type: none"> 1. What makes a device digital and what are the hardware components of a digital device? 2. What is the structure of a computer network? 3. How does an operating system control the operation of a computer system? 4. How can we fix common problems that occur with computer technology?
Unit 2: Digital Citizenship	(6 Weeks)	<ol style="list-style-type: none"> 1. How can I practice digital wellness and safety? 2. How can we interact with others in positive ways using online platforms? 3. What is ethical and safe online behavior? 4. What are some possible consequences of the misuse of technology and social media? 5. What is intellectual property and how do we properly credit the work of others?
Unit 3: Research and Productivity	(8 Weeks)	<ol style="list-style-type: none"> 1. How can I use and create text, graphical, and multimedia content for various tasks and projects? 2. How can I apply new knowledge? 3. How can I create innovative projects using technology to inform or persuade others? 4. How do I find and evaluate a variety of sources, including print, web, video, and artificial intelligence?
Unit 4: Programming	(6 weeks)	<ol style="list-style-type: none"> 1. How do the coding structures of sequencing, loops, and events work together to complete tasks? 2. How can I use critical thinking skills to debug errors in my code? 3. How do functions and variables make programming code more effective and efficient? 4. How do different types of programming languages compare, such as block-based and text-based? 5. How can I use algorithmic thinking to analyze problems and develop solutions?
Unit 5: Engineering Design	(8 weeks)	<ol style="list-style-type: none"> 1. How can I evaluate products and design new, innovative solutions to real world problems? 2. What is engineering and how do engineers collaborate to solve problems using the design process? 3. How can I solve problems with constraints? 4. How does technology affect the environment and society as a whole?

<p>Unit 6: Data and Analysis</p>	<p>(4 weeks)</p>	<ol style="list-style-type: none"> 1. How are spreadsheet and database tools used in a variety of fields, including business, research, and engineering? 2. How do spreadsheet formulas and functions automate calculations to analyze data? 3. How can we make design choices that will make a spreadsheet easier to understand? 4. Why is data important when making decisions?
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Student Learning

Career Education (NJDOE CTE Clusters)

21st Century Themes:

- Global Awareness
- Financial, Economic, Business and Entrepreneurial Literacy
- Civic Literacy
- Health Literacy
- Environmental Literacy
- Creativity and Innovation
- Critical Thinking
- Problem Solving
- Communication
- Collaboration
- Information Literacy
- Media Literacy
- ICT (Information, Communication and Technology) Literacy

Modifications and Accommodations:

Special Education

- Printed copy of board work/notes provided
- Additional time for skill mastery
- Assistive technology
- Behavior management plan
- Center-Based Instruction
- Check work frequently for understanding
- Computer or electronic device utilization
- Extended time on tests/ quizzes
- Have student repeat directions to check for understanding
- Highlighted text visual presentation
- Modified assignment format
- Modified test content
- Modified test format
- Modified test length
- Multiple test sessions
- Multi-sensory presentation
- Preferential seating
- Preview of content, concepts, and vocabulary
- Reduced/shortened written assignments
- Secure attention before giving instruction/directions
- Shortened assignments
- Student working with an assigned partner

- Teacher initiated weekly assignment sheet
- Use open book, study guides, test prototypes
- Cubing activities
- Exploration by interest
- Flexible grouping
- Goal setting with students
- Jigsaw
- Mini workshops to re-teach or extend skills Open-ended activities
- Think-Pair-Share
- Varied supplemental materials

ELL

- Allowing students to correct errors (looking for understanding)
- Teaching key aspects of a topic Eliminate nonessential information Using videos, illustrations, pictures, and drawings to explain or clarify
- allowing products (projects, timelines, demonstrations, models, drawings, dioramas, poster boards, charts, graphs, slideshows, videos, etc.) to demonstrate student's learning
- Allowing students to correct errors (looking for understanding)
- Allowing the use of note cards or open-book during testing
- Decreasing the amount of work presented or required
- Having peers take notes or providing a copy of the teacher's notes
- Modifying tests to reflect selected objectives
- Providing study guides
- Reducing the number of answer choices on a multiple choice test
- Tutoring by peers
- Explain/clarify key vocabulary terms

