Readington Township Public Schools

Technology: Grades K-8

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Readington Township Public Schools
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I. OVERVIEW

Learning to use technology for communication is an absolute necessity in today's society. We need to give careful attention to helping student use their technological skills in the interest of learning and demonstrating what they know. We want them to be comfortable with electronic conversations and learning groups, to use rapid and efficient keyboarding for word processing, to create websites and multimedia presentations, and to use the Internet as a tool for gathering information. At the same time, it is important that even younger students begin to understand that using the Internet requires caution as well as ethical and responsible behavior. (*The Continuum of Literacy Learning*, Fountas and Pinnell)

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. 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. (New Jersey Department of Education)

Technology instruction is an integral part of all grade levels and curricular areas. Our Technology, Innovation and Design, Library Media Specialists and Classroom teachers will all work together towards the goal of teaching the Core Content Standards for Technology.

II. STUDENT OUTCOMES 2014 New Jersey Core Content Standards -Technology

Grade Level Band PRE-K

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*

- **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.
- **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.

B. Creativity and Innovation: *Students demonstrate creative thinking, construct knowledge and develop innovative products and process using technology.*

- **8.1.P.B.1** Create a story about a picture taken by the student on a digital camera or mobile device.

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.*

- **8.1.P.C.1** Collaborate with peers by participating in interactive digital games or activities.

E: Research and Information Fluency: *Students apply digital tools to gather, evaluate, and use information.*

8.1.P.E.1 Use the Internet to explore and investigate questions with a teacher's support.

Grade Level Band K-2

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.*

8.1.2.A.1 Identify the basic features of a digital device and explain its purpose.

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.

B. Creativity and Innovation: *Students demonstrate creative thinking, construct knowledge and develop innovative products and process using technology.*

8.1.2.B.1 Illustrate and communicate original ideas and stories using multiple digital tools and resourses.

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.*

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.

D. Digital Citizenship: *Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.*

8.1.2.D.1 Develop an understanding of ownership of print and non-print information.

E: Research and Information Fluency: *Students apply digital tools to gather, evaluate, and use information.*

8.1.2.E.1 Use digital tools and online resources to explore a problem or issue.

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.*

8.1.2.F.1 Use geographic mapping tools to plan and solve problems.

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.

Strand

A. The Nature of Technology: Creativity and Innovation *Technology systems impact every aspect of the world in which we live.*

- **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 school, home and work.
- **8.2.2.A.3** Identify a system and the components that work together to accomplish its purpose.
- **8.2.2.A.4** Choose a product to make and plan the tools and materials needed.
- **8.2.2.A.5** Collaborate to design a solution to a problem affecting the community.

B. Technology and Society: *Knowledge and understanding of human, cultural and society values are fundamental when designing technology systems and products in the global society.*

- **8.2.2.B.1** Identify how technology impacts or improves life.
- **8.2.2.B.2** Demonstrate how reusing a product affects the local and global environment.
- **8.2.2.B.3** Identify products or systems that are designed to meet human needs.
- **8.2.2.B.4** Identify how the ways people live and work has changed because of technology.

C. Design: *The design process is a systematic approach to solving problems.*

- **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 function to peers and discuss.
- **8.2.2.C.3** Explain why we need to make new products.
- **8.2.2.C.4** Identify designed products and brainstorm how to improve one used in the classroom.
- **8.2.2.C.5** Describe how the parts of a common toy or tool interact and work as part of a system.
- **8.2.2.C.6** Investigate a product that has stopped working and brainstorm ideas to correct the problem.

D. Abilities for a Technological World: *The designed world is the product of a design process that provides the means to convert resources into products and systems.*

- **8.2.2.D.1** Collaborate and apply a design process to solve a simple problem from everyday experiences.
- **8.2.2.D.2** Discover how a product works by taking it apart, sketching how parts fit, and putting it 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 or systems.
- **8.2.2.D.5** Identify how using a tool (such as a bucket or wagon) aids in reducing work.

E. Computational Thinking: Programming: *Computational thinking builds and enhances problem solving, allowing students to move beyond using knowledge to creating knowledge.*

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 input through a series of written commands and then interprets and displays information as output.

8.2.2.E.3 Create algorithms (a sets of instructions) using a pre-defined set of commands (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 vocabulary words: input, output, the operating system, debug, and algorithm).

Grade Level Band 3-5

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.*

8.1.5.A.1 Select and use the appropriate digital tools and resources to accomplish a variety of tasks including solving problems.

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.

B. Creativity and Innovation: *Students demonstrate creative thinking, construct knowledge and develop innovative products and process using technology.*

8.1.5.B.1 Collaborative to produce a digital story about a significant local event or issue based on first-person interviews.

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.*

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.

D. Digital Citizenship: *Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.*

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.

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.

8.1.5.D.4 Understand digital citizenship and demonstrate an understanding of the personal consequences of inappropriate use of technology and social media.

E: Research and Information Fluency: *Students apply digital tools to gather, evaluate, and use information.*

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.

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.*

8.1.5.F.1 Apply digital tools to collect, organize, and analyze data that support a scientific finding.

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.

Strand

A. The Nature of Technology: Creativity and Innovation *Technology systems impact every aspect of the world in which we live.*

8.2.5.A.1 Compare and contrast how products made in nature differ from products that are human made in how they are produced and used.

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

8.2.5.A.3 Investigate and present factors that influence the development and function of products and systems, e.g., resources, criteria and constraints.

8.2.5.A.4 Compare and contrast how technologies have changed over time due to human needs and economic, political and/or cultural influences.

8.2.5.A.5 Identify how improvement in the understanding of materials science impacts technologies.

B. Technology and Society: *Knowledge and understanding of human, cultural and society values are fundamental when designing technology systems and products in the global society.*

8.2.5.B.1 Examine ethical considerations in the development and production of a product through its life cycle.

8.2.5.B.2 Examine systems used for recycling and recommend simplification of the systems and share with product developers.

8.2.5.B.3 Investigate ways that various technologies are being developed and used to reduce

improper use of resources.

8.2.5.B.4 Research technologies that have changed due to society's changing needs and wants.

8.2.5.B.5 Explain the purpose of intellectual property law.

8.2.5.B.6 Compare and discuss how technologies have influenced history in the past century.

C. Design: *The design process is a systematic approach to solving problems.*

8.2.5.C.1 Collaborate with peers to illustrate components of a designed system.

8.2.5.C.2 Explain how specifications and limitations can be used to direct a product's development.

8.2.5.C.3 Research how design modifications have lead to new products.

8.2.5.C.4 Collaborate and brainstorm with peers to solve a problem evaluating all solutions to provide the best results with supporting sketches or models.

8.2.5.C.5 Explain the functions of a system and subsystems.

8.2.5.C.6 Examine a malfunctioning tool and identify the process to troubleshoot and present options to repair the tool.

8.2.5.C.7 Work with peers to redesign an existing product for a different purpose.

D. Abilities for a Technological World: *The designed world is the product of a design process that provides the means to convert resources into products and systems.*

8.2.5.D.1 Identify and collect information about a problem that can be solved by technology, generate ideas to solve the problem, and identify constraints and trade-offs to be considered.

8.2.5.D.2 Evaluate and test alternative solutions to a problem using the constraints and trade-offs identified in the design process to evaluate potential solutions.

8.2.5.D.3 Follow step by step directions to assemble a product or solve a problem.

8.2.5.D.4 Explain why human-designed systems, products, and environments need to be constantly monitored, maintained, and improved.

8.2.5.D.5 Describe how resources such as material, energy, information, time, tools, people and capital are used in products or systems.

8.2.5.D.6 Explain the positive and negative effect of products and systems on humans, other species and the environment, and when the product or system should be used.

8.2.5.D.7 Explain the impact that resources such as energy and materials used in a process to produce products or system have on the environment.

E. Computational Thinking: Programming: *Computational thinking builds and enhances problem solving, allowing students to move beyond using knowledge to creating knowledge.*

8.2.5.E.1 Identify how computer programming impacts our everyday lives.

8.2.5.E.2 Demonstrate an understanding of how a computer takes input of data, processes and stores the data through a series of commands, and outputs information.

8.2.5.E.3 Using a simple, visual programming language, create a program using loops, events and procedures to generate specific output.

8.2.5.E.4 Use appropriate terms in conversation (e.g., algorithm, program, debug, loop, events, procedures, memory, storage, processing, software, coding, procedure, and data).

Grade Level Band 6-8

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.*

8.1.8.A.1 Demonstrate knowledge of a real world problem using digital tools.

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.

B. Creativity and Innovation: *Students demonstrate creative thinking, construct knowledge and develop innovative products and process using technology.*

8.1.8.B.1 Synthesize and publish information about a local or global issue or event (ex. telecollaborative project, blog, school web).

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.*

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.

D. Digital Citizenship: *Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.*

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.

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.

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.

E: Research and Information Fluency: *Students apply digital tools to gather, evaluate, and use information.*

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.

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.*

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.

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.

Strand

A. The Nature of Technology: Creativity and Innovation *Technology systems impact every aspect of the world in which we live.*

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).

8.2.8.A.2 Examine a system, consider how each part relates to other parts, and discuss a part to redesign
to improve the system.

8.2.8.A.3 Investigate a malfunction in any part of a system and identify its impacts.

8.2.8.A.4 Redesign an existing product that impacts the environment to lessen its impact(s) on the environment.

8.2.8.A.5 Describe how resources such as material, energy, information, time, tools, people, and capital contribute to a technological product or system.

B. Technology and Society: *Knowledge and understanding of human, cultural and society values are fundamental when designing technology systems and products in the global society.*

8.2.8.B.1 Evaluate the history and impact of sustainability on the development of a designed product or system over time and present results to peers.

8.2.8.B.2 Identify the desired and undesired consequences from the use of a product or system.

8.2.8.B.3 Research and analyze the ethical issues of a product or system on the environment and report findings for review by peers and /or experts.

8.2.8.B.4 Research examples of how humans can devise technologies to reduce the negative consequences of other technologies and present your findings.

8.2.8.B.5 Identify new technologies resulting from the demands, values, and interests of individuals, businesses, industries and societies.

8.2.8.B.6 Compare and contrast the different types of intellectual property including copyrights, patents and trademarks.

8.2.8.B.7 Analyze the historical impact of waste and demonstrate how a product is upcycled, reused or remanufactured into a new product.

C. Design: *The design process is a systematic approach to solving problems.*

- **8.2.8.C.1** Explain how different teams/groups can contribute to the overall design of a product.
- **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 product or system, from the perspective of the user and the producer.
- **8.2.8.C.4** Identify the steps in the design process that would be used to solve a designated problem.
- **8.2.8.C.5** Explain the interdependence of a subsystem that operates as part of a system. Create a technical sketch of a product with materials and measurements labeled.
- **8.2.8.C.6** Collaborate to examine a malfunctioning system and identify the step-by-step process used to troubleshoot, evaluate and test options to repair the product, presenting the better solution.
- **8.2.8.C.7** Collaborate with peers and experts in the field to research and develop a product using the design process, data analysis and trends, and maintain a design log with annotated sketches to record the developmental cycle.
- **8.2.8.C.8** Develop a proposal for a chosen solution that include models (physical, graphical or mathematical) to communicate the solution to peers.

D. Abilities for a Technological World: *The designed world is the product of a design process that provides the means to convert resources into products and systems.*

- **8.2.8.D.1** Design and create a product that addresses a real world problem using a design process under specific constraints.
- **8.2.8.D.2** Identify the design constraints and trade-offs involved in designing a prototype (e.g., how the prototype might fail and how it might be improved) by completing a design problem and reporting results in a multimedia presentation, design portfolio or engineering notebook.
- **8.2.8.D.3** Build a prototype that meets a STEM-based design challenge using science, engineering, and math principles that validate a solution.
- **8.2.8.D.4** Research and publish the steps for using and maintaining a product or system and incorporate diagrams or images throughout to enhance user comprehension.
- **8.2.8.D.5** Explain the impact of resource selection and the production process in the development of a common or technological product or system.
- **8.2.8.D.6** Identify and explain how the resources and processes used in the production of a current technological product can be modified to have a more positive impact on the environment.

E. Computational Thinking: Programming: *Computational thinking builds and enhances problem solving, allowing students to move beyond using knowledge to creating knowledge.*

- **8.2.8.E.1** Identify ways computers are used that have had an impact across the range of human activity and within different careers where they are used.
- **8.2.8.E.2** Demonstrate an understanding of the relationship between hardware and software.
- **8.2.8.E.3** Develop an algorithm to solve an assigned problem using a specified set of commands and use peer review to critique the solution.
- **8.2.8.E.4** Use appropriate terms in conversation (e.g., programming, language, data, RAM, ROM, Boolean logic terms).

III. ESSENTIAL UNDERSTANDINGS

Pre-K: Essential Understandings

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 will:

- Understand and use technology systems.
- Select and use applications effectively and productively

B. Creativity and Innovation:

Students will:

- Apply existing knowledge to generate new ideas, products, or processes.
- Create original works as a means of personal or group expression.

C. Communication and Collaboration:

Students will:

- 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.

D. Digital Citizenship:

Students will:

- Advocate and practice safe, legal, and responsible use of information and technology.

E: Research and Information Fluency:

Students will:

- Plan strategies to guide inquiry.

K-2: Essential Understandings

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 will:

- Understand and use technology systems.
- Select and use applications effectively and productively.

B. Creativity and Innovation:

Students will:

- Apply existing knowledge to generate new ideas, products, or processes.
- Create original works as a means of personal or group expression.

C. Communication and Collaboration:

Students will:

- 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.

D. Digital Citizenship:

Students will:

- Advocate and practice safe, legal, and responsible use of information and technology.

E: Research and Information Fluency:

Students will:

- 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.

F: Critical thinking, problem solving, and decision making:

Students will:

- 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.

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.

Strand

A. The Nature of Technology: Creativity and Innovation

Students will be able to understand:

- The characteristics and scope of technology.
- The core concepts of technology.
- The relationships among technologies and the connections between technology and other fields of study.

B. Technology and Society:

Students will be able to understand:

- The cultural, social, economic and political effects of technology.
- The effects of technology on the environment.
- The role of society in the development and use of technology.
- The influence of technology on history.

C. Design:

Students will be able to understand:

- The attributes of design.
- The application of engineering design.
- The role of troubleshooting, research and development, invention and innovation and experimentation in problem solving.

D. Abilities for a Technological World:

Students will be able to understand:

- Apply the design process.
- Use and maintain technological products and systems.
- Assess the impact of products and systems.

E. Computational Thinking: Programming: Students will be able to understand:

- Computational thinking and computer programming as tools used in design and engineering.

Grades 3-5: Essential Understandings

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 will:

- Understand and use technology systems.
- Select and use applications effectively and productively.

B. Creativity and Innovation:
Students will:

- Apply existing knowledge to generate new ideas, products, or processes.
- Create original works as a means of personal or group expression.

C. Communication and Collaboration:
Students will:

- 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.

D. Digital Citizenship:
Students will:

- Advocate and practice safe, legal, and responsible use of information and technology.
- Demonstrate personal responsibility for lifelong learning.
- Exhibit leadership for digital citizenship.

E: Research and Information Fluency:
Students will:

- 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.

F: Critical thinking, problem solving, and decision making:
Students will:

- 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

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.

Strand

A. The Nature of Technology: Creativity and Innovation

Students will be able to understand:

- The characteristics and scope of technology.
- The core concepts of technology.
- The relationships among technologies and the connections between technology and other fields of study.

B. Technology and Society:

Students will be able to understand:

- The cultural, social, economic and political effects of technology.
- The effects of technology on the environment.
- The role of society in the development and use of technology.
- The influence of technology on history.

C. Design:

Students will be able to understand:

- The attributes of design.
- The application of engineering design.
- The role of troubleshooting, research and development, invention and innovation and experimentation in problem solving.

D. Abilities for a Technological World:

Students will be able to understand:

- Apply the design process.
- Use and maintain technological products and systems.
- Assess the impact of products and systems.

E. Computational Thinking: Programming:

Students will be able to understand:

- Computational thinking and computer programming as tools used in design and engineering.

Grades 6-8: Essential Understandings

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 will:

- Understand and use technology systems.
- Select and use applications effectively and productively.

B. Creativity and Innovation:
Students will:.

- Apply existing knowledge to generate new ideas, products, or processes.
- Create original works as a means of personal or group expression.

C. Communication and Collaboration:
Students will:

- 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.

D. Digital Citizenship:
Students will:

- Advocate and practice safe, legal, and responsible use of information and technology.
- Demonstrate personal responsibility for lifelong learning.
- Exhibit leadership for digital citizenship.

E: Research and Information Fluency:
Students will:

- 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.

F: Critical thinking, problem solving, and decision making:.
Students will:

- 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.

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.

Strand
A. The Nature of Technology: Creativity and Innovation
Students will be able to understand:

- The characteristics and scope of technology.

- The core concepts of technology.
- The relationships among technologies and the connections between technology and other fields of study.

B. Technology and Society:

Students will be able to understand:

- The cultural, social, economic and political effects of technology.
- The effects of technology on the environment.
- The role of society in the development and use of technology.
- The influence of technology on history.

C. Design:

Students will be able to understand:

- The attributes of design.
- The application of engineering design.
- The role of troubleshooting, research and development, invention and innovation and experimentation in problem solving.

D. Abilities for a Technological World:

Students will be able to understand:

- Apply the design process.
- Use and maintain technological products and systems.
- Assess the impact of products and systems.

E. Computational Thinking: Programming:

Students will be able to understand:

- Computational thinking and computer programming as tools used in design and engineering.

IV. STRATEGIES

- Teacher presentation
- Inquiry experiences
- Group or individual projects
- Small Group instruction

V. EVALUATION

Assessments may include but are not limited to:

- Teacher Observations
- Anecdotal Records
- Class Participation
- Homework Assignments
- Notebooks/Journals
- Project-based rubrics
- Unit Tests, Quizzes
- Project presentations

VI. REQUIRED RESOURCES

May include but are not limited to:

- Bee Bots
- Makey Makey Boards
- Lego Robotics
- Pro-Bots

Supplemental Materials:

- Brain Pop
- Hour of Code
- Edheads
- Coding Software

VII. SCOPE AND SEQUENCE

Pre-K

- Find buttons and icons on the computer screen to make simple programs work
- Use simple computerized desktop, laptop, and handheld devices that require interaction
- Use the computer to play simple games
- Use touch screen, mouse, or keys effectively

Grades K-2

- Use basic technology vocabulary and features of an operating system
- Create and maintain files and folders
- Use basic computer icons
- Know some favorite websites and use them to get information
- Bookmark favorite sites
- Demonstrate correct keyboarding techniques
- Use a simple search engine to find information
- Produce a finished document using word processing / publishing processing software
  Suggested Projects
  - digital presentation of a life cycle
  - use of digital photos for data collection
  - word process a final draft of writing for publishing

Grades 3-5

- Demonstrate effective input of text and data, using touch keyboarding/touch screen with proper technique.
- Create documents with advanced text-formatting and graphics using word processing.
- Use programing language to complete a task
- Practice safe, legal and responsible use of information and technology while using the Internet during information gathering.
- Evaluate and select information sources and digital tools based on the appropriateness for specific assignments and tasks
- Plan, organize and manage activities to develop a solution or complete a project
- Use, add and collaborate on shared documents

- Use computer applications to modify information independently and/or collaboratively to solve problems.
- Produce a multimedia project using text, graphics, moving images, and sound
- Draw information from both text (print) and non-text (photos, illustrations)
- Recognize that information is framed by the source's point of view and use this information to detect bias on websites

  Suggested Projects
  - use of spreadsheet applications to record and analyze data
  - collaborate on and submit group presentations digitally
  - code a simple computer program to complete a task
  - word process a final draft of writing for publishing

Grades 6-8

- Use technology tools for research and problem solving across curriculum areas
- Demonstrate effective input of text and data, using touch keyboarding with proper technique
- Create documents with advanced text-formatting and graphics using word processing
- Construct a simple spreadsheet, enter data, and interpret the information
- Use computer applications to modify information independently and/or collaboratively to solve problems.
- Determine when technology tools are appropriate to solve problem and make a decision
- Communicate knowledge through multimedia presentations, desktop published reports, and other electronic media
- Locate and validate information on the Internet
- Understand the importance of multiple sites and sources for research

  Suggested Projects
  - use of spreadsheet applications to record and analyze data
  - word process a final draft of writing for publishing

PENDING ATTACHMENTS:

- Innovation and Design Units for Grades 4-5
- Innovation and Design Units for Grades 6-8