

Content Area	Technology
Standard	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 COLLABORATIVELY TO CREATE AND COMMUNICATE KNOWLEDGE.
Strand	A. Technology Operations and Concepts

By the end of grade	Content	CPI #	CPI
Preschool	Preschool Teaching and Learning Standards of Quality		
2	The use of technology and digital tools requires knowledge and appropriate use of operations and related applications .	8.1.2.A.1	Identify the basic features of a computer and explain how to use them effectively.
		8.1.2.A.2	Use technology terms in daily practice.
		8.1.2.A.3	Discuss the common uses of computer applications and hardware and identify their advantages and disadvantages.
		8.8.2.A.4	Create a document with text using a word processing program.
		8.1.2.A.5	Demonstrate the ability to navigate in developmentally appropriate virtual environments .
4	The use of technology and digital tools requires knowledge and appropriate use of operations and related applications .	8.1.4.A.1	Demonstrate effective input of text and data using an input device.
		8.1.4.A.2	Create a document with text formatting and graphics using word processing.
		8.1.4.A.3	Create and present a multimedia presentation that includes graphics.
		8.1.4.A.4	Create a simple spreadsheet, enter data, and interpret the information.
		8.1.4.A.5	Determine the benefits of a wide range of digital tools by using them to solve problems.

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8	The use of technology and digital tools requires knowledge and appropriate use of operations and related applications .	8.1.8.A.1	Create professional documents (e.g., newsletter, personalized learning plan, business letter or flyer) using advanced features of a word processing program.
		8.1.8.A.2	Plan and create a simple database, define fields, input data and produce a report using sort and query.
		8.1.8.A.3	Create a multimedia presentation including sound and images.
		8.1.8.A.4	Generate a spreadsheet to calculate, graph and present information.
		8.1.8.A.5	Select and use appropriate tools and digital resources to accomplish a variety of tasks and to solve problems.
12	The use of technology and digital tools requires knowledge and appropriate use of operations and related applications .	8.1.12.A.1	Construct a spreadsheet, enter data, and use mathematical or logical functions to manipulate data, generate charts and graphs and interpret the results.
		8.1.12.A.2	Produce and edit a multi-page document for a commercial or professional audience using desktop publishing and/or graphic software.
		8.1.12.A.3	Participate in online courses, learning communities, social networks or a virtual world as resources for lifelong learning.
		8.1.12.A.4	Create a personalized digital portfolio that contains a resume, exemplary projects and activities reflecting personal and academic interests, achievements, and career aspirations.

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Strand	B. Creativity and Innovation

By the end of grade	Content	CPI #	CPI
Preschool	Preschool Teaching and Learning Standards of Quality		
2	The use of digital tools enhances creativity and the construction of knowledge.	8.1.2.B.1	Illustrate and communicate original ideas and stories using digital tools and media-rich resources .
4	The use of digital tools enhances creativity and the construction of knowledge.	8.1.4.B.1	Produce a media-rich digital story about a significant local event or issue based on first-person interviews.
8	The use of digital tools enhances creativity and the construction of knowledge.	8.1.8.B.1	Synthesize and publish information about a local or global issue or event on a web-based shared hosted service .
12	The use of digital tools enhances creativity and the construction of knowledge.	8.1.12.B.1	Design and pilot a digital learning game to demonstrate knowledge and skills related to one or more content areas or a real world situation.

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Strand	C. Communication and Collaboration

By the end of grade	Content	CPI #	CPI
Preschool	Preschool Teaching and Learning Standards of Quality		
2	Digital tools and environments support the learning process and foster collaboration in solving local or global issues and problems.	8.1.2.C.1	Engage in a variety of developmentally appropriate learning activities with students in other classes, schools or countries using electronic tools.
4	Digital tools and environments support the learning process and foster collaboration in solving local or global issues and problems.	8.1.4.C.1	Engage in online discussions with learners in the United States or from other countries to understand their perspectives on a global problem / issue.
8	Digital tools and environments support the learning process and foster collaboration in solving local or global issues and problems.	8.1.8.C.1	Participate in an online learning community with learners from other countries to understand their perspectives on a global problem / issue and propose possible solutions.
12	Digital tools and environments support the learning process and foster collaboration in solving local or global issues and problems.	8.1.12.C.1	Develop an innovative solution to a complex local or global problem / issue in collaboration with peers and experts and present ideas for feedback in an online community.

