Arizona Educational Technology Standards
2022

Arizona Department of Education
High Academic Standards for Students

Overview

Arizona's Educational Technology Standards illustrate what students should know and be able to do in a digital world. They integrate with all academic standards to create multi-modal pathways for all learners, while building technological literacy, media literacy, and digital citizenship. Arizona last adopted its Educational Technology Standards in 2009. This document contained performance objectives, which acted as a checklist for learning discrete skills. As technology has advanced, so have educational technology standards, which now need to be more robust and rigorous to reflect technology's increased role in the learning and lives of students. This is illustrated in Arizona's new, more robust Educational Technology Standards.

Vision

Arizona's Educational Technology Standards are designed to be equitably integrated into all classes for all students to use technology to:

- Develop agency over their learning and understanding
- Build transferable skills that adapt with changing technology
- Innovate solutions for real-world issues
- Utilize higher-level thinking skills
- Build, enhance, and extend content knowledge
- Foster local and global collaboration

Purpose of the Arizona Educational Technology Standards

The Arizona Educational Technology Standards present a vision of what it means to be a technologically literate, informed digital citizen, who is college and career ready. Today's students must be prepared to thrive in a constantly evolving technological landscape. The Arizona Educational Technology Standards are designed to empower student voices and ensure that learning is a student-driven process. These standards outline what all students need to know, understand, and be able to do at each point in their K-12 educational journey.

Process for Developing Arizona's Educational Technology Standards

The process for developing Arizona's Educational Technology Standards involved the following steps:

- Approval by the Arizona State Board of Education to open the standards review process;
- A call for volunteer educators to apply to join the working group;
- The building of a working group of Arizona technology educators from around the state;
- Working group meetings to review other state standards, key resources, and current research;
- The building and vetting of the draft Arizona Educational Technology Standards;
- A public review period of 45 days where public feedback on the draft was collected;

- Review of the draft by a panel of national and statewide experts;
- A final revision of the draft to incorporate public feedback; and
- Adoption of Arizona's Educational Technology Standards by the Arizona State Board of Education.

As is the case with all standards review and creation processes in Arizona, the development of Arizona's Educational Technology Standards involved feedback and decision-making from educators, experts, parents, students, and community members from across the state. For a complete list of contributors and their affiliations, see the back matter of the standards document.

Standards, Curriculum, and Instruction

While the Arizona Educational Technology Standards serve as the basis for a district's or school's educational technology curriculum, they are not the curriculum itself. Therefore, identifying the sequence of instruction at each grade band **–** what will be taught and for how long **–** requires concerted effort and attention at the local level. Curricular tools are selected by the district/school and adopted through the local governing board. The Arizona Department of Education defines standards, curriculum, and instruction as:

- **Standards** are what a student needs to know, understand, and be able to do by the end of each grade. They build across grade levels in a progression of increasing understanding and through a range of cognitive demand levels. Standards are adopted at the state level by the Arizona State Board of Education.
- **Curriculum** refers to resources used for teaching and learning the standards. Curricula are adopted at the local level.
- **Instruction** refers to the methods or methodologies used by teachers to teach their students. Instructional techniques are employed by individual teachers in response to the needs of the students in their classes to help them progress through the curriculum to master the standards. Decisions about instructional practice and techniques are made at a local level.

Effective Teaching Practices

Research into best practices shows that effective teachers support students in the following ways:

- Modeling, scaffolding, and clarification of challenging curriculum
- Using student strengths as starting points and building on their funds of knowledge
- Investing in and taking personal responsibility for students' success
- Creating and nurturing cooperative environments
- Having high behavioral expectations
- Reshaping the prescribed curriculum when needed to meet student needs
- Encouraging relationships among schools and communities
- Building student agency

Essential Conditions

Researchers and educators investigating the many dimensions of technology in education have identified essential conditions that optimize the likelihood that technology integration will make a positive contribution to teaching and learning. Three of these conditions are vital if schools are to integrate these technology standards successfully:

- Access for every classroom to a high-speed Internet connection and robust wireless network, up-to-date computers, and a variety of digital teaching and learning technologies;
- Professional development for educators and administrators that promotes learner-centered instruction and technology integration; and
- Sustainable and sufficient funding to keep the infrastructure of network and classroom technologies current and reliable.

