Standard 8.2 Technology Education, Engineering, Design, and Computational Thinking – Programming: All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.	**By the end of Grade 2**

Strand A: The Nature of Technology: Creativity and Innovation

Rationale: Technology systems impact every aspect of the world in which we live.

Technology CPI

8.2.2.A.3
Identify a system and the components that work together to accomplish its purpose.

Instructional Design Ideas

- Interdisciplinary Learning: Content area standards are developed while cultivating relevant technology applications and skills.
- Multiple Means of Representation: Activate or Supply Background Knowledge- Provide examples of systems that students can use and experience to demonstrate the interactions of technologies and the components that work together. Watch videos and discuss systems that students and their families use. Provide options to express and organize information through concept maps, KWL charts and graphic organizers.

Sample Activity

In groups, students will attempt to build the tallest tower out of marshmallows and uncooked spaghetti (See Marshmallow Challenge lesson link below). Students will routinely write descriptions of their process and progress. They will first draw a sketch of their tower, illustrating how the shape of the objects will help their tower to be the tallest. After the tower is built, students will reflect on the experience and both write about and discuss how the individual pieces worked together in the construction of the tower.

Content Area CPI

NGSS-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.

CCSS.ELA-LITERACY.CCRA.W.10
Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.

Technology Options

- Chogger: A simple platform where you can use different tools to create drawings.

- edheads: An online educational resource that provides free science and math games and activities that promote critical thinking.

- MindMups: An app that supports visual thinking and provides a collaborative environment to develop and share documents. Organizing thoughts in a mind map allows them to be stored online and/or exported to use with other applications.

- Prezi: A presentation app that allows users to collect and present information visually and display "what if" scenarios.

Tech Tip: There are many free options available to use on the devices presently in your classroom. Inventory the resources available and search to locate compatible freeware, open source materials or applications.

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Strand A: The Nature of Technology: Creativity and Innovation

Legend	Symbols used are a quick reference to indicate additional resources have been included. Additional information to locate resources is provided on a supplemental page.		
⏰	Time Tips That Transform Practice	📘	Supporting Research and Resources
🧠	Professional Development and/or Classroom Resources	👥	Multiple Means of Representation
L	Lessons	🎭	Multiple Means of Actions and Expressions
▦	Technology Resources	✔	Multiple Means of Engagement

📘	**NGSS-K-2-ETS1-2:** http://www.nextgenscience.org/k-2ets-engineering-design **CCSS.ELA-LITERACY.CCRA.W.10:** http://www.corestandards.org/ELA-Literacy/CCRA/W/10/ **Technology 8.2.2.A.3:** http://www.state.nj.us/education/aps/cccs/tech/
🎭	**Multiple Means of Representation:** Activate or Supply Background Knowledge- http://www.udlcenter.org/aboutudl/udlguidelines/principle1
L	**Class Rules:** http://learningtogive.org/lessons/unit36/lesson4.html **Marshmallow Towers:** http://www.crscience.org/lessonplans/2_MarshmallowChallenge_Gautham_1213.pdf **The Sun and Its Energy:** http://www.need.org/files/curriculum/guides/The%20Sun%20and%20its%20Energy.pdf **What is Authority:** http://www.civiced.org/resources/curriculum/constitution-day-and-citizenship-day
🧠 ▦	**Chogger:** http://chogger.com/create **Edheads.org**: http://www.edheads.org/ **MindMup:** http://blog.mindmup.com/ **Prezi:** http://prezi.com/ **PBS.org**: http://pbskids.org/lab Explore new ways to support learning online. This site has a collection of interactive games, educator's resources, activities and more.

Standard 8.2 Technology Education, Engineering, Design, and Computational Thinking – Programming: All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.	**By the end of Grade 5**

Strand A: The Nature of Technology: Creativity and Innovation

Rationale: Technology systems impact every aspect of the world in which we live.

Technology CPI

8.2.5.A.2
Investigate and present factors that influence the development and function of a product and a system.

Content Area CPI

CCSS.ELA-LITERACY.CCRA.W.2
Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.

NGSS-Science 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.

Instructional Design Ideas

- Interdisciplinary Learning: Content area standards are developed while cultivating relevant technology applications and skills.

- Multiple Means of Action and Expression:

  Provide opportunities to organize ideas using graphic organizers or use word prediction tools to construct a summary. Presentation options could be offered that may include graphic art tools and/or web site development tools with text reader access.

Sample Activity

Research how devices that are used to play music have changed over time. Based on your research, write an informational piece that identifies a design problem of the music-playing device that needed to be changed, and explain the pros and cons of the new innovation. Present and publish the results to inform others of the advantages and disadvantages of the newest device.