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Strand	D. Digital Citizenship

By the end of grade	Content	CPI #	CPI
Preschool	Preschool Teaching and Learning Standards of Quality		
2	Technological advancements create societal concerns regarding the practice of safe, legal and ethical behaviors.	8.1.2.D.1	Model legal and ethical behaviors when using both print and non-print information by citing resources.
4	Technological advancements create societal concerns regarding the practice of safe, legal and ethical behaviors.	8.1.4.D.1	Explain the need for individuals and members of the global community to practice cyber safety, cyber security, and cyber ethics when using existing and emerging technologies.
		8.1.4.D.2	Analyze the need for and use of copyrights.
		8.1.4.D.3	Explain the purpose of an Acceptable Use Policy (AUP) and the consequences of inappropriate use of technology.
8	Technological advancements create societal concerns regarding the practice of safe, legal and ethical behaviors.	8.1.8.D.1	Model appropriate online behaviors related to cyber safety, cyber bullying, cyber security, and cyber ethics.
		8.1.8.D.2	Summarize the application of fair use and creative commons.
		8.1.8.D.3	Demonstrate how information may be biased on a controversial issue .

By the end of grade	Content	CPI #	CPI
12	Technological advancements create societal concerns regarding the practice of safe, legal and ethical behaviors.	8.1.12.D.1	Evaluate policies on unauthorized electronic access (hacking) and disclosure, and dissemination of personal information.
		8.1.12.D.2	Demonstrate appropriate use of copyrights, fair use and creative commons.
		8.1.12.D.3	Compare and contrast international government policies on filters for censorship.
		8.1.12.D.4	Explain the impact of cyber crimes on society.

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Strand	E. Research and Information Literacy

By the end of grade	Content	CPI #	CPI
Preschool	Preschool Teaching and Learning Standards of Quality		
2	Effective use of digital tools assists in gathering and managing information.	8.1.2.E.1	Explore a problem / issue affecting children using digital tools and online resources and discuss possible solutions.
4	Effective use of digital tools assists in gathering and managing information.	8.1.4.E.1	Investigate a problem / issue found in the United States and / or another country from multiple perspectives using digital tools and online resources and evaluate findings to present possible solutions.
		8.1.4.E2	Evaluate the accuracy, relevance, and appropriateness of print and non-print electronic information sources to complete a variety of tasks.
8	Effective use of digital tools assists in gathering and managing information.	8.1.8.E.1	Gather and analyze findings to produce a possible solution for a content-related or real world problem using data collection technology .
12	Effective use of digital tools assists in gathering and managing information.	8.1.12.E.1	Develop a systematic plan of investigation with peers and experts from other countries to produce an innovative solution to a state, national or worldwide issue.
		8.1.12.E.2	Predict the impact on society of unethical use of digital tools based on research with peers and experts in the field.

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Strand	F. Critical Thinking, Problem Solving, and Decision Making

By the end of grade	Content	CPI #	CPI
Preschool	Preschool Teaching and Learning Standards of Quality		
2	Information accessed through the use of digital tools assists in generating solutions and making decisions.	8.1.2.F.1	Use mapping tools to plan and choose alternate routes to and from various locations.
4	Information accessed through the use of digital tools assists in generating solutions and making decisions.	8.1.4.F.1	Select and apply digital tools to collect, organize, and analyze data that support a scientific finding.
8	Information accessed through the use of digital tools assists in generating solutions and making decisions.	8.1.8.F.1	Use an electronic authoring tool in collaboration with learners from other countries to evaluate and summarize the perspectives of other cultures about a current event or contemporary figure.
12	Information accessed through the use of digital tools assists in generating solutions and making decisions.	8.1.12.F.1	Select and use specialized databases for advanced research to solve real world problems.
		8.1.12.F.2	Analyze the capabilities and limitations of current and emerging technology resources and assess their potential to address educational, career, personal, and social needs.

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Standard	8.2 Technology Education, Engineering and Design ALL STUDENTS WILL DEVELOP AN UNDERSTANDING OF THE NATURE AND IMPACT OF TECHNOLOGY, ENGINEERING, TECHNOLOGICAL DESIGN AND THE DESIGNED WORLD AS THEY RELATE TO THE INDIVIDUAL, GLOBAL SOCIETY, AND THE ENVIRONMENT.
Strand	A. Nature of Technology: Creativity and Innovation

By the end of grade	Content	CPI #	CPI
Preschool	Preschool Teaching and Learning Standards of Quality		
2	Technology systems impact every aspect of the world in which we live.	8.2.2.A.1	Describe how technology's products, systems and resources are useful tools at school, home and work.
4	Technology systems impact every aspect of the world in which we live.	8.2.4.A.1	Investigate factors that influence the development and function of products and systems.
		8.2.4.A.2	Compare and contrast how a product has changed over time due to economic, political and / or cultural influences using a digital format.
8	Technology systems impact every aspect of the world in which we live.	8.2.8.A.1	Explain the impact of globalization on the development of a technological system over time.
12	Technology systems impact every aspect of the world in which we live.	8.2.12.A.1	Design and create a technology product or system that improves the quality of life and identify trade-offs, risks and benefits.

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Strand	B. Design: Critical Thinking, Problem Solving, and Decision Making

By the end of grade	Content	CPI #	CPI
Preschool	Preschool Teaching and Learning Standards of Quality		
2	The design process is a systematic approach to solving problems.	8.2.2.B.1	Brainstorm and devise a plan to repair a broken toy / tool using the design process.
		8.2.2.B.2	Investigate the influence of a specific technology on the individual, family, community and environment.
4	The design process is a systemic approach to solving problems.	8.2.4.B.1	Develop a product using an online simulation that explores the design process.
		8.2.4.B.2	Design an alternative use for an existing product.
		8.2.4.B.3	Explain the positive and negative effect of products and systems on humans, other species and the environment.
		8.2.4.B.4	Compare and contrast how technology transfer happens within a technology, among technologies, and among other fields of study.

By the end of grade	Content	CPI #	CPI
8	The design process is a systemic approach to solving problems.	8.2.8.B.1	Design and create a product using the design process that addresses a real world problem with specific criteria and constraints.
		8.2.8.B.2	Identify the design constraints and trade offs involved in designing a prototype, (how the prototype might fail, and how it might be improved) by completing a design problem and reporting results in a multimedia presentation.
		8.2.8.B.3	Solve a science-based design challenge and build a prototype using science and math principles throughout the design process.
12	The design process is a systemic approach to solving problems.	8.2.12.B.1	Design and create a product that maximizes conservation and sustainability of a scarce resource by using the design process and entrepreneurial skills.
		8.2.12.B.2	Design and create a prototype for solving a global problem, documenting how the proposed design features affect the feasibility of the prototype through the use of engineering, drawing and other technical methods of illustration.
		8.2.12.B.3	Analyze the full costs, benefits, trade-offs and risks related to the use of technologies in a potential career path.

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Strand	C. Technological Citizenship, Ethics and Society

By the end of grade	Content	CPI #	CPI
Preschool	Preschool Teaching and Learning Standards of Quality		
2	Knowledge and understanding of human, cultural and societal values are fundamental when designing technology systems and products in the global society.	8.2.2.C.1	Demonstrate how reusing a product affects the local and global environment.
4	Knowledge and understanding of human, cultural and societal values are fundamental when designing technology systems and products in the global society.	8.2.4.C.1	Explain the impact of disposing of materials in a responsible way.
		8.2.4.C.2	Explain the purpose of trademarks and the impact of trademark infringement on businesses.
		8.2.4.C.3	Examine ethical considerations in the development and production process of a product from its inception through marketing, use, maintenance and disposal by consumers.
8	Knowledge and understanding of human cultural and societal values are fundamental when designing technology systems and products in the global society.	8.2.8.C.1	Explain the need for a patent and process of registering one.
		8.2.8.C.2	Compare and contrast current and past incidences of ethical and unethical use of labor in the United States or another country and present results in a media-rich presentation.

By the end of grade	Content	CPI #	CPI
12	Knowledge and understanding of human cultural and societal values are fundamental when designing technology systems and products in the global society.	8.2.12.C.1	Analyze the ethical impact of a product, system or environment worldwide and report findings in a web-based publication for further comment and analysis.
		8.2.12.C.2	Evaluate the ethical considerations regarding resources used for the design, creation, maintenance and sustainability of a chosen product.
		8.2.12.C.3	Evaluate the positive and negative impacts in a design by providing a digital overview of a chosen product and address the negative impacts.

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Strand	D. Research and Information Fluency

By the end of grade	Content	CPI #	CPI
Preschool	Preschool Teaching and Learning Standards of Quality		
2	Information literacy skills, research, data analysis and prediction are the basis for the effective design of technology systems.	8.2.2.D.1	Collect and post the results of a digital classroom survey about a problem or issue and predict consequences based on claims and reasons.
4	Information literacy skills, research, data analysis and prediction are the basis for the effective design of technology systems.	8.2.4.D.1	Analyze responses collected from owners / users of a particular product and suggest modifications in the design of the product based on responses.
8	Information literacy skills, research, data analysis and prediction are the basis for the effective design of technology systems.	8.2.8.D.1	Evaluate the role of ethics and bias on trend analysis and prediction in the development of a product that impacts communities in the United States and / or other countries.
12	Information literacy skills, research, data analysis and prediction are the basis for the effective design of technology systems.	8.2.12.D.1	Reverse engineer a product to assist in designing a more eco-friendly version guided by an analysis of trends and data about renewable and sustainable materials.

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Strand	E. Communication and Collaboration

By the end of grade	Content	CPI #	CPI
Preschool	Preschool Teaching and Learning Standards of Quality		
2	Digital tools facilitate local and global communication and collaboration in designing products and systems.	8.2.2.E.1	Communicate with students in the United States or other countries using digital tools to gather information about a specific topic and share results.
4	Digital tools facilitate local and global communication and collaboration in designing products and systems.	8.2.4.E.1	Explain how technology is / was successfully or unsuccessfully used to address a local / global problem by producing and publishing a report in collaboration with peers.
8	Digital tools facilitate local and global communication and collaboration in designing products and systems.	8.2.8.E.1	Develop a product using the design process, data analysis and trends and maintain a digital log with annotated sketches to record the development cycle in collaboration with peers and experts in the field.
12	Digital tools facilitate local and global communication and collaboration in designing products and systems.	8.2.12.E.1	Devise a technological product or system, addressing a global issue, using the design process and provide documentation through drawings, data and materials that reflect diverse cultural perspectives.

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Strand	F. Resources for a technological world

By the end of grade	Content	CPI #	CPI
Preschool	Preschool Teaching and Learning Standards of Quality		
2	Technology is created through the application and appropriate use of technological resources.	8.2.2.F.1	Identify the resources needed to create technological products and systems.
4	Technology is created through the application and appropriate use of technological resources.	8.2.4.F.1	Describe how resources are used in a technological product or system.
		8.2.4.F.2	Explain how resources are processed in order to produce products and systems.
8	Technology is created through the application and appropriate use of technological resources.	8.2.8.F.1	Explain the impact of resource selection and processing in the development of a common technological product or system.
		8.2.8.F.2	Explain how the resources and processes used in the production of a current product can be modified to have a more positive impact on the environment (e.g., recycled metals, alternate energy sources) and the economy.

By the end of grade	Content	CPI #	CPI
12	Technology is created through the application and appropriate use of technological resources.	8.2.12.F.1	Determine and use the appropriate application of resources in the design, development, and creation of a technological product or system.
		8.2.12.F.2	Explain how material science impacts the quality of products.
		8.2.12.F.3	Select and utilize resources that have been modified by digital tools in the creation of a technological product or system (CNC equipment, CAD software).

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Strand	G. The Designed World

By the end of grade	Content	CPI #	CPI
Preschool	Preschool Teaching and Learning Standards of Quality		
2	The designed world is the product of a design process that provides the means to convert resources into products and systems.	8.2.2.G.1	Describe how the parts of a common toy / tool interact and work as part of a system.
		8.2.2.G.2	Explain the importance of safety in the use and selection of appropriate tools and resources for a specific purpose.
4	The designed world is the product of a design process that provides the means to convert resources into products and systems.	8.2.4.G.1	Examine a malfunctioning tool and use a step-by-step process to troubleshoot and present options to repair the product.
		8.2.4.G.2	Explain the functions of a system and subsystems.
		8.2.4.G.3	Evaluate the function, value, and esthetics of a technological product, system or environment from the perspective of the user and the producer.
8	The designed world is the product of a design process that provides the means to convert resources into products and systems.	8.2.8.G.1	Explain why human designed systems, products and environments need to be constantly monitored, maintained, and improved.
		8.2.8.G.2	Explain the interdependence of a subsystem that operates as part of a system.

By the end of grade	Content	CPI #	CPI
12	The designed world is the product of a design process that provides the means to convert resources into products and systems.	8.2.12.G.1	Analyze the interactions among various technologies and collaborate to create a product or system demonstrating their interactivity.

PRESCHOOL TEACHING AND LEARNING STANDARDS OF QUALITY

Technology Standards for Preschool-Age Children

Like blocks, books and crayons, technology in a preschool classroom offers versatile learning tools that can support children's development in all domains. For example, there are electronic storybooks that can "read" stories to children in multiple languages, adventure games that foster problem solving skills, story-making programs that encourage literacy and creativity, math-related games that help children count and classify, and science activities that promote inquiry and an understanding of the world through the lens of a child. When preschoolers are encouraged to work together with electronic devices and computers, social skills are tapped as children negotiate turn-taking. However, technology should never be used to replace the concrete, real-life experiences critical to a young child's learning, and must always be used in balance with other meaningful activities and routines. Technology should be embedded into children's centers and enhance their learning and development during choice time as well as in small group experiences.

Definition of "technology"

The number and type of developmentally appropriate technology-based play options for preschool-age children are increasing on a daily basis. While some of these experiences involve "traditional" desktop computers of the mouse-and keyboard-variety, others involve new and sometimes unexpected forms. They may include a toy that talks or responds to a child's touch, an electronic storybook, or a pen-like stylus that can read a word with a tap in a variety of languages. There are game consoles that can convert a large screen into a gross motor game or easel; and a variety of technology-based tools that can enhance a child's exploration or representation, including audio recorders, digital cameras, TV microscopes or video capture devices.

When using and choosing technology for children teachers should

- Never formally "teach" technology skills and competencies. Instead, set the stage for successful experimentation, by providing the materials, introducing them, and being available to lend support.
- Let children pretend with the types of gadgets they see their parents using. Stock the dramatic play area with a non-working mouse and keyboard, cell phone and/or electronic music device.
- Look for activities that give children ways to "accidentally succeed", providing instant feedback and fostering feelings of control. Avoid poorly designed interactive media experiences that might frustrate a child with long stretches of uninterrupted animation or narration that can cause children to lose interest.
- Keep a camcorder or digital camera handy to capture and display children's work.

- Set the stage for highly social, active learning. Choose activities that encourage more than one child to play the game. Place two to three chairs around computers, and multiple head sets around electronic books. Select logic and problem-solving activities that encourage children to work together.
- Offer technology options in each center of the room during choice and small group times. Use tools such as timers to encourage children **take turns** and to encourage them to use other activities in the room.
- Model common technology vocabulary, such as email, Internet site, software, hardware, computer, mouse, digital camera, and printer.
- Encourage children to record their activities and projects using digital cameras.
- Introduce new technology during circle time, prior to placing it in a center; and model how to care for the technological device.
- Use strategies to help children monitor computer usage.
- Mark the left mouse button with a sticker, to help children know which button to press.
- Research software, toys and gadgets before buying by reading reviews, like any other classroom material.
- Use computers to conduct Internet searches for subjects of interest. Let children participate in the process of coming up with search words, and see the results in ways they can understand (e.g., as a set of images rather than text).
- Make technology accessible to all children including English Language Learners and use it as an accommodation for an individual child with special needs. Assistive technologies can take the form of low tech, mid tech and high tech (e.g. visual schedule, touch screens, single switch toys, and augmentative devices).

By the end of preschool, children with technology experience can use pull-down menus to launch programs, negotiate menus and interfaces, and feel comfortable using computers, digital cameras, smart toys, handheld devices and game consoles for simulations, art projects, creating stories and looking up facts. The behaviors listed below are indicative of these understandings, and should never be used as a formal measure of a child's knowledge. In addition, technology is continually evolving, so it is important to use this list in principle, and add skills or concepts that reflect the state of the art.

Children should be able to

- Use the mouse to negotiate a simple menu on the screen.
- Know the “power keys” on a keyboard (e.g., ENTER, spacebar).
- be familiar with how to work frequently used, high quality interactive games or activities, in either screen or toy-based formats.
- Have a basic working vocabulary of common technology terms, such as digital camera, battery, screen, computer, Internet, mouse, keyboard, and printer.
- Take a digital picture.
- Recognize that the number keys are in their own row on the keyboard.

- Put in a disk, cassette tape or DVD and press play and stop.
- Access a printer.
- Type their name on a QWERTY keyboard.
- Turn smart toys on and/or off.
- Understand the basic functions of a browser, including how to open or close windows and use the “back” key.
- Begin to understand how concrete investigations can be explored further through the use of the internet with teacher’s support.

Glossary:

Controversial issue: e.g., global warming, scarcity of water, alternative energy sources, election campaigns

Current and emerging technology resources: e.g., cell phones, GPS, online communities using wikis, blogs, vlogs and / or Nings

Data-collection technology: e.g., probes, handheld devices, and geographic mapping systems

Digital learning game: e.g., Alice, Lively

Developmentally appropriate: Students' developmental level prescribes the learning environment and activities that are used.

Digital tools for grade 2: e.g., computers, digital cameras, software.

Digital tools for grades 4, 8, 12: e.g., computers, digital cameras, probing devices, software, cell phones, GPS, online communities, VOIP and, virtual conferences

Electronic authoring tools: software to allow book development online, e.g., multimedia electronic book

Mapping tools: e.g., Google earth, Yahoo maps and Google maps

Media-rich: multiple forms of digital applications in one product, e.g., graphic design, word processing and spreadsheet

Multimedia presentation: e.g., movie, podcast, vlog

Online discussion: UNICEF, Oracle, i-Earn, blogs, wikis

Online learning community: e.g., i-Earn, Ning, blogs, wikis, Second Life

Operations and related applications: e.g., saving a word processing file to a network drive, printing a spreadsheet

Reverse engineer: isolating the components of a completed system

Shared hosted services: e.g., podcasts, videos or vlogs

Technologies refer to *medical, agricultural and related biotechnologies, energy and power, information and communications, transportation, manufacturing, and construction

Virtual environments: e.g., games, simulations, websites, blogs

Web-based publication: e.g. web page, wiki, blog, ezine