It is understood that not every classroom has access to a high-speed Internet connection and other up-to-date teaching and learning technologies. An important part of implementing the new educational technology standards will be to continue to call for sufficient funding for all districts to help close gaps related to educational technology for all students in all schools.

Students with Disabilities

There is no doubt that technology continues to enhance the educational experience of students with disabilities and those served by a Section 504 plan. High on the list of the benefits of assistive and adaptive technologies are greater independence, productivity, and expanded opportunities for social inclusion. Existing and emerging technologies have the power to connect and engage all students with personalized teaching and learning.

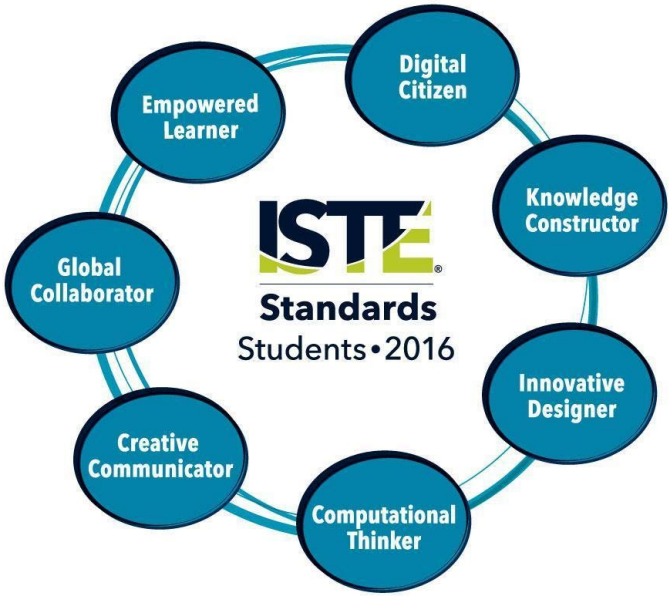
Universal Design for Learning

Many schools make use of Universal Design for Learning (UDL), a set of principles for curriculum development that give all individuals equal opportunities to learn. It provides a blueprint for creating instructional goals, methods, materials, and assessments that work for everyone, with flexible approaches that can be customized and adjusted for individual needs.

Inclusion

Students must feel safe and comfortable to be able to learn effectively. To be inclusive, an educator must actively address when individual students or student groups are not feeling safe or comfortable. One key success factor for improving inclusion is to recognize the diversity of knowledge students bring to the classroom. Students add great value from all perspectives, and active encouragement and support means embracing and highlighting the value added from multiple perspectives. High expectations for all students, along with authentic and active engagement, is a key driver for learning for all students.

Seven Pillars of Arizona's Educational Technology Standards (Based on the 2016 ISTE Standards for Students which were developed by educators around the world. Click here to learn more.)



1. **Empowered Learner** - Students leverage technology to take an active role in choosing, achieving, and demonstrating competency in their learning goals, informed by the learning sciences.

2. **Digital Citizen** - Students recognize the rights, responsibilities, and opportunities of living, learning and working in an interconnected digital world, and they act and model in ways that are safe, legal, and ethical.

3. **Knowledge Constructor** - Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts, and make meaningful learning experiences for themselves and others.

4. **Innovative Designer** - Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions.

5. **Computational Thinker** - Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.

6. **Creative Communicator** - Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.

7. **Global Collaborator** - Students use digital tools to broaden their perspectives and enrich their learning by collaborating with others and working effectively in teams locally and globally.