Technology Options

- Apache Open Office: A free downloadable productivity suite to support research (Base), writing (Writer), presentation (Impress) and more. Download to your device.

- Google Drive: Allows users to create, communicate and share files and is compatible with a variety of operating systems.

- TED Talks: Contains "Ideas Worth Spreading" video clips that are searchable by length, topic and content area.

- Wikispaces Classroom: Supports the creation of individual or collaborative project development. The creator and instructor can see all pages and historical entries.

Tech Tip: Using color as the only method to communicate may block the content from viewers. As an alternative use text and color (multiple means). Think of a STOP sign; the consistent color and words all convey the meaning.

Standard 8.2 Technology Education, Engineering, Design, and Computational Thinking – Programming: All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment	By the end of Grade 5

Strand A: The Nature of Technology: Creativity and Innovation

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	Time Tips That Transform Practice		Supporting Research and Resources
	Professional Development and/or Classroom Resources		Multiple Means of Representation
L	Lessons		Multiple Means of Actions and Expressions
	Technology Resources		Multiple Means of Engagement

	CCSS.ELA-LITERACY.CCRA.W.2: http://www.corestandards.org/ELA-Literacy/CCRA/W/#CCSS.ELA-Literacy.CCRA.W.2 **Next Generation Science 3-5-ETS1-1:** http://www.nextgenscience.org/3-5ets1-engineering-design **Technology 8.2.5.A.2:** http://www.state.nj.us/education/aps/cccs/tech/
	Build Fluencies with Graduated Levels of Support for Practice and Performance: http://www.udlcenter.org/aboutudl/udlguidelines/principle2
	Adaptive Device Design: http://www.tryengineering.org/lessons/adaptivedevices.pdf **Living Without Technology**: http://www.pbs.org/wnet/1900house/lessons/lesson2a.html **The Power of Invention: From to Discovery to Design -** http://www.us.mensa.org/learn/gifted-youth/lesson-and-activity-plans/lesson-plans/general-the-power-of-invention/
	Apache Open Office: https://www.openoffice.org/product/index.html **Google Drive**: https://tools.google.com/dlpage/drive **Getting Started with Google Drive**: https://support.google.com/drive/answer/2424384?hl=en **TED Talks**: http://www.ted.com/talks **Wearable Technology: Hype or Help?**: https://www.youtube.com/watch?v=kT9MJI6Cigk **Wikispaces Classroom**: https://www.wikispaces.com/content/classroom

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Strand A: The Nature of Technology: Creativity and Innovation

Rationale: Technology systems impact every aspect of the world in which we live.

Technology CPI

8.2.8.A.1
Research a product that was designed for a specific demand and identify how the product has changed to meet new demands (i.e. telephone for communication – smart phone for mobility needs).

Instructional Design Ideas

- Interdisciplinary Learning: Content area standards are developed while cultivating relevant technology applications and skills.
- Multiple Means of Engagement: Minimize Threats and Distractions- Offer a template to be completed by drawing, writing, typing, using symbolic representations or tools that exhibit students' strengths. Students are allowed to use word processing with speech recognition and word prediction or other tools to match images to concepts.

Sample Activity

Using the Internet, investigate how the current smart phone has changed from its predecessor. Consider the reasons for the change. Analyze the impact the innovation has on status, social class and standard of living. Develop an organized informative/ explanatory text to convey your ideas, concepts and information with a supported examination of the topic and analysis.

Content Area CPI

CCSS.ELA-LITERACY.CCRA.W.2
Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.

Social Studies 6.1.8.C.4.c
Analyze how technological innovations affected the status and social class of different groups of people, and explain the outcomes that resulted.

Technology Options

- Easybib: A free bibliography creator which supports MLA, APA or Chicago formatting.

- Live Binder: An online three ring binder. This website organizes links to external documents, files and evidence for evaluation. It is compatible with multiple platforms and devices.

- NaturalReader: A text to speech tool used to help close reading gaps, language barriers and other unique needs, which helps reduce barriers to content.

- The History of the Lightbulb: Energy.gov has resources reviewing science and innovations. An example is the light bulb which has changed over 150 years; this tells the how and why.

- Wearable Technology: Fashioning the Future This site defines wearable technology and examines challenges to the creation and distribution of early generations of wearable technology.

Standard 8.2 Technology Education, Engineering, Design, and Computational Thinking – Programming: All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment	**By the end of Grade 8**

Strand A: The Nature of Technology: Creativity and Innovation

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📘	**CCSS.ELA-LITERACY.CCRA.W.2**: http://www.corestandards.org/ELA-Literacy/CCRA/W/#CCSS.ELA-Literacy.CCRA.W.2 **Social Studies 6.1.8.C.4.c**: http://www.state.nj.us/education/cccs/2014/ss/ **Technology 8.2.8.A.1**: http://www.state.nj.us/education/aps/cccs/tech/
🎭	**UDL Checkpoint 7.3: Minimize Threats and Distractions-** http://www.udlcenter.org/aboutudl/udlguidelines/principle3 **Why Teach with an Interdisciplinary Approach**: http://serc.carleton.edu/econ/interdisciplinary/why.html
L	**The Harmless Holder**: http://pbskids.org/designsquad/parentseducators/resources/index.html?category=green **Irrigation Ides**: http://www.tryengineering.org/lessons/irrigationideas.pdf
🧠 ▦	**EasyBib**: http://www.easybib.com/ **Live Binder**: http://www.livebinders.com/welcome/home **NaturalReader**: http://www.naturalreaders.com/ **The History of the Light Bulb**: http://energy.gov/articles/history-light-bulb **Wearable Technology: Fashioning the Future**- http://www.wareable.com/wearable-tech/what-is-wearable-tech-753

Standard 8.2 Technology Education, Engineering, Design, and Computational Thinking – Programming: All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.	**By the end of Grade 12**

Strand A: The Nature of Technology: Creativity and Innovation

Rationale: Technology systems impact every aspect of the world in which we live.

Technology CPI

8.2.12.A.2
Analyze a current technology and the resources used, to identify the trade-offs in terms of availability, cost, desirability and waste.

Instructional Design Ideas

- Interdisciplinary Learning: Content area standards are developed while cultivating relevant technology applications and skills.

- Multiple Means of Representation: Guide Information Processing, Visualization, and Manipulation-
Provide a teacher developed list of technologies to be discussed. Offer visual content such as videos, highlighted text in projected presentations, pictures and other representations. Give students hands-on opportunities with samples of technologies to inspect and explore.

Sample Activity

Research a new medical technology and analyze how it has evolved to support wellness. Identify the advantages and disadvantages. Debate social/ ethical implications of adoption. Use relevant evidence and valid reasoning to justify your position.

Content Area CPI

CCSS.ELA-LITERACY.CCRA.SL.4
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.

Health and Physical Education 2.1.12.A.2

Debate the social and ethical implications of the availability and use of technology and medical advances to support wellness.

Technology Options

- **America's New Deadly Obsession**: A resource making relevant connections to technology advancements examining the cost.

- **Legal and Ethical Issues with Inappropriate Cell Phone Usage**: Spotlights the issues while modeling an idea for development of a presentation.

- **Prezi**: cloud-based presentation software that is compatible with multiple types of hardware for creating and sharing.

- **National Highway Traffic Safety Administration: Stop the Texts. Stop the Wrecks. -** text and video resources.

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Strand A: The Nature of Technology: Creativity and Innovation

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	Professional Development and/or Classroom Resources		Multiple Means of Representation
L	Lessons		Multiple Means of Actions and Expressions
	Technology Resources		Multiple Means of Engagement

	CCSS.ELA-LITERACY.CCRA.SL.4: http://www.corestandards.org/ELA-Literacy/CCRA/SL/ **Health and Physical Education 2.1.12.A.2**: http://www.state.nj.us/education/cccs/2014/chpe/ **Technology 8.2.2.A.3**: http://www.state.nj.us/education/aps/cccs/tech/
	Guide Information Processing, Visualization, and Manipulation: http://www.udlcenter.org/aboutudl/udlguidelines/principle1
L	**Dangers of Distracted Driving**: http://www.thenophonezone.org/downloadfiles/No-Phone-Zone-Lesson-Plan.pdf **Youth Obesity: Schools Fight Back**: http://www.pbs.org/newshour/spc/thenews/materials/Obesity_LP_Science.pdf - What technology has the potential to have an impact (positive or negative) on obesity?
	America's New Deadly Obsession: http://www.oprah.com/oprahshow/Americas-New-Deadly-Obsession-Partial-Episode-Video **Legal and Ethical Issues with Inappropriate Cell Phone Usage**: https://prezi.com/8msimracbrc9/legal-and-ethical-issues-with-inappropriate-cell-phone-usage/ **Prezi**: http://prezi.com/ **National Highway Traffic Safety Administration**: http://www.stoptextsstopwrecks.org/#home