Harrison Township School District
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Technology

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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.

"A major consequence of accelerating technological change is a difference in levels of technological ability and understanding. The workforce of the future must have the ability to use, manage, and understand technology." – International Technology and Engineering Educators Association

The design process builds in our students the recognition that success is not merely identifying a problem but working through a process and that failure is not an end but rather a point for reevaluation. Whether applied as a skill in product development, in the learning environment, in daily life, in a local or more global arena, the design process supports students in their paths to becoming responsible, effective citizens in college, careers and life.

Computational thinking provides an organizational means of approaching life and its tasks. It develops an understanding of technologies and their operations and provides students with the abilities to build and create knowledge and new technologies. Not all students will be programmers, but they should have an understanding of how computational thinking can build knowledge and control technology.

Accessed on October 1, 2014 (http://www.state.nj.us/education/aps/cccs/tech/)

The goals that follow provide direction for basic technology proficiencies while considering the various levels of complexity expected at the different grade levels. The 8.1 and 8.2 standards were recently (October 1, 2014) adopted by the NJ DOE and are under review at all grade levels in Harrison Township. Our current technology-based projects and learning activities address many but not all of the adopted standards. Full alignment is anticipated for the 2015-16 school year.

Grade K-2 Technology Goals

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 digital knowledge.

- A. Technology Operations and Concepts: *Students demonstrate a sound understanding of technology concepts, systems, and operations.*
    - a. Use an input device (MicroSoft/Chrome/iPad) to select an item and navigate the screen
    - b. Use digital devices to create stories with pictures, numbers, letters and word (e.g. Word, Google Docs, Crayola.com, Seussville.com, reading Maze, Kidspiration, etc.)
    - c. Use basic technology terms in the proper context in conversation with peers and teachers (e.g. camera, tablet, Internet, mouse, keyboards, and printer)
    - d. Demonstrate the ability to access and use resources on computing device (MicroSoft/Chrome/iPad)
    - e. Identify the basic features of a digital device and explain its purpose.
    - f. Create a document using a word processing application (e.g. Word, Google Docs, note pad).
    - g. Compare the common use of at least two different digital applications and identify the advantages and disadvantages of each (Word vs Google Docs & Skype/Blackboard vs Facetime)
    - h. Demonstrate developmentally appropriate navigation skills in virtual environments (i.e. games, museums; e.g. keyboarding, Google Docs)
    - i. Enter information into a spreadsheet and sort the information
    - j. Identify the structure and components of a database
    - k. Enter information into a spreadsheet and filter the information

- B. Creativity and Innovation: *Students demonstrate creative thinking, construct knowledge, and develop innovative products and process using technology.*
    - a. Create a story about a picture taken by the student on a digital camera or mobile device (Kidspiration, Kid Pix, Kid Pix 5, Story Time, etc.)
    - b. Illustrate and communicate original ideas and stories using multiple digital tools and resources

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.*
    a. Collaborate with peers by participating in interactive digital games or activities (keyboarding, Reflex Math, Math Expressions)
    b. 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 (*under development*)

D. Digital Citizenship: *Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.*
    a. 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.*
    a. Use the internet to explore and investigate questions with a teacher's support
    b. 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.*
    a. Use geographic mapping tools (Google Maps, MapQuest) to plan and solve problems

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 (*under review*).

A. The Nature of Technology: Creativity and Innovation: *Technology systems impact every aspect of the world in which we live (*under development*).*
    a. Define products produced as a result of technology or of nature
    b. Describe how defined products and systems are useful at school, home, and work
    c. Identify a system and the components that work together to accomplish its purpose
    d. Chose a product to make and plan the tools and materials needed
    e. 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 (*under development*).*
   a. Identify how technology impacts or improves life
   b. Demonstrate how reusing a product affects the local and global environment
   c. Identify products or systems that are designed to meet human needs
   d. 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 (*under development*).*
   a. Brainstorm ideas on how to solve a problem or build a product
   b. Create a drawing of a product or device that communicates its functions to peers and discuss
   c. Explain why we need to make new products
   d. Identify designed products and brainstorm how to improve one used in the classroom
   e. Describe how the parts of a common toy or tool interact and work as part of a system
   f. 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 (*under development*).*
   a. Collaborate and apply a design process to sole a simple problem from everyday experiences
   b. Discover how a product works by taking it apart, sketching how parts fit, and putting it back together
   c. Identify the strengths and weaknesses in a product or system
   d. 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.*
   a. List and demonstrate the steps to an everyday task
   b. Demonstrate an understanding of how a computer takes input through a series of written commands and then interprets and displays information as output
   c. Create algorithms (sets of instructions) using a pre-defined set of commands (e.g. to move a student or character through a maze) (*under development*)
   d. Debug an algorithm (i.e. correct an error)
   e. Use appropriate terms in conversation (e.g. basic vocabulary words: input, output, operating system, debug, and algorithm)

Grade 3-5 Technology Goals

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 digital knowledge.

    A. Technology Operations and Concepts: *Students demonstrate a sound understanding of technology concepts, systems, and operations.*
   a. Select and use the appropriate digital tools and resources to accomplish a variety of tasks including solving problems
   b. Format a document using a word processing application to enhance text and include graphics, symbols, and/or pictures
   c. Use a graphic organizer to organize information about a problem or issue
   d. Graph data using a spreadsheet, analyze and produce a report that explains the analysis of data
   e. Create and use a database to answer basic questions
   f. 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.*
   a. Collaborate to produce a digital story about a significant local event or issue based on first-person interviews (*under review*)

    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.*
   a. 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 (*under development*)

    D. Digital Citizenship: *Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.*
   a. Understand the need for and use of copyrights
   b. Analyze resource citations in online materials for proper use
   c. Demonstrate an understanding of the need to practice cyber safety, cyber security, and cyber ethics when using technologies and social media
   d. 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.*
   a. Use digital tools and online resources to research the accuracy of, relevance of, 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.*
  a. Apply digital tools to collect, organize, and analyze data that support a scientific finding

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.

A. The Nature of Technology: Creativity and Innovation: *Technology systems impact every aspect of the world in which we live (*under development*).*
  a. Compare and contrast how products made in nature differ from products that are human made in how they are produced and used
  b. Investigate and present factors that influence the development and function of products and systems, e.g. resources, criteria, and constraints
  c. Compare and contrast how technologies have changed over time due to human needs and economic, political and/or cultural influences
  d. 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 (*under development*).*
  a. Examine ethical considerations in the development and production of a product through its lie cycle
  b. Examine systems used for recycling and recommend simplifications of the system and share with product developers
  c. Investigate ways that various technologies are being developed and used to reduce improper uses of resources
  d. Research technologies that have changed due to society's changing needs and wants
  e. Explain the purpose of intellectual property law
  f. Compare and discuss how technologies have influenced history in the past century

C. Design: *The design process is a systematic approach to solving problems (*under development*).*
   a. Collaborate with peers to illustrate components of a designed system
   b. Explain how specifications and limitations can be used to direct a product's development
   c. Research how design modifications have led to new products
   d. Collaborate and brainstorm with peers to solve a problem evaluating all solutions to provide the best results with supporting sketches or models
   e. Explain the functions of a system and subsystems
   f. Examine a malfunctioning tool and identify the process to process to troubleshoot and present options to repair the tool
   g. 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 (*under review and development*).*
   a. 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
   b. Evaluate and test alternative solutions to a problem using the constraints and trade-offs identified in the design process to evaluate potential solutions
   c. Follow step-by-step directions to assemble a product or solve a problem
   d. Explain why human-designed systems, products, and environments need to be constantly monitored, maintained, and improved
   e. Describe how resources such as material, energy, information, time, tools, people, and capital are used in products or systems
   f. Explain the positive and negative effects of a products and systems on humans, other species, and the environment, and when the product or system should be used
   g. Explain the impact that resources such as energy and materials used in a process to produce products or systems 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.*
   a. Identify how computer programming impacts are everyday lives
   b. Demonstrate and understanding of how a computers takes input of data, processes and stores the data through a series of commands, and outputs information
   c. Using a simple, visual programming language, create a program using loops, events, and procedures to generate specific output (*under development*)
   d. Use appropriate terms in conversation (e.g. algorithm, program, debug, loops, events, procedures, memory, storage, processing, software, coding, and data)

Grade 6 Technology Goals

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 digital knowledge.

A. Technology Operations and Concepts: *Students demonstrate a sound understanding of technology concepts, systems, and operations.*
   a. Demonstrate knowledge of a real world problem using digital tools
   b. 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
   c. Graph and calculate data within a spreadsheet and present a summary of the results

B. Creativity and Innovation: *Students demonstrate creative thinking, construct knowledge, and develop innovative products and process using technology.*
   a. Synthesize and publish information about a local or global issue or school event (e.g. 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.*
   a. Collaborate to develop and publish work that provides perspectives on a global problem for discussion with learners from other countries (*under development*)

D. Digital Citizenship: *Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.*
   a. Understand and model appropriate online behaviors related to cyber safety, cyber bulling, cyber security, and cyber ethics including the appropriate use of social media
   b. Demonstrate the application of appropriate citations to digital content
   c. Demonstrate an understanding of fair use and Creative Commons to intellectual property
   d. Assess the credibility and accuracy of digital content
   e. Understand appropriate uses for social media and negative consequences if misuse

E. Research and Information Fluency: *Students apply digital tools to gather, evaluate, and use information.*
   a. Effectively use a variety of research tools and filters in professional public data bases (ERIC) to find information to solve real world problems (*under review*)

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 (*under review*).*
   a. Explore a local issue, by using digital tools to collect and analyze data to identify a solution and make an informed decision

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 (*under review*).

A. The Nature of Technology: Creativity and Innovation: *Technology systems impact every aspect of the world in which we live.*
   a. 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)
   b. Examine a system, consider how each part relates to other parts, and discuss a part to redesign to improve the system
   c. Investigate a malfunction in any part of a system and identify its impact
   d. Redesign an existing product that impacts the environment to lessen its impact(s) on the environment
   e. 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 (*under review*).*
   a. Identify the desired and undesired consequences from the use of a product or system
   b. Research and analyze the ethical issues of a product or system on the environment and report findings for review by peers and/or experts
   c. Compare and contrast the different types of intellectual property including copyrights, patents, and trademarks
   d. 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 (*under review*).*
   a. Explain how different teams/groups can contribute to the overall design of a product
   b. Explain the need for optimization in a design process
   c. Evaluate the function, value, and aesthetic of a technological product or system, from the perspective of the user and the producer
   d. Create a technical sketch of a product with materials and measurements labeled

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 (*under development*).*
   a. Design and create a product that addresses real world problems using a design process under specific constraints
   b. Build a prototype that meets STEM-based design challenge using science, engineering, and math principles that validate a solution
   c. 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.*
   a. Identify ways computers are used that have had an impact across the range of human activity and within different careers where they are used
   b. Demonstrate and understanding of the relationship between hardware and software
   c. Use appropriate terms in conversation (e.g. programming, language, RAM, ROM, Boolean logic terms)