Understanding the Educational Technology Standards Framework

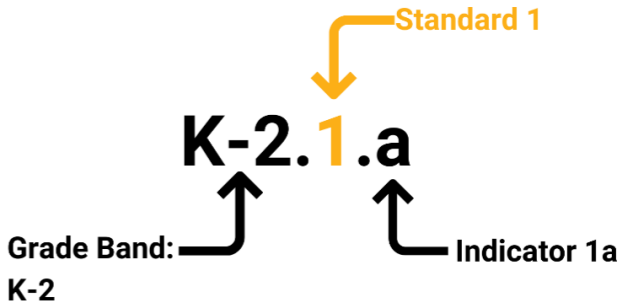
The Arizona Educational Technology Standards are structured so that that **standard**, which applies K-12, is at the top of the page. On the same page, the grade-band **indicator** for the standard is listed for each grade *band* (K-2, 3-5, 6-8, and 9-12) so that educators can see the progression of the skill called for in the indicator across the K-12 continuum. Under each grade-band indicator is a **Sample Student Performance**, which provides specific examples of the student learning that can demonstrate mastery of the indicator for each grade-band.

A **Standard** is a broad statement of the learning that applies to Grades K–12.

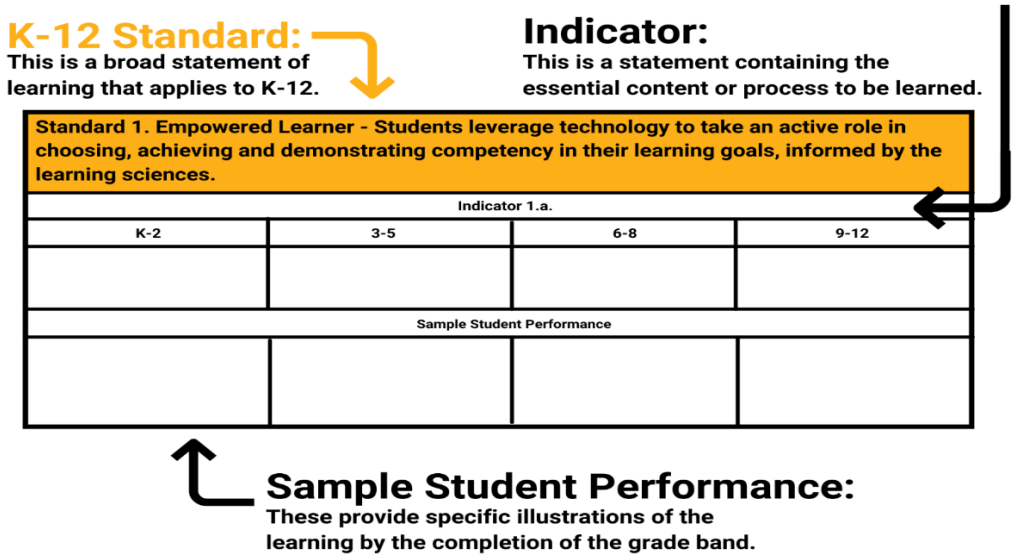
An **Indicator** is a statement containing the essential content or process to be learned and the cognitive demand required to learn it. Each standard includes developmentally appropriate **grade-band** performance indicators, which are considered essential to the standards. The 9-12 indicators are the endpoint and the grade-level indicators are scaffolded to build toward mastery.

Samples of student performance provide specific illustrations of the learning by the completion of the grade band. However, these examples are not exhaustive, and educators are encouraged to find multiple ways by which learners can demonstrate what they know.

