Appendix of Technology Standards and Infusion Exemplars Grades 9-12

Content Area: **Technology**
Course(s): **Sample Course, Chemistry**
Time Period:
Length: **Sample Length & Grade Level**
Status: **Published**

Department of Curriculum and Instruction

Belleville Public Schools

Curriculum Guide

Appendix of Technology Standards and Infusion Exemplars

Grade 9-12

Belleville Board of Education

102 Passaic Avenue

Belleville, NJ 07109

Prepared by: Ms. Karen L. Franciosa

Dr. Richard Tomko, Ph.D., M.J., Superintendent of Schools

Ms. LucyAnn Demikoff, Director of Curriculum and Instruction K-12

Ms. Nicole Shanklin, Director of Elementary Education

Mr. George Droste, Director of Secondary Education

Board Approved: September 23, 2019

Appendix of Technology Standards and Exemplars

The purpose of this appendix is to serve as a guide for educators to meet the technological requirements as per the NJDOE website:

New Jersey's Technology Standards consist of 8.1 Educational Technology and 8.2 Technology, Engineering, Design and Computational Thinking, which work symbiotically to provide students with the necessary skills for college and career readiness.

> "Advances in technology have drastically changed the way we interact with the world and each other. The digital age requires that we understand and are able to harness the power of technology to live and learn". - International Society for Technology in Education

In this ever-changing digital world where citizenship is being re-imagined, our students must be able to harness the power of technology to live, solve problems and learn in college, on the job and throughout their lives. Enabled with digital and civic citizenship skills, students are empowered to be responsible members of today's diverse global society.

Readiness in this century demands that students actively engage in critical thinking, communication, collaboration, and creativity. Technology empowers students with real-world data, tools, experts and global outreach to actively engage in solving meaningful problems in all areas of their lives. The power of

technology discretely supports all curricular areas and multiple levels of mastery for all students.

Technology Infusion Exemplars by Discipline for Grades 9-12

What **Technology Infusion** and/or strategies are integrated into this unit to enhance learning? Please list all hardware, software and strategies. Please find a technology pedagogy wheel for assistance while completing this section.

ELA:

- Digital Brain Dump with Flipgrid and Socrative
- Caption This! A fun, deep-thinking Google Drawings activity.
- Create an online portfolio including a social media page and business card for a character identity using Canva.
- "Add and Pass" activity in docs- Digital version of adding onto a story and passing to next group of students until finished. Begin with an image on a blank document (can be a scene from a story or even a historical figure).
- Writable.com- 600+ prompts and assignments
- ThinkCERCA.com-Web-based literacy program that scffold the development of critical thinking and argumentative writing skills.
- Commonlit.org-Feature rich literacy resource.
- readwritethink.org: ***A-ll's Well that Sells Well***: ***A Creative Introduction to Shakespeare***: After taking a virtual tour of The Globe Theater in Elizabethan London, students compare attending a performance at The Globe to attending a current professional production (such as a play on Broadway) or to viewing a movie at a local theater. They discuss the similarities and differences in the theaters and imagine what types of products might have been advertised in Elizabethan time, if The Globe showed commercials before the play like modern movie theaters do. They create a commercial advertisement geared toward an Elizabethan audience to promote one of today's products or conveniences. This activity helps students better understand the Elizabethan times and Elizabethan theater audiences, as well as persuasive advertising techniques.
- readwritethink.org: ***Creating Psychological Profiles of Characters in To Kill a Mockingbird***: Design a digital poster and plan a presentation representing a psychological profiles for a selected character while determining what specific factors (such as family, career, environment, and so forth) have the greatest influence on the characters' decision making throughout the novel.
- readwritethink.org: ***Ghosts and Fears in Language Arts: Exploring the Ways Writers Scare Readers***:

Fright Fair Projects: "Why people like to be scared"-Students can create a Google survey on what movies fellow teens watch, whether or not they watch horror movies and if so why do they like them? Statistics on how well scary movies do at the box office can be researched and fellow students who enjoy horror films can be interviewed. Findings can be presented in the form of a digital news broadcast.

- readwritethink.org: ***An Introduction to Graphic Novels:Podcast***readwritethink.org: ***Comics and Graphic Novels***
- Create a Book Trailer

MATH:

- Digital Brain Dump with Flipgrid and Socrative.
- Khan Academy: Algebra Functions
- Math by Kahoot-Algebra (Curriculum Aligned Games and videos)
- Kahoot:Math by Kahoot-Algebra (Model and Solve Equations with Variables ob Both Sides)
- YouTube:Algebra Basics: Solving Equations Part 1-Math Antics
- YouTube:Algebra Basics: Solving Equations Part 2-Math Antics
- YouTube:Basic Linear Functions-Math Antics
- Khan Academy:Solving Equations
- Khan Acaemy:Geometry-Law of Detachment

SCIENCE:

- Digital Brain Dump with Flipgrid and Socrative
- YouTube:Intro to Chemistry, Basic Concepts-Periodic Table
- Khan Academy: Introduction to Chemistry
- Weather and Climate- Bozeman Science
- Create PowToon on subject material
- Khan Academy:High School Biology:Cells
- Khan Academy:High School Biology:Evolution

SOCIAL STUDIES:

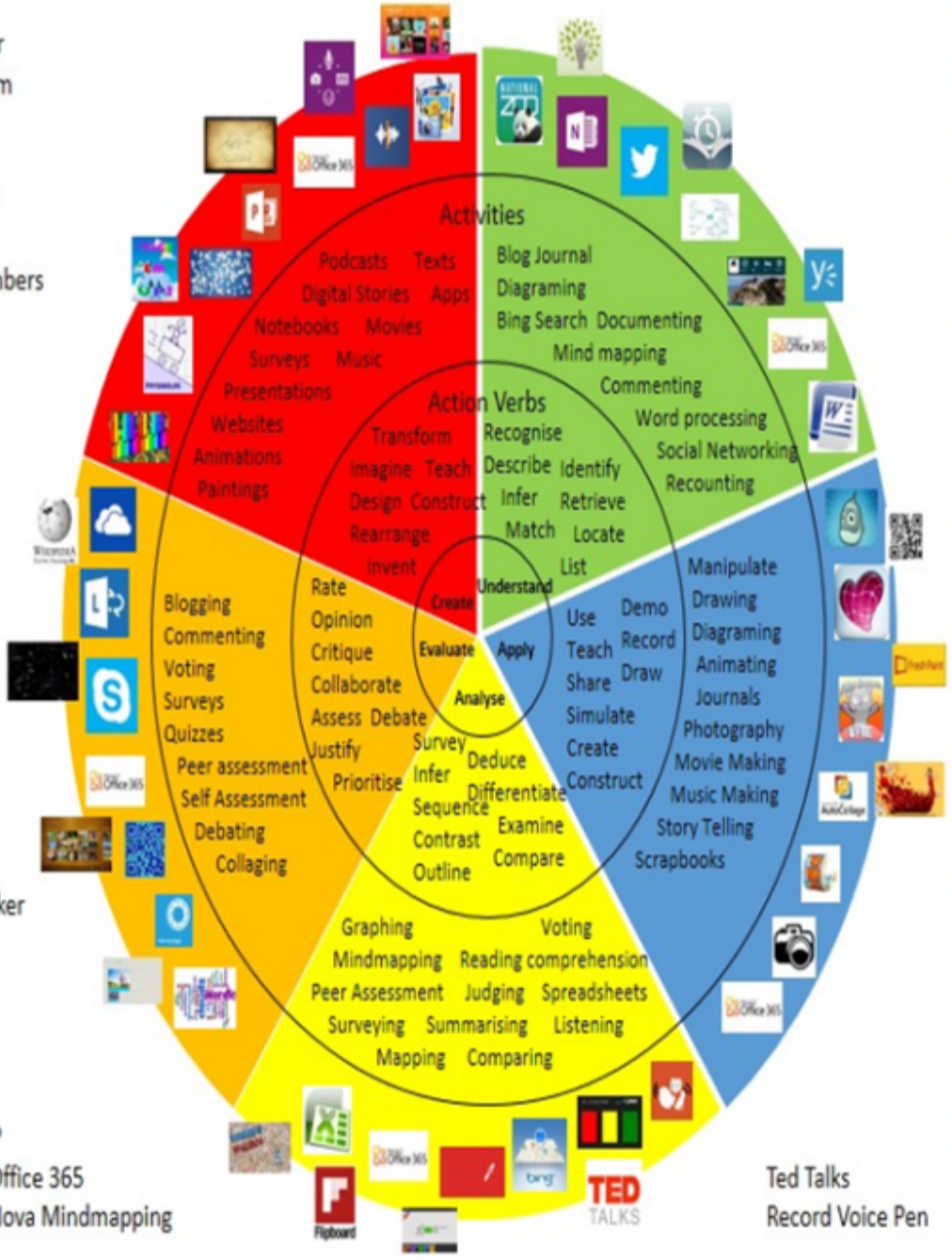
- Google Earth
- Digital Brain Dump with Flipgrid and Socrative.
- Caption This! A fun, deep-thinking Google Drawings activity
- Digital History- A comprehensive collection of historical data on United States history.
- Digital History: The Great Depression
- Create an online portfolio including a social media page and business card for a historian using Canva.
- iCivics.org gives students the necessary tools to learn about and participate in civic life, and teaches the materials and support to achieve this goal. Their free resources include interactive digital tools, print-and-go lessons and award winning games.
- http://www.loc.gov: Library of Congress: News, events, new content and more from the National Library of Congress and Specifice subject areas- From legislature to poetry, from music to science, from cataloging to copyright.

- Historical Thinking Matters.org: A pick for best social studies websites "focused on key topics in U.S. history, that is designed to teach students how to critically read primary souces and how to critique and construct historical narratives.
- Historical Thinking Matters: Rosa Parks (Black History Month)
- YouTube: Larry King Live (1995)- Interview with Rosa Parks (Black History Month)
- NPR: National Public Radio-Podcasts
- Ted Talks: Uglyy History: Witch Hunts

Win 8.1 Apps/Tools Pedagogy Wheel

Podcasts
Photostory 3
Kid Story Builder
Music Maker Jam
Paint A Story
Office 365
MS PowerPoint
Stack 'Em Up
NqSquared Numbers
Physamajig
Xylophone 8

Wikipedia
Skydrive
Lync
SkyMap
Skype
Office 365
Puzzle Touch
Easy QR
Memorylage
Life Moments
Word Cloud Maker



Where's Waldo?
MS Excel Office 365
Flipboard Nova Mindmapping

Ted Talks
Record Voice Pen

Originally taken from http://www.coetail.com/vzimmer/files/2013/02/iPadagogy-Wheel.001.jpg
And adapted for Windows 8.1 devices by Charlotte Beckhurst @CharBeckhurst

New Jersey Student Learning Standards (NJSLS-S)

Adopted 10.1.14

2014 New Jersey Student Learning Standards - Technology

Content Area		Technology	
Standard		8.1 Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.	
Strand		A. Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations.	
Grade Level bands	Content Statement Students will:	Indicator	Indicator
P	Understand and use technology systems.	8.1.P.A.1	Use an input device to select an item and navigate the screen
		8.1.P.A.2	Navigate the basic functions of a browser.
	Select and use applications effectively and productively.	8.1.P.A.3	Use digital devices to create stories with pictures, numbers, letters and words.
		8.1.P.A.4	Use basic technology terms in the proper context in conversation with peers and teachers (e.g., camera, tablet, Internet, mouse, keyboard, and printer).
		8.1.P.A.5	Demonstrate the ability to access and use resources on a computing device.
K-2	Understand and use technology systems.	8.1.2.A.1	Identify the basic features of a digital device and explain its purpose.
	Select and use applications effectively and productively.	8.1.2.A.2	Create a document using a word processing application.
		8.1.2.A.3	Compare the common uses of at least two different digital applications and identify the advantages and disadvantages of using each.
		8.1.2.A.4	Demonstrate developmentally appropriate navigation skills in virtual environments (i.e. games, museums).
		8.1.2.A.5	Enter information into a spreadsheet and sort the information.
		8.1.2.A.6	Identify the structure and components of a database.
		8.1.2.A.7	Enter information into a database or spreadsheet and filter the information.
3-5	Understand and use technology systems.	8.1.5.A.1	Select and use the appropriate digital tools and resources to accomplish a variety of tasks including solving problems.
	Select and use applications effectively and productively.	8.1.5.A.2	Format a document using a word processing application to enhance text and include graphics, symbols and/ or pictures.
		8.1.5.A.3	Use a graphic organizer to organize information about problem or issue.
		8.1.5.A.4	Graph data using a spreadsheet, analyze and produce a report that explains the analysis of the data.
		8.1.5.A.5	Create and use a database to answer basic questions.
		8.1.5.A.6	Export data from a database into a spreadsheet; analyze and produce a report that explains the analysis of the

			data.
6-8	Understand and use technology systems.	8.1.8.A.1	Demonstrate knowledge of a real world problem using digital tools.
	Select and use applications effectively and productively.	8.1.8.A.2	Create a document (e.g. newsletter, reports, personalized learning plan, business letters or flyers) using one or more digital applications to be critiqued by professionals for usability.
		8.1.8.A.3	Use and/or develop a simulation that provides an environment to solve a real world problem or theory.
		8.1.8.A.4	Graph and calculate data within a spreadsheet and present a summary of the results
		8.1.8.A.5	Create a database query, sort and create a report and describe the process, and explain the report results.
9-12	Understand and use technology systems.	8.1.12.A.1	Create a personal digital portfolio which reflects personal and academic interests, achievements, and career aspirations by using a variety of digital tools and resources.
	Select and use applications effectively and productively.	8.1.12.A.2	Produce and edit a multi-page digital document for a commercial or professional audience and present it to peers and/or professionals in that related area for review.
		8.1.12.A.3	Collaborate in online courses, learning communities, social networks or virtual worlds to discuss a resolution to a problem or issue.
		8.1.12.A.4	Construct a spreadsheet workbook with multiple worksheets, rename tabs to reflect the data on the worksheet, and use mathematical or logical functions, charts and data from all worksheets to convey the results.
		8.1.12.A.5	Create a report from a relational database consisting of at least two tables and describe the process, and explain the report results.
Content Area	Technology		
Standard	8.1 Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.		
Strand	B. Creativity and Innovation: Students demonstrate creative thinking, construct knowledge and develop innovative products and process using technology.		
Grade Level bands	Content Statement Students will:	Indicator	Indicator
P	Apply existing knowledge to generate new ideas, products, or processes. Create original works as a means of personal or group expression.	8.1.P.B.1	Create a story about a picture taken by the student on a digital camera or mobile device.
K-2		8.1.2.B.1	Illustrate and communicate original ideas and stories using multiple digital tools and resources.
3-5		8.1.5.B.1	Collaborative to produce a digital story about a significant local event or issue based on first-person interviews.
6-8		8.1.8.B.1	Synthesize and publish information about a local or global issue or event (ex. telecollaborative project, blog, school web).
9-12		8.1.12.B.2	Apply previous content knowledge by creating and piloting a digital learning game or tutorial.
Content Area	Technology		

Standard	8.1 Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.		
Strand	C. Communication and Collaboration: Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.		
Grade Level bands	Content Statement	Indicator	Indicator
P	Interact, collaborate, and publish with peers, experts, or others by employing a variety of digital environments and media. Communicate information and ideas to multiple audiences using a variety of media and formats. Develop cultural understanding and global awareness by engaging with learners of other cultures. Contribute to project teams to produce original works or solve problems.	8.1.P.C.1	Collaborate with peers by participating in interactive digital games or activities.
K-2		8.1.2.C.1	Engage in a variety of developmentally appropriate learning activities with students in other classes, schools, or countries using various media formats such as online collaborative tools, and social media.
3-5		8.1.5.C.1	Engage in online discussions with learners of other cultures to investigate a worldwide issue from multiple perspectives and sources, evaluate findings and present possible solutions, using digital tools and online resources for all steps.
6-8		8.1.8.C.1	Collaborate to develop and publish work that provides perspectives on a global problem for discussions with learners from other countries.
9-12		8.1.12.C.1	Develop an innovative solution to a real world problem or issue in collaboration with peers and experts, and present ideas for feedback through social media or in an online community.
Content Area	Technology		
Standard	8.1 Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.		
Strand	D. Digital Citizenship: Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.		
Grade Level bands	Content Statement	Indicator	Indicator
K-2	Advocate and practice safe, legal, and responsible use of information and technology.	8.1.2.D.1	Develop an understanding of ownership of print and nonprint information.
3-5	Advocate and practice safe, legal, and responsible use of information and technology.	8.1.5.D.1	Understand the need for and use of copyrights.
		8.1.5.D.2	Analyze the resource citations in online materials for proper use.
	Demonstrate personal responsibility for lifelong learning.	8.1.5.D.3	Demonstrate an understanding of the need to practice cyber safety, cyber security, and cyber ethics when using technologies and social media.
	Exhibit leadership for digital citizenship.	8.1.5.D.4	Understand digital citizenship and demonstrate an understanding of the personal consequences of inappropriate use of technology and social media.
6-8	Advocate and practice safe, legal, and responsible use of information and technology.	8.1.8.D.1	Understand and model appropriate online behaviors related to cyber safety, cyber bullying, cyber security, and cyber ethics including appropriate use of social

			media.
	Demonstrate personal responsibility for lifelong learning.	8.1.8.D.2	Demonstrate the application of appropriate citations to digital content.
		8.1.8.D.3	Demonstrate an understanding of fair use and Creative Commons to intellectual property.
	Exhibit leadership for digital citizenship.	8.1.8.D.4	Assess the credibility and accuracy of digital content.
		8.1.8.D.5	Understand appropriate uses for social media and the negative consequences of misuse.
9-12	Advocate and practice safe, legal, and responsible use of information and technology.	8.1.12.D.1	Demonstrate appropriate application of copyright, fair use and/or Creative Commons to an original work.
	Demonstrate personal responsibility for lifelong learning.	8.1.12.D.2	Evaluate consequences of unauthorized electronic access (e.g., hacking) and disclosure, and on dissemination of personal information.
		8.1.12.D.3	Compare and contrast policies on filtering and censorship both locally and globally.
	Exhibit leadership for digital citizenship.	8.1.12.D.4	Research and understand the positive and negative impact of one's digital footprint.
		8.1.12.D.5	Analyze the capabilities and limitations of current and emerging technology resources and assess their potential to address personal, social, lifelong learning, and career needs.

Content Area	Technology
Standard	8.1 Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
Strand	E: Research and Information Fluency: Students apply digital tools to gather, evaluate, and use information.

Grade Level bands	Content Statement Students will:	Indicator	Indicator
P	Plan strategies to guide inquiry.	8.1.P.E.1	Use the Internet to explore and investigate questions with a teacher's support.
K-2	Plan strategies to guide inquiry Locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media. Evaluate and select information sources and digital tools based on the appropriateness for specific tasks.	8.1.2.E.1	Use digital tools and online resources to explore a problem or issue.
3-5	Plan strategies to guide inquiry. Locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media. Evaluate and select information sources and digital tools based on	8.1.5.E.1	Use digital tools to research and evaluate the accuracy of, relevance to, and appropriateness of using print and non-print electronic information sources to complete a variety of tasks.

	the appropriateness for specific tasks.		
6-8	Plan strategies to guide inquiry. Locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media. Evaluate and select information sources and digital tools based on the appropriateness for specific tasks. Process data and report results.	8.1.8.E.1	Effectively use a variety of search tools and filters in professional public databases to find information to solve a real world problem.
9-12	Plan strategies to guide inquiry. Locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media. Evaluate and select information sources and digital tools based on the appropriateness for specific tasks. Process data and report results.	8.1.12.E.1	Produce a position statement about a real world problem by developing a systematic plan of investigation with peers and experts synthesizing information from multiple sources.
		8.1.12.E.2	Research and evaluate the impact on society of the unethical use of digital tools and present your research to peers.

Content Area	Technology
Standard	8.1 Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
Strand	F: Critical thinking, problem solving, and decision making: Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.

Grade Level bands	Content Statement Students will:	Indicator	Indicator
K-2	Identify and define authentic problems and significant questions for investigation. Plan and manage activities to develop a solution or complete a project. Collect and analyze data to identify solutions and/or make informed decisions. Use multiple processes and diverse perspectives to explore alternative solutions.	8.1.2.F.1	Use geographic mapping tools to plan and solve problems.
3-5	Identify and define authentic	8.1.5.F.1	Apply digital tools to collect, organize, and analyze data

	problems and significant questions for investigation. Plan and manage activities to develop a solution or complete a project. Collect and analyze data to identify solutions and/or make informed decisions. Use multiple processes and diverse perspectives to explore alternative solutions		that support a scientific finding.
6-8	Identify and define authentic problems and significant questions for investigation. Plan and manage activities to develop a solution or complete a project. Collect and analyze data to identify solutions and/or make informed decisions. Use multiple processes and diverse perspectives to explore alternative solutions.	8.1.8.F.1	Explore a local issue, by using digital tools to collect and analyze data to identify a solution and make an informed decision.
9-12	Identify and define authentic problems and significant questions for investigation. Plan and manage activities to develop a solution or complete a project. Collect and analyze data to identify solutions and/or make informed decisions. Use multiple processes and diverse perspectives to explore alternative solutions.	8.1.12.F.1	Evaluate the strengths and limitations of emerging technologies and their impact on educational, career, personal and or social needs.

2014 New Jersey Core Curriculum Content Standards - Technology

Content Area	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, tecl computational thinking and the designed world as they relate to the individual, global society, and tl		
Strand	A. The Nature of Technology: Creativity and Innovation Technology systems impact every aspect o we live.		
Grade Level	Content Statement Students will be able to	Indicator	Indicator

bands	understand:		
K-2	The characteristics and scope of technology.	8.2.2.A.1	Define products produced as a result of technology or of nature.
		8.2.2.A.2	Describe how designed products and systems are useful at schoc
	The core concepts of technology.	8.2.2.A.3	Identify a system and the components that work together to acc
		8.2.2.A.4	Choose a product to make and plan the tools and materials neede
	The relationships among technologies and the connections between technology and other fields of study.	8.2.2.A.5	Collaborate to design a solution to a problem affecting the comn
3-5	The characteristics and scope of technology.	8.2.5.A.1	Compare and contrast how products made in nature differ from human made in how they are produced and used.
		8.2.5.A.2	Investigate and present factors that influence the development ar product and a system.
	The core concepts of technology.	8.2.5.A.3	Investigate and present factors that influence the development ar and systems, e.g., resources, criteria and constraints.
	The relationships among technologies and the connections between technology and other fields of study.	8.2.5.A.4	Compare and contrast how technologies have changed over time and economic, political and/or cultural influences.
		8.2.5.A.5	Identify how improvement in the understanding of materials scie technologies.
6-8	The characteristics and scope of technology.	8.2.8.A.1	Research a product that was designed for a specific demand and product has changed to meet new demands (i.e. telephone for co phone for mobility needs).
	The core concepts of technology.	8.2.8.A.2	Examine a system, consider how each part relates to other parts, redesign to improve the system.
		8.2.8.A.3	Investigate a malfunction in any part of a system and identify its
	The relationships among technologies and the connections between technology and other fields of study.	8.2.8.A.4	Redesign an existing product that impacts the environment to les the environment.
		8.2.8.A.5	Describe how resources such as material, energy, information, ti capital contribute to a technological product or system.
9-12	The characteristics and scope of technology.	8.2.12.A.1	Propose an innovation to meet future demands supported by an a full costs, benefits, trade-offs and risks, related to the use of the
	The core concepts of technology.	8.2.12.A.2	Analyze a current technology and the resources used, to identify of availability, cost, desirability and waste.
	The relationships among technologies and the connections between technology and other fields of study.	8.2.12.A.3	Research and present information on an existing technological p repurposed for a different function.

Content Area	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, tec computational thinking and the designed world as they relate to the individual, global society, and t
Strand	B. Technology and Society: Knowledge and understanding of human, cultural and societal values a designing technological systems and products in the global society.

Grade	Content Statement	Indicator	Indicator

Level bands	Students will be able to understand:		
K-2	The cultural, social, economic and political effects of technology.	8.2.2.B.1	Identify how technology impacts or improves life.
	The effects of technology on the environment.	8.2.2.B.2	Demonstrate how reusing a product affects the local and global
	The role of society in the development and use of technology.	8.2.2.B.3	Identify products or systems that are designed to meet human n
	The influence of technology on history.	8.2.2.B.4	Identify how the ways people live and work has changed becau
3-5	The cultural, social, economic and political effects of technology.	8.2.5.B.1	Examine ethical considerations in the development and product through its life cycle.
	The effects of technology on the environment.	8.2.5.B.2	Examine systems used for recycling and recommend simplifica share with product developers.
		8.2.5.B.3	Investigate ways that various technologies are being developed improper use of resources.
	The role of society in the development and use of technology.	8.2.5.B.4	Research technologies that have changed due to society's chang
		8.2.5.B.5	Explain the purpose of intellectual property law.
	The influence of technology on history.	8.2.5.B.6	Compare and discuss how technologies have influenced history
6-8	The cultural, social, economic and political effects of technology.	8.2.8.B.1	Evaluate the history and impact of sustainability on the develop product or system over time and present results to peers.
		8.2.8.B.2	Identify the desired and undesired consequences from the use o
	The effects of technology on the environment.	8.2.8.B.3	Research and analyze the ethical issues of a product or system c report findings for review by peers and /or experts.
		8.2.8.B.4	Research examples of how humans can devise technologies to r consequences of other technologies and present your findings.
	The role of society in the development and use of technology.	8.2.8.B.5	Identify new technologies resulting from the demands, values, a individuals, businesses, industries and societies.
		8.2.8.B.6	Compare and contrast the different types of intellectual property patents and trademarks.
	The influence of technology on history.	8.2.8.B.7	Analyze the historical impact of waste and demonstrate how a p reused or remanufactured into a new product.
9-12	The cultural, social, economic and political effects of technology.	8.2.12.B.1	Research and analyze the impact of the design constraints (spec for a product or technology driven by a cultural, social, econom publish for review.
	The effects of technology on the environment.	8.2.12.B.2	Evaluate ethical considerations regarding the sustainability resources that are used for the design, creation and mainte product.
	The role of society in the development and use of technology.	8.2.12.B.3	Analyze ethical and unethical practices around intellectual prop influenced by human wants and/or needs.

	The influence of technology on history.	8.2.12.B.4	Investigate a technology used in a given period of history, e.g., revolution or information age, and identify their impact and hov changed to meet human needs and wants.
		8.2.12.B.5	Research the historical tensions between environmental and ecc as driven by human needs and wants in the development of a te and present the competing viewpoints to peers for review.

Content Area	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, tec computational thinking and the designed world as they relate to the individual, global society, and t
Strand	C. Design: The design process is a systematic approach to solving problems.

Grade Level bands	Content Statement Students will be able to understand:	Indicator	Indicator
K-2	The attributes of design.	8.2.2.C.1	Brainstorm ideas on how to solve a problem or build a product.
		8.2.2.C.2	Create a drawing of a product or device that communicates its f discuss.
		8.2.2.C.3	Explain why we need to make new products.
	The application of engineering design.	8.2.2.C.4	Identify designed products and brainstorm how to improve one
		8.2.2.C.5	Describe how the parts of a common toy or tool interact and wc
	The role of troubleshooting, research and development, invention and innovation and experimentation in problem solving.	8.2.2.C.6	Investigate a product that has stopped working and brainstorm i problem.
3-5	The attributes of design.	8.2.5.C.1	Collaborate with peers to illustrate components of a designed sy
		8.2.5.C.2	Explain how specifications and limitations can be used to direct development.
		8.2.5.C.3	Research how design modifications have lead to new products.
	The application of engineering design.	8.2.5.C.4	Collaborate and brainstorm with peers to solve a problem evalu provide the best results with supporting sketches or models.
		8.2.5.C.5	Explain the functions of a system and subsystems.
	The role of troubleshooting, research and development, invention and innovation and experimentation in problem solving.	8.2.5.C.6	Examine a malfunctioning tool and identify the process to troub options to repair the tool.
		8.2.5.C.7	Work with peers to redesign an existing product for a different
6-8	The attributes of design.	8.2.8.C.1	Explain how different teams/groups can contribute to the overal
		8.2.8.C.2	Explain the need for optimization in a design process.
		8.2.8.C.3	Evaluate the function, value, and aesthetics of a technological p the perspective of the user and the producer.
	The application of engineering design.	8.2.8.C.4	Identify the steps in the design process that would be used to so problem.
		8.2.8.C.5	Explain the interdependence of a subsystem that operates as par
		8.2.8.C.5.a	Create a technical sketch of a product with materials and measu

	The role of troubleshooting, research and development, invention and innovation and experimentation in problem solving.	8.2.8.C.6	Collaborate to examine a malfunctioning system and identify th used to troubleshoot, evaluate and test options to repair the proc better solution.
		8.2.8.C.7	Collaborate with peers and experts in the field to research and d the design process, data analysis and trends, and maintain a des sketches to record the developmental cycle.
		8.2.8.C.8	Develop a proposal for a chosen solution that include models (p mathematical) to communicate the solution to peers.
9-12	The attributes of design.	8.2.12.C.1	Explain how open source technologies follow the design proces
		8.2.12.C.2	Analyze a product and how it has changed or might change ove needs and wants.
	The application of engineering design.	8.2.12.C.3	Analyze a product or system for factors such as safety, reliabilit considerations, quality control, environmental concerns, manuf maintenance and repair, and human factors engineering (ergonc
		8.2.12.C.4	Explain and identify interdependent systems and their functions
		8.2.12.C.5	Create scaled engineering drawings of products both manually a materials and measurements labeled.
	The role of troubleshooting, research and development, invention and innovation and experimentation in problem solving.	8.2.12.C.6	Research an existing product, reverse engineer and redesign it t function.
		8.2.12.C.7	Use a design process to devise a technological product or syster global problem, provide research, identify trade-offs and constr process through drawings that include data and materials.

Content Area	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, tec computational thinking and the designed world as they relate to the individual, global society, and t
Strand	D. Abilities for a Technological World: The designed world is the product of a design process that convert resources into products and systems.

Grade Level bands	Content Statement Students will understand how to:	Indicator	Indicator
K-2	Apply the design process.	8.2.2.D.1	Collaborate and apply a design process to solve a simple proble experiences.
	Use and maintain technological products and systems.	8.2.2.D.2	Discover how a product works by taking it apart, sketching how back together.
		8.2.2.D.3	Identify the strengths and weaknesses in a product or system.
		8.2.2.D.4	Identify the resources needed to create technological products o
	Assess the impact of products and systems.	8.2.2.D.5	Identify how using a tool (such as a bucket or wagon) aids in re
3-5	Apply the design process.	8.2.5.D.1	Identify and collect information about a problem that can be sol generate ideas to solve the problem, and identify constraints and considered.
		8.2.5.D.2	Evaluate and test alternative solutions to a problem using the cc identified in the design process to evaluate potential solutions.
	Use and maintain technological products and systems.	8.2.5.D.3	Follow step by step directions to assemble a product or solve a
		8.2.5.D.4	Explain why human-designed systems, products, and environm constantly monitored, maintained, and improved.
		8.2.5.D.5	Describe how resources such as material, energy, information, t capital are used in products or systems.
	Assess the impact of products	8.2.5.D.6	Explain the positive and negative effect of products and system

	and systems.		species and the environment, and when the product or system sl
		8.2.5.D.7	Explain the impact that resources such as energy and materials produce products or system have on the environment.
6-8	Apply the design process.	8.2.8.D.1	Design and create a product that addresses a real world problem under specific constraints.
		8.2.8.D.2	Identify the design constraints and trade-offs involved in design how the prototype might fail and how it might be improved) by problem and reporting results in a multimedia presentation, des engineering notebook.
		8.2.8.D.3	Build a prototype that meets a STEM-based design challenge us engineering, and math principles that validate a solution.
	Use and maintain technological products and systems.	8.2.8.D.4	Research and publish the steps for using and maintaining a proc incorporate diagrams or images throughout to enhance user con
	Assess the impact of products and systems.	8.2.8.D.5	Explain the impact of resource selection and the production pro development of a common or technological product or system.
		8.2.8.D.6	Identify and explain how the resources and processes used in th current technological product can be modified to have a more p environment.
9-12	Apply the design process.	8.2.12.D.1	Design and create a prototype to solve a real world problem usi identify constraints addressed during the creation of the prototy made, and present the solution for peer review.
		8.2.12.D.2	Write a feasibility study of a product to include: economic, mar financial, and management factors, and provide recommendatio
	Use and maintain technological products and systems.	8.2.12.D.3	Determine and use the appropriate resources (e.g., CNC (Comp Control) equipment, 3D printers, CAD software) in the design, creation of a technological product or system.
	Assess the impact of products and systems.	8.2.12.D.4	Assess the impacts of emerging technologies on developing cou
		8.2.12.D.5	Explain how material processing impacts the quality of enginee products.
		8.2.12.D.6	Synthesize data, analyze trends and draw conclusions regarding technology on the individual, society, or the environment and p

Content Area	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, tec computational thinking and the designed world as they relate to the individual, global society, and t		
Strand	E. Computational Thinking: Programming: Computational thinking builds and enhances prob students to move beyond using knowledge to creating knowledge.		
Grade Level bands	Content Statement Students will be able to understand:	Indicator	Indicator
K-2	Computational thinking and computer programming as tools used in design and engineering.	8.2.2.E.1	List and demonstrate the steps to an everyday task.
		8.2.2.E.2	Demonstrate an understanding of how a computer takes in of written commands and then interprets and displays info
		8.2.2.E.3	Create algorithms (a sets of instructions) using a pre-defin

			(e.g., to move a student or a character through a maze).
		8.2.2.E.4	Debug an algorithm (i.e., correct an error).
		8.2.2.E.5	Use appropriate terms in conversation (e.g., basic vocabul output, the operating system, debug, and algorithm).
3-5	Computational thinking and computer programming as tools used in design and engineering.	8.2.5.E.1	Identify how computer programming impacts our everyday live
		8.2.5.E.2	Demonstrate an understanding of how a computer takes input o stores the data through a series of commands, and outputs infor
		8.2.5.E.3	Using a simple, visual programming language, create a progran and procedures to generate specific output.
		8.2.5.E.4	Use appropriate terms in conversation (e.g., algorithm, program procedures, memory, storage, processing, software, coding, pro
6-8	Computational thinking and computer programming as tools used in design and engineering.	8.2.8.E.1	Identify ways computers are used that have had an impact acros activity and within different careers where they are used.
		8.2.8.E.2	Demonstrate an understanding of the relationship between hard
		8.2.8.E.3	Develop an algorithm to solve an assigned problem using a spe and use peer review to critique the solution.
		8.2.8.E.4	Use appropriate terms in conversation (e.g., programming, lang ROM, Boolean logic terms).
9-12	Computational thinking and computer programming as tools used in design and engineering.	8.2.12.E.1	Demonstrate an understanding of the problem-solving capacity world.
		8.2.12.E.2	Analyze the relationships between internal and external co
		8.2.12.E.3	Use a programming language to solve problems or accomp robotic functions, website designs, applications, and game
		8.2.12.E.4	Use appropriate terms in conversation (e.g., troubleshootir diagnostic software, GUI, abstraction, variables, data type statements).