At Risk

- Allowing students to correct errors (looking for understanding)
- Teaching key aspects of a topic Eliminate nonessential information allowing products (projects, timelines, demonstrations, models, drawings, dioramas, poster boards, charts, graphs, slideshows, videos, etc.) to demonstrate student's learning
- Allowing students to select from given choices .
- Allowing the use of note cards or open-book during testing
- Collaborating (general education teacher and specialist) to modify vocabulary, omit or modify items to reflect objectives for the student, eliminate sections of the test, and determine how the grade will be determined prior to giving the test
- decreasing the amount of work presented or required .
- Having peers take notes or providing a copy of the teacher's notes
- Marking students' correct and acceptable work, not the mistakes
- Modifying tests to reflect selected objectives
- Providing study guides
- Reducing the number of answer choices on a multiple choice test
- Tutoring by peers
- Using authentic assessments with real-life problem-solving
- Using true/false, matching, or fill in the blank tests in lieu of essay tests
- using videos, illustrations, pictures, and drawings to explain or clarify
- Flexible grouping
- Goal setting with students
- Jigsaw
- Mini workshops to re-teach or extend skills Open-ended activities
- Think-Pair-Share
- Varied supplemental materials

Gifted and Talented

- Alternative formative and summative assessments
- Choice boards
- Games and tournaments
- Group investigations
- Independent research and projects
- Interest groups for real world application
- Learning contracts
- Leveled rubrics
- Multiple intelligence options
- Personal agendas
- Project-based learning
- Problem-based learning
- Stations/centers
- Think-Tac-Toes
- Tiered activities/assignments
- Tiered products _____

504

- Printed copy of board work/notes provided
- Additional time for skill mastery
- Assistive technology
- Behavior management plan
- Center-Based Instruction
- Check work frequently for understanding
- Computer or electronic device utilization
- Extended time on tests/ quizzes
- Have student repeat directions to check for understanding
- Highlighted text visual presentation
- Modified assignment format
- Modified test content
- Modified test format
- Modified test length
- Multiple test sessions
- Multi-sensory presentation
- Preferential seating
- Preview of content, concepts, and vocabulary
- Reduced/shortened written assignments
- Secure attention before giving instruction/directions
- Shortened assignments
- Student working with an assigned partner
- Teacher initiated weekly assignment sheet
- Use open book, study guides, test prototype
- Exploration by interest
- Flexible grouping
- Goal setting with students
- Mini workshops to re-teach or extend skills Open-ended activities
- Think-Pair-Share
- Varied supplemental materials

Unit 1 Overview: Computing Systems

Unit 1 Summary:

Students will demonstrate comprehensive computer knowledge and an understanding of its operations and components. Students will understand the use of technology concepts, systems, operations and the impact of technology on the world around us. They will have a basic knowledge of network connectivity and how the internet connects devices around the world.

Essential Questions:

- What makes a device digital and what are the hardware components of a digital device?
- What is the structure of a computer network?
- How does an operating system control the operation of a computer system?
- How can we fix common problems that occur with computer technology?
- How do we improve the security of our devices and data?

New Jersey Student Learning Standards

New Jersey Student Learning Standards:

CPI:

8.1.8.CS.1: Recommend improvements to computing devices in order to improve the ways users interact with the devices.

8.1.8.CS.2: Design a system that combines hardware and software components to process data.

8.1.8.CS.3: Justify design decisions and explain potential system trade-offs.

8.1.8.CS.4: Systematically apply troubleshooting strategies to identify and resolve hardware and software problems in computing systems.

8.1.8.NI.1: Model how information is broken down into smaller pieces, transmitted as addressed packets through multiple devices over networks and the Internet, and reassembled at the destination.

8.1.8.NI.2: Model the role of protocols in transmitting data across networks and the Internet and how they enable secure and errorless communication.

8.1.8.NI.3: Explain how network security depends on a combination of hardware, software, and practices that control access to data and systems.

8.1.8.NI.4: Explain how new security measures have been created in response to key malware events.

8.1.8.IC.1: Compare the trade-offs associated with computing technologies that affect individual's everyday activities and career options.

8.1.8.IC.2: Describe issues of bias and accessibility in the design of existing technologies.

Interdisciplinary Connections:

ELA/Literacy

- Acquire and use academic and domain-specific words and phrases.
- Interpret information
- Use specialized, topic-specific language.

Mathematics

- Make sense of problems and persevere in solving them
- Reason abstractly
- Use appropriate tools strategically

21st Century Themes:

- Global Awareness
- Environmental Literacy
- Critical Thinking
- Problem Solving
- Communication
- Collaboration
- Information Literacy
- Media Literacy
- ICT (Information, Communication and Technology) Literacy

Enduring Understandings

Students will understand that...

- How to distinguish between types of technology and appropriate applications to solve problems.
- Computers are part of an interconnected system.
- Technology has impacted how we live, learn and work and is constantly evolving.

Unit 1 Student Learning Objectives

Students will know...

- 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.

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.
- Advancements in computing technology can change individuals' behaviors.
- Society is faced with trade offs due to the increasing globalization and automation that computing brings.

Unit 1 Assessments

Formative Assessments:

- Pretest/Post test
- Observation
- Class Participation
- Think-Pair-Share

Summative Assessments:

- Quiz
- Unit Projects

Alternative Assessments:

- Do-Now
- Exit Tickets
- Classroom Games
- Self-assessment
- Feedback from home form

Additional Resources/Links

- **Google Docs**
- **Google Slides**
- **Google Drawing**
- **MS Office**
- applieddigitalskills.withgoogle.com
- [Computing Systems Notes](#)

Unit 2 Overview: Digital Citizenship

Unit 2 Summary:

Students will demonstrate an understanding of human, cultural, and societal issues related to technology and practice legal and ethical behavior. They will also understand how to interact with technology and social media both in the classroom and beyond, as well as how to deal with cyberbullying. Students will demonstrate an understanding of the need to practice cyber safety when using technology and social media.

Essential Questions:

- How can I practice digital wellness and safety?
- How can we interact with others in positive ways using online platforms?
- What is ethical and safe online behavior?
- What are some possible consequences of the misuse of technology and social media?
- What is intellectual property and how do we properly credit the work of others?

New Jersey Student Learning Standards

New Jersey Student Learning Standards:

CPI:

9.4.8.DC.1: Analyze the resource citations in online materials for proper use.

9.4.8.DC.2: Provide appropriate citation and attribution elements when creating media products (e.g., W.6.8).

9.4.8.DC.3: Describe tradeoffs between allowing information to be public (e.g., within online games) versus keeping information private and secure.

9.4.8.DC.4: Explain how information shared digitally is public and can be searched, copied, and potentially seen by public audiences.

9.4.8.DC.5: Manage digital identity and practice positive online behavior to avoid inappropriate forms of self-disclosure.

9.4.8.DC.6: Analyze online information to distinguish whether it is helpful or harmful to reputation.

9.4.8.DC.7: Collaborate within a digital community to create a digital artifact using strategies such as crowdsourcing or digital surveys.

9.4.8.DC.8: Explain how communities use data and technology to develop measures to respond to effects of climate change (e.g., smart cities).

Interdisciplinary Connections:

ELA/Literacy

- Acquire and use academic and domain-specific words and phrases.
- Interpret information
- Use specialized, topic-specific language.

Mathematics

- Make sense of problems and persevere in solving them
- Reason abstractly
- Use appropriate tools strategically

21st Century Themes:

- Global Awareness
- Environmental Literacy

- Critical Thinking
- Problem Solving
- Communication
- Collaboration
- Information Literacy
- Media Literacy
- ICT (Information, Communication and Technology) Literacy

Enduring Understandings

Students will understand that...

- There are negative consequences to cyberbullying and unethical or unsafe online behavior.
- Being a responsible citizen means standing up for what is right, as inaction is a choice.
- A person's digital footprint extends beyond the classroom, across devices and over time.

Unit 2 Student Learning Objectives

Students will know...

- Detailed examples exist to illustrate crediting others when incorporating their digital artifacts in one's own work.
- There are tradeoffs between allowing information to be public and keeping information private and secure.
- Digital footprints are publicly accessible, even if only shared with a select group. Appropriate measures such as proper interactions can protect online reputations.
- Digital communities are used by individuals to share information, organize, and engage around issues and topics of interest.
- Digital technology and data can be leveraged by communities to address effects of **climate change**.

Unit 2 Assessments

Formative Assessments:

- Pretest/Post test
- Observation
- Class Participation
- Think-Pair-Share

Summative Assessments:

- Quiz
- Unit Projects

Alternative Assessments:

- Do-Now
- Exit Tickets
- Classroom Games
- Self-assessment
- Feedback from home form

Additional Resources/Links

- [Commonsense.org](https://www.common Sense.org)
- <https://iste.org/digital-citizenship-lessons>
- [PBS Learning Media](https://www.pbslearningmedia.org/)
- [Interland Digital Citizenship Activities](https://www.interland.org/digital-citizenship-activities)
- [Be Internet Awesome Peardeck Slides](https://www.beinternetawesome.org/peardeck-slides)
- [sos.fbi.gov](https://www.sos.fbi.gov/)
- <https://everfi.com/courses/k-12/digital-literacy-wellness-safety/>
- [Creativity, Copyright, and Fair Use](https://www.creativitycopyrightandfairuse.org/)
- <https://climatekids.nasa.gov/kids-guide-to-climate-change/>
- <https://www.pblworks.org/teaching-about-climate-change-project-based-learning>

Unit 3 Overview: Research and Productivity

Unit 3 Summary:

Within this unit, students will evaluate and select information sources and digital tools based on the appropriateness for specific tasks. The students will be able to locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media.

Essential Questions:

- How can I use and create text, graphical, and multimedia content for various tasks and projects?
- How can I apply new knowledge?
- How can I create innovative projects using technology to inform or persuade others?
- How do I find and evaluate a variety of sources, including print, web, video, and artificial intelligence?

New Jersey Student Learning Standards

New Jersey Student Learning Standards:

CPI:

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

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

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

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

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

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

9.4.8.CT.3: Compare past problem-solving solutions to local, national, or global issues and analyze the factors that led to a positive or negative outcome.

9.4.8.TL.3: Select appropriate tools to organize and present information digitally.

9.4.8.TL.4: Synthesize and publish information about a local or global issue or event (e.g., MSLS4-5, 6.1.8.CivicsPI.3).

9.4.8.TL.5: Compare the process and effectiveness of synchronous collaboration and asynchronous collaboration.

9.4.8.TL.6: Collaborate to develop and publish work that provides perspectives on a real-world problem.

Interdisciplinary Connections:

ELA/Literacy

- Gather relevant information from multiple sources
- Summarize or paraphrase information

Mathematics

- Make sense of problems and persevere in solving them
- Reason abstractly

21st Century Themes:

- Global Awareness
- Environmental Literacy

- Critical Thinking
- Problem Solving
- Communication
- Collaboration
- Information Literacy
- Media Literacy
- ICT (Information, Communication and Technology) Literacy

Enduring Understandings

Students will understand that...

- There are multiple resources available for research, including print and digital resources.
- They must evaluate a resource for appropriateness and accuracy.
- They must properly cite a source.
- Artificial Intelligence (AI) is a new technology that needs to be considered carefully, and utilized in ways that help us learn.

Unit 3 Student Learning Objectives

Students will know...

- Some digital tools are appropriate for gathering, organizing, analyzing, and presenting information, while other types of digital tools are appropriate for creating text, visualizations, models, and communicating with others.
- Digital tools allow for remote collaboration and rapid sharing of ideas unrestricted by geographic location or time.
- Gathering and evaluating knowledge and information from a variety of sources, including global perspectives, fosters creativity and innovative thinking.
- Multiple solutions exist to solve a problem.
- An essential aspect of problem solving is being able to self reflect on why possible solutions for solving problems were or were not successful.
- There are multiple digital tools that make use of AI technology. This technology has the ability to automate tasks in research and content creation. We need to be able to evaluate the content it produces, and not use it as a substitute for our own thinking and learning. AI generated content needs to be properly cited when it is used.

Unit 3 Assessments

Formative Assessments:

- Pretest/Post test
- Observation
- Class Participation
- Think-Pair-Share

Summative Assessments:

- Quiz
- Unit Projects

Alternative Assessments:

- Do-Now
- Exit Tickets
- Classroom Games
- Self-assessment
- Feedback from home form

Additional Resources/Links

- Google Docs, Google Slides
- [Bookcreator.com](https://bookcreator.com)
- <https://climatekids.nasa.gov/kids-guide-to-climate-change/>
- [Canva.com](https://canva.com)
- <https://www.epa.gov/climate-change/climate-change-resources-educators-and-students>
- <https://kids.nationalgeographic.com/>
- <https://climate.nasa.gov/for-educators/>
- [World Book](#), [Britannica](#)
- [Evaluating Websites](#)
- iMovie
- Adobe Fresco
- Anchor (podcasting) app
- <https://globalgoals.org/>
- <https://climatekids.nasa.gov/kids-guide-to-climate-change/>
- <https://www.pblworks.org/teaching-about-climate-change-project-based-learning>

Unit 4 Overview: Programming

Unit 4 Summary:

Students will participate in coding activities to develop/enhance an understanding of computational thinking and create and debug algorithms using appropriate terms. Students will be able to understand computational thinking and computer programming as tools used in design and engineering.

Essential Questions:

- How do the coding structures of sequencing, loops, and events work together to complete tasks?
- How can I use critical thinking skills to debug errors in my code?
- How do functions and variables make programming code more effective and efficient?
- How do different types of programming languages compare, such as block-based and text-based?
- How can I use algorithmic thinking to analyze problems and develop solutions?

New Jersey Student Learning Standards

New Jersey Student Learning Standards:

CPI:

- 8.1.8.AP.1: Design and illustrate algorithms that solve complex problems using flowcharts and/or pseudocode.
- 8.1.8.AP.2: Create clearly named variables that represent different data types and perform operations on their values.
- 8.1.8.AP.3: Design and iteratively develop programs that combine control structures, including nested loops and compound conditionals.
- 8.1.8.AP.4: Decompose problems and subproblems into parts to facilitate the design, implementation, and review of programs.
- 8.1.8.AP.5: Create procedures with parameters to organize code and make it easier to reuse.
- 8.1.8.AP.6: Refine a solution that meets users' needs by incorporating feedback from team members and users.
- 8.1.8.AP.7: Design programs, incorporating existing code, media, and libraries, and give attribution.
- 8.1.8.AP.8: Systematically test and refine programs using a range of test cases and users.
- 8.1.8.AP.9: Document programs in order to make them easier to follow, test, and debug.

Interdisciplinary Connections:

ELA/Literacy

- Directional awareness
- Phonological awareness/phonics and word recognition
- Reading Fluency

Mathematics

- Make sense of problems and persevere in solving them
- Counting and cardinality
- Reason abstractly and quantitatively
- Recognize patterns to make code more efficient using loops

21st Century Themes:

- Global Awareness
- Environmental Literacy
- Critical Thinking
- Problem Solving

- Communication
- Collaboration
- Information Literacy
- Media Literacy
- ICT (Information, Communication and Technology) Literacy

Enduring Understandings

Students will understand that...

- Computer scientists blend human ideas and digital tools to efficiently solve problems in our everyday lives.
- Computational thinking can be used to break down steps within a complex task.

Unit 4 Student Learning Objectives

Students will know...

- Individuals design algorithms that are reusable in many situations.
- Algorithms that are readable are easier to follow, test, and debug.
- 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.

Unit 4 Assessments

Formative Assessments:

- Pretest/Post test
- Observation
- Class Participation
- Think-Pair-Share

Summative Assessments:

- Quiz
- Unit Projects

Alternative Assessments:

- Do-Now
- Exit Tickets
- Classroom Games
- Self-assessment
- Feedback from home form

Additional Resources/Links

- [Code Studio](#)
- [Ozobot coding](#)
- [Dash robots](#)
- [Vex IQ robots](#)
- [Scratch](#)
- **Rubix Cubes**
- [Lego Mindstorms](#)
- [CodeHS](#)
- [Bloxels](#)
- [Makey Makey](#)
- [Python](#)
- **Parrot Mini Drones**

Unit 5 Overview: Engineering Design

Unit 5 Summary:

Students will develop an understanding of human, cultural, and societal values that are fundamental when designing technology systems and products in the global society. They will brainstorm ideas, identify designed products and prototype solutions using 2D and/or 3D models. Students will use critical thinking skills, construct knowledge, and develop projects and processes using technology and consider their effects on the natural world.

Essential Questions:

- How can I evaluate products and design new, innovative solutions to real world problems?
- What is engineering and how do engineers collaborate to solve problems using the design process?
- How can I solve problems with constraints?
- How does technology affect the environment and society as a whole?

New Jersey Student Learning Standards

New Jersey Student Learning Standards:

CPI:

8.2.8.ED.1: Evaluate the function, value, and aesthetics of a technological product or system, from the perspective of the user and the producer.

8.2.8.ED.2: Identify the steps in the design process that could be used to solve a problem.

8.2.8.ED.3: Develop a proposal for a solution to a real-world problem that includes a model (e.g., physical prototype, graphical/technical sketch).

8.2.8.ED.4: Investigate a malfunctioning system, identify its impact, and explain the step-by-step process used to troubleshoot, evaluate, and test options to repair the product in a collaborative team.

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

8.2.8.ITH.2: Compare how technologies have influenced society over time.

8.2.8.ITH.3: Evaluate the impact of sustainability on the development of a designed product or system.

8.2.8.ITH.4: Identify technologies that have been designed to reduce the negative consequences of other technologies and explain the change in impact.

8.2.8.ITH.5: Compare the impacts of a given technology on different societies, noting factors that may make a technology appropriate and sustainable in one society but not in another.

8.2.8.NT.1: Examine a malfunctioning tool, product, or system and propose solutions to the problem.

8.2.8.NT.2: Analyze an existing technological product that has been repurposed for a different function.

8.2.8.NT.3: Examine a system, consider how each part relates to other parts, and redesign it for another purpose.

8.2.8.NT.4: Explain how a product designed for a specific demand was modified to meet a new demand and led to a new product.

8.2.8.ETW.1: Illustrate how a product is upcycled into a new product and analyze the short- and long-term benefits and costs.

8.2.8.ETW.2: Analyze the impact of modifying resources in a product or system (e.g., materials, energy, information, time, tools, people, capital).

8.2.8.ETW.3: Analyze the design of a product that negatively impacts the environment or society and develop possible solutions to lessen its impact.

8.2.8.ETW.4: Compare the environmental effects of two alternative technologies devised to address climate change issues and use data to justify which choice is best.

8.2.8.EC.1: Explain ethical issues that may arise from the use of new technologies.

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

Interdisciplinary Connections:

ELA/Literacy

- Read grade-level text with purpose and understanding
- Gather relevant information from multiple sources
- Summarize or paraphrase information

Mathematics –

- Make sense of problems and persevere in solving them
- Reason abstractly
- Represent and interpret data
- Area and perimeter
- Creating scale drawings, performing calculations related to scale

Science

- Use models to describe phenomena
- Find systematic solutions to problems that are based on scientific knowledge
- Engineering Design

21st Century Themes:

- Global Awareness
- Environmental Literacy
- Critical Thinking
- Problem Solving
- Communication
- Collaboration
- Information Literacy
- Media Literacy
- ICT (Information, Communication and Technology) Literacy

Enduring Understandings

Students will understand that...

- Engineers use a design process to solve problems based on a real world need.
- They can 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.

Unit 5 Student Learning Objectives

Students will know...

- Engineering design is a systematic, creative and iterative process used to address local and **global problems.**
- The process includes generating ideas, choosing the best solution, and making, testing, and redesigning models or prototypes.
- Engineering design specifications involve making trade-offs between competing requirements /design features.
- Economic, political, social, and **cultural aspects of society** drive development of new technological products, processes, and systems.
- Technology interacts with society, sometimes bringing about changes in a society's economy, politics, and **culture**, and often leading to the creation of new needs and wants.

- New needs and wants may create strains on local economies and workforces.
- Improvements in technology are intended to make the completion of tasks easier, safer, and/or more efficient.
- Technology advances through the processes of innovation and invention 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.
- Resources need to be utilized wisely to have positive effects on the environment and society.
- Some technological decisions involve trade-offs between **environmental** and economic needs, while others have positive effects for both the economy and environment.
- Technological disparities have consequences for public health and prosperity.

Unit 5 Assessments

Formative Assessments:

- Pretest/Post test
- Observation
- Class Participation
- Think-Pair-Share

Summative Assessments:

- Quiz
- Unit Projects

Alternative Assessments:

- Do-Now
- Exit Tickets
- Classroom Games
- Self-assessment
- Feedback from home form

Additional Resources/Links

- **Legos/Building Blocks**
- **3D printers**
- **Cardboard & DIY materials**
- **Virtual field trips**
- teachengineering.org
- commonsense.org
- <https://kids.nationalgeographic.com/>
- [Engineering is Elementary](#)

- **Minecraft: Education Edition**
- **K'Nex**
- **KEVA planks**
- **Little bits**
- **[Hummingbird Bit](#)**
- **<https://www.njsba.org/steam-tank-challenge/>**
- **<https://globalgoals.org/>**

Unit 6 Overview: Data and Analysis

Unit 6 Summary:

Students will be able to identify spreadsheets and databases, and their uses. They will use software applications to enter, calculate, sort, and filter information, and create tables and graphs to present data.

Essential Questions:

- How are spreadsheet and database tools used in a variety of fields, including business, research, and engineering?
- How do spreadsheet formulas and functions automate calculations to analyze data?
- How can we make design choices that will make a spreadsheet easier to understand?
- Why is data important when making decisions?

New Jersey Student Learning Standards

New Jersey Student Learning Standards:

CPI:

- 8.1.8.DA.1: Organize and transform data collected using computational tools to make it usable for a specific purpose.
- 8.1.8.DA.2: Explain the difference between how the computer stores data as bits and how the data is displayed.
- 8.1.8.DA.3: Identify the appropriate tool to access data based on its file format.
- 8.1.8.DA.4: Transform data to remove errors and improve the accuracy of the data for analysis.
- 8.1.8.DA.5: Test, analyze, and refine computational models.

8.1.8.DA.6: Analyze **climate change** computational models and propose refinements.

- 9.4.8.TL.2: Gather data and digitally represent information to communicate a real-world problem (e.g., MS-ESS3-4, 6.1.8.EconET.1, 6.1.8.CivicsPR.4).

Interdisciplinary Connections:

ELA/Literacy

- Gather relevant information from multiple sources
- Summarize or paraphrase information
- Graphic Organizer

Mathematics –

- Make sense of problems and persevere in solving them
- Counting and cardinality
- Organize numerical data in table and graph formats
- Use spreadsheets to perform calculations on numeric data

21st Century Themes:

- Financial, Economic, Business and Entrepreneurial Literacy
- Critical Thinking
- Problem Solving
- Communication
- Collaboration
- Information Literacy
- Media Literacy
- ICT (Information, Communication and Technology) Literacy

Enduring Understandings

Students will understand that...

- Computer technology is a useful tool for organizing, calculating, and analyzing data.

- Effective use of data can help us make decisions and solve problems.

Unit 6 Student Learning Objectives

Students will know...

- People use digital devices and tools to automate the collection, use, and transformation of data.
- The manner in which data is collected and transformed is influenced by the type of digital device(s) available and the intended use of the data.
- 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.

Unit 6 Assessments

Formative Assessments:

- Pretest/Post test
- Observation
- Class Participation
- Think-Pair-Share

Summative Assessments:

- Quiz
- Unit Projects

Alternative Assessments:

- Do-Now
- Exit Tickets
- Classroom Games
- Self-assessment
- Feedback from home form

Additional Resources/Links

- **Google Sheets/Microsoft Excel**
- **CS Unplugged- [Image Representation](#)**
- <https://nces.ed.gov/nceskids/>
- [Graph creator-Canva](#)
- [Pie Chart creator-Canva](#)
- <https://virtuallscienteachers.org/pie-chart-maker/>
- applieddigitalskills.withgoogle.com
- **Pixel Art**