Coding Scheme for Ed Tech Standards:



Additional Example of Educational Technology Standard:
6-8.3.c (Grade Band 6-8, Standard 3, Indicator 3c)



Standard 1. Empowered Learner - Students leverage technology to take an active role in choosing, achieving, and demonstrating competency in their learning goals, informed by the learning sciences.			
Indicator 1.a.			
K-2	**3-5**	**6-8**	**9-12**
K-2.1.a. Students, with guidance, consider and set personal learning goals and utilize appropriate technology to demonstrate knowledge and reflect on the learning process.	**3-5.1.a.** Students, in collaboration with an educator, develop learning goals, select the technology tools to achieve them, and reflect on and revise the learning process as needed to achieve goals.	**6-8.1.a.** Students articulate personal learning goals, select, and manage appropriate technologies to achieve them, and reflect on their successes and areas of improvement in working toward their goals.	**9-12.1.a.** Students articulate and set personal learning goals, develop strategies leveraging technology to achieve them, and reflect on the learning process itself to improve learning outcomes.
Sample Student Performance			
• *Students select work samples that show evidence of learning within a digitized portfolio and conference with the teacher to set and monitor a goal for improvement.*	•*Students, with guidance, will identify, and use digital learning tools or resources to set learning goals.* •*Students reflect on learning experiences for the purpose of improving future performance.*	•*Students create digital portfolios.* •*Students set personal learning goals and use online tools to share and reflect on their learning.*	•*Students take an active role in choosing what and how they learn, articulating their learning goal, activating prior knowledge, brainstorming authentic questions about a topic of study, or selecting a topic from a menu of options.* •*Students reflect on their learning using tools, such as digital exit tickets, journals, and video reflections.*

Standard 1. Empowered Learner - Students leverage technology to take an active role in choosing, achieving, and demonstrating competency in their learning goals, informed by the learning sciences.			
Indicator 1.b.			
K-2	**3-5**	**6-8**	**9-12**
K-2.1.b. Students, with guidance, learn about technologies that can be used to connect to others and demonstrate the ability to link purpose with resource(s) to enhance and customize their learning.	**3-5.1.b.** Students, in collaboration with an educator, build a network of experts and peers to customize their environments to enhance their learning, in accordance with school policy.	**6-8.1.b.** Students identify and begin to develop online networks of experts and peers to customize their learning environments in accordance with school policy.	**9-12.1.b.** Students build networks of experts and peers to customize their learning environments in ways that support the learning process and in accordance with school policy.
Sample Student Performance			
•*Students participate in teacher-led connections both in and outside the students' community (e.g., videoconference, email, virtual field trips).* •*Students use tools to personalize content accessibility (e.g., highlighting, video, text-to-speech, audio).*	•*Students, with guidance, extend their learning environment to include online collaborative spaces, such as collaborative documents, sites, or video conferencing.* •*Students, with guidance, customize their environments through choice in how they learn and how they show or express their learning.*	•*Students participate in school-approved online groups to support learning (e.g., online discussion boards through a Learning Management System).* •*Students use school-approved collaborative and file sharing groups to network and get assistance from teachers and peers.*	•*Students work collaboratively with their peers, teachers and experts to share their knowledge and learn from and with others to achieve higher order thinking.* •*Students demonstrate higher order thinking through the use of collaborative online tools, participation in Personal Learning Networks (PLN), digital platforms, in-person, and virtual groups both synchronously and asynchronously.* •*Students make informed choices about the digital tools that they use to support their learning.*

Standard 1. Empowered Learner - Students leverage technology to take an active role in choosing, achieving, and demonstrating competency in their learning goals, informed by the learning sciences.			
Indicator 1.c.			
K-2	**3-5**	**6-8**	**9-12**
K-2.1.c. Students, with guidance, learn to recognize feedback from both people and features embedded in digital tools, and use age-appropriate technology to share learning.	**3-5.1.c.** Students, in collaboration with an educator, examine feedback from both people and the features embedded in digital tools, and use age-appropriate technology to share learning.	**6-8.1.c.** Students integrate feedback from people and digital tools to improve their learning process, and they select technology to demonstrate their learning in a variety of ways.	**9-12.1.c.** Students actively use technology to seek feedback that informs and improves their practice and to demonstrate their learning in a variety of ways.
Sample Student Performance			
•Students use automated learning systems to demonstrate learning and receive active feedback (e.g., online quizzes, interactive content learning platforms). *•Students create, review, and share work using digital tools.*	*•Students seek digital or human feedback by utilizing built-in features within digital tools and online programs. (Spell check, grammar check, comments, etc.)* *•Students, with guidance and feedback, create artifacts using age-appropriate digital tools to demonstrate their learning, such as posters, presentations, video, or audio recordings.*	*•Students solicit feedback for their ideas using digital tools such as online polls or surveys to gather data during the learning process.* *•Students create digital products (e.g., collaborative documents, blog posts, videos, website) that provide opportunities for audience participation and feedback.*	*•Students use feedback mechanisms that are built into technology (e.g., learning analytics, AI powered feedback) to understand and improve their own practice (e.g., writing, projects, problem-solving strategies).* *•Students use digital communication tools (surveys, discussion boards, video chat) to connect with others (e.g., peers, teachers, experts) who can provide meaningful feedback*

Standard 1. Empowered Learner - Students leverage technology to take an active role in choosing, achieving, and demonstrating competency in their learning goals, informed by the learning sciences.			
Indicator 1.d.			
K-2	**3-5**	**6-8**	**9-12**
K-2.1.d. Students, with guidance, learn to recognize commonalities and fundamental structures across digital tools and begin to transfer learning between tools or learning environments.	**3-5.1.d.** Students explore age-appropriate technologies and begin to transfer their learning to different tools or learning environments.	**6-8.1.d.** Students navigate a variety of technologies and transfer their skills to troubleshoot and learn how to use new technologies.	**9-12.1.d.** Students choose, use and troubleshoot current technologies, and are able to transfer their knowledge to explore new technologies.
Sample Student Performance			
•*Students access devices and digital resources (e.g., locate, launch, use, create, save, retrieve).* •*Students transfer skills from one digital platform to another (e.g., open, cut, save, copy, paste).*	•*Students transfer digital skills to other devices or programs (e.g., how to format text across multiple applications, restarting devices or programs).* •*Students apply prior knowledge to understand how new technologies or applications work.*	•*Students apply their current technological knowledge and skills to different technologies and devices.* •*Students use a variety of devices (e.g., mobile devices and computers) to support planning, implementing, and reflecting upon a defined task.* •*Students collaborate and pool collective knowledge to investigate, troubleshoot, and/or explore new technology tools.*	•*Students understand the basic operation of technology and various applications such that they can perform basic troubleshooting techniques.* •*Students apply their prior knowledge as they select and learn new tools and applications based on their needs to support their learning process.*

Standard 2. Digital Citizen - Students recognize the rights, responsibilities, and opportunities of living, learning, and working in an interconnected digital world, and they act and model in ways that are safe, legal, and ethical.			
Indicator 2.a.			
K-2	**3-5**	**6-8**	**9-12**
K-2.2.a. Students, with guidance, discuss and develop their digital identity through responsible use of technology.	**3-5.2.a.** Students demonstrate an understanding of the role a digital identity plays in the digital world and learn the permanence of their decisions when interacting online.	**6-8.2.a.** Students cultivate their digital identities and reputations within a digital environment and understand that digital actions are permanent.	**9-12.2.a.** Students cultivate and manage their digital identity and reputation and are aware of the permanence of their actions in the digital world.
Sample Student Performance			
•Students identify both positive and negative impacts technology can have on them. *•Students explain how information shared online leaves a digital footprint or trail.*	*•Students understand the components of digital identities and digital footprints.* *•Students explore privacy settings for the various platforms they use and illustrate an awareness of how they are represented online based on activities and online connections.*	*•Students demonstrate knowledge of when to share personal information.* *•Students consider the permanency of online posting and sharing before they act.* *•Students cultivate an authentic and positive digital presence.*	*•Students experience and analyze how social media impacts society, individuals, and organizations.* *•Students learn about positive online participation and permanence of their digital footprint by actively cultivating a social media presence designed for future employers or schools to view.*

Standard 2. Digital Citizen - Students recognize the rights, responsibilities, and opportunities of living, learning, and working in an interconnected digital world, and they act and model in ways that are safe, legal, and ethical.			
Indicator 2.b.			
K-2	**3-5**	**6-8**	**9-12**
K-2.2.b. Students, with guidance, engage in positive and safe behavior when using devices and working online with others.	**3-5.2.b.** Students, in collaboration with an educator, identify and practice safe, legal, and ethical behavior when using technology and interacting online.	**6-8.2.b.** Students demonstrate and advocate for positive, safe, legal, and ethical behavior when using technology and when interacting with others online.	**9-12.2.b.** Students engage in and advocate for positive, safe, legal, and ethical behavior when using technology, including social interactions online or when using networked devices.
Sample Student Performance			
•Students explain the potential benefits and implications of interacting with others online. *•Students demonstrate positive and safe online behavior when using technology.*	*•Students demonstrate appropriate use of technology (e.g., being respectful in shared online collaborative spaces: documents, emails, websites etc.) and explain the importance of responsible technology use.* *•Students communicate thoughtfully, respectfully, and authentically in all digital interactions.*	*•Students interact online in ways that demonstrate empathy (e.g., taking another's perspective in a discussion board), advocacy of safe use (e.g., teaching others to detect phishing and spam), and ethical digital behavior.* *•Students demonstrate awareness of healthy digital behaviors such as media balance and ergonomics.*	*•Students understand and demonstrate appropriate online behaviors and technology use.* *•Students make decisions about how, when, and how much they use it, the amount of personal information they provide to others (e.g., digital footprint), giving credit for the use of others' online content (e.g., citation), and the manner in which they interact with others digitally (e.g., discussion, collaboration, video chat).*

Standard 2. Digital Citizen - Students recognize the rights, responsibilities, and opportunities of living, learning, and working in an interconnected digital world, and they act and model in ways that are safe, legal, and ethical.			
Indicator 2.c.			
K-2	**3-5**	**6-8**	**9-12**
K-2.2.c. Students, with guidance, begin to develop an understanding of ownership, sharing of information, and how to respect the work of others.	**3-5.2.c.** Students, in collaboration with an educator, examine, use, and demonstrate respect for intellectual property including copyright, permission, and fair use, with both print and digital media when using and sharing the work of others.	**6-8.2.c.** Students demonstrate and advocate for an understanding of intellectual property including copyright, permission, and fair use by including appropriate citation and attribution elements.	**9-12.2.c.** Students demonstrate and advocate for an understanding of and respect for the rights and obligations of using and sharing intellectual property.
Sample Student Performance			
•Students articulate the importance of respecting others' digital content and information. *•Students locate the title and author (individual or organization) for an age-appropriate digital resource.*	*•Students, with guidance, identify, explore, and discuss laws and rules that apply to print and digital content (e.g., copyright law, fair use guidelines, Creative Commons licenses).* *•Students explain and utilize basic concepts of intellectual property when using and sharing the work of others (e.g. plagiarism, copyright, and fair use).*	*•Students respect copyright law and fair use by correctly attributing sources and adhering to any licenses (such as Creative Commons) when reusing content or resources from websites.* *•Students describe the impact of unethical and illegal use of technology on individuals and society.*	*•Students practice ethical and appropriate use of all media and comply with copyright law.* *•Students cite electronic and print sources in the appropriate format for school and personal work.* *•Students understand fair use and utilize Creative Commons licensing for personal work to protect created digital products.*

Standard 2. Digital Citizen - Students recognize the rights, responsibilities, and opportunities of living, learning, and working in an interconnected digital world, and they act and model in ways that are safe, legal, and ethical.			
Indicator 2.d.			
K-2	**3-5**	**6-8**	**9-12**
K-2.2.d. Students, with guidance, demonstrate the importance of keeping their information private.	**3-5.2.d.** Students, in collaboration with an educator, demonstrate an understanding of what personal data is, how to keep it private, and how it might be shared online.	**6-8.2.d.** Students demonstrate an understanding of what personal data is, how it is collected, and how to keep it private and secure, including the awareness of current technology terms and processes.	**9-12.2.d.** Students manage their personal data to maintain digital privacy and security, and are aware of data-collection technology used to track their navigation online.
Sample Student Performance			
•Students explain the difference between information that is likely safe and appropriate to share online and information that should not be shared. *•Students discuss the tracking of online activity and the importance of keeping some information private.*	*•Students demonstrate an understanding of their responsibility to keep their personal data private (e.g., creating strong passwords and keeping phone number, address, parent's name, birth date private).* *•Students demonstrate understanding of privacy policies for digital tools, services, and apps, and make informed decisions about technology use.*	*•Students use secure, and unique, passwords to protect the privacy of information.* *•Students understand and can identify online phishing, spam and malicious emails.* *•Students understand how personal information is collected and shared, and the potential values and costs of data sharing.*	*•Students make conscientious decisions about the amount and type of personal identifiable information (PII) they give.* *•Students are familiar with how data is tracked and used by those who collect it, including data collected from apps, phishing attempts, malware, etc.* *•Students apply practices that help keep passwords and accounts safe and secure (e.g. adjusting privacy settings, the use of private browsing, etc.).* *•Students understand how personal information is collected and shared, and the potential values and costs of data sharing.*

Standard 3. Knowledge Constructor - Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts, and make meaningful learning experiences for themselves and others.			
Indicator 3.a.			
K-2	**3-5**	**6-8**	**9-12**
K-2.3.a. Students, with guidance, use provided digital tools and resources to find information on topics of interest.	**3-5.3.a.** Students, in collaboration with an educator, employ appropriate research techniques to locate digital resources that will help them in their learning process.	**6-8.3.a.** Students practice and improve research strategies to locate information and other resources for their intellectual or creative pursuits.	**9-12.3.a.** Students plan and employ effective research strategies to locate information and other resources for their intellectual and/or creative pursuits.
Sample Student Performance			
•Students use basic search tools with age-appropriate digital resources for locating and using information. *•Students generate simple search terms to find information in a digital resource (e.g., online library catalog).*	*•Students demonstrate an understanding of the functionality of a search engine, then gather, organize, and summarize information from multiple digital learning tools and resources to build knowledge of a topic.* *•Students use a variety of appropriate search techniques (e.g., keywords and phrases, quotation marks) to locate needed information using age-appropriate digital learning tools and resources.*	*•Students locate relevant information and media using effective keywords, as well as a variety of search techniques (e.g., exact phrase matching, file-type search, boolean or advanced search filters).* *• Students locate relevant information and media by evaluating search results, then revising keywords and applying alternative search techniques.*	*•Students use a variety of digital resources (e.g., databases, online search engines) to locate relevant and accurate information about topics of study/inquiry.* *•Students use advanced search techniques such as boolean operators, exact phrase matching, and file-type searches to locate quality sources of information and modify search strategies to demonstrate resilience in the research process.*

Standard 3. Knowledge Constructor - Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts, and make meaningful learning experiences for themselves and others.			
Indicator 3.b.			
K-2	**3-5**	**6-8**	**9-12**
K-2.3.b. Students, with guidance, become familiar with age-appropriate criteria for evaluating digital content.	**3-5.3.b.** Students, in collaboration with an educator, learn how to evaluate sources for accuracy, perspective, credibility, and relevance.	**6-8.3.b.** Students practice evaluating the accuracy, perspective, credibility, and relevance of information, media, data or other resources.	**9-12.3.b.** Students evaluate the accuracy, perspective, credibility, and relevance of information, media, data or other resources.
Sample Student Performance			
•Students apply basic questions to help them evaluate whether a digital resource is a good fit for the purpose. *•Students distinguish between nonfiction and fictional digital resources.*	*•Students use multiple criteria to differentiate between relevant and irrelevant information found with digital tools and resources.* *•Students utilize evaluation templates (e.g., checklist or rubric) to identify sources based on accuracy, perspective, credibility, and relevance (e.g., identifiable author, validity, biases, etc.).*	*• Students recognize different types of misinformation that can be found online (e.g., satire, outdated, manipulated content) and different types of bias (e.g., source or personal bias).* *• Students employ strategies to verify information (e.g., using fact-checking sites, checking reliability of sources aka lateral reading, tracking back to original source).*	*•Students use a framework for evaluating the quality of information found online.* *•Students assess how point of view, context and purpose impact content, message, and style of text, media, and online presentation.* *•Students compare and contrast information found on the same issue to recognize and minimize different types of bias and fairness to the topic.*

Standard 3. Knowledge Constructor - Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts, and make meaningful learning experiences for themselves and others.			
Indicator 3.c.			
K-2	**3-5**	**6-8**	**9-12**
K-2.3.c. Students, with guidance, use a variety of provided tools to organize information and make connections to their learning.	**3-5.3.c** Students, in collaboration with an educator, use a variety of strategies to collect and organize information and make meaningful connections between resources.	**6-8.3.c.** Students locate and collect a variety of resources and organize information to make meaningful connections.	**9-12.3.c.** Students curate information from digital resources using a variety of tools and methods to create collections of artifacts that demonstrate meaningful connections or conclusions.
Sample Student Performance			
•Students use digital tools to organize information and support classroom learning (e.g. graphic organizers, concept mapping, photo collage, category sorts, timelines, files).	*•Students use digital tools to collect and organize information based on relationships and themes.* *•Students organize digital resources in meaningful ways (e.g., graphic organizers, flowcharts, historical events, timelines, storyboards).*	*•Students curate resources (e.g., locate, collect, select) from multiple sources for an intended purpose.* *• Students use digital tools to organize online resources, information, and media into useful collections or artifacts (e.g., graphic organizers, timelines, infographics).*	*•Students select and organize digital resources, then use a variety of digital tools (e.g., resource management, annotation and note-taking, citation-creation) to showcase learning through an assemblage of content and/or artifacts (e.g., portfolio, website, multimedia).*

Standard 3. Knowledge Constructor - Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts, and make meaningful learning experiences for themselves and others.			
Indicator 3.d.			
K-2	**3-5**	**6-8**	**9-12**
K-2.3.d. Students, with guidance, explore real-world issues and share their ideas about them with others.	**3-5.3.d.** Students, in collaboration with an educator, explore real-world problems and issues and collaborate with others to find answers or solutions.	**6-8.3.d.** Students explore real-world problems and issues and actively pursue solutions for them.	**9-12.3.d.** Students build knowledge by actively exploring real-world issues and problems, developing ideas and theories, and pursuing answers and solutions.
Sample Student Performance			
•Students explore real-world issues through research and digitally share ideas about the topics (e.g., presentation, video, discussion).	*•Students work collaboratively using technology to identify and analyze a solution to a problem.* *•Students engage in appropriate online dialogue (e.g., suitable school language, inclusive conversations, etc.) to further their understanding of issues, events, and problems, and to propose solutions.*	*•Students tap into their own natural curiosity as well as current real-world issues to drive learning.* *•Students use digital tools and resources (e.g., online research, digital interviews, and simulations) to increase understanding, develop perspective, and create solutions.*	*•Students tap into their own natural curiosity as well as current real-world issues to drive learning.* *•Students formulate solutions for a variety of current issues based on research and resolutions.* *•Students use statistics and other forms of data to inform their ideas on solutions to problems locally and globally.*

Standard 4. Innovative Designer - Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions.			
Indicator 4.a.			
K-2	**3-5**	**6-8**	**9-12**
K-2.4.a. Students, with guidance, ask questions, suggest solutions, test ideas to solve problems, and share their learning.	**3-5.4.a.** Students, in collaboration with an educator, explore and practice a design process by generating ideas to solve a problem by planning, creating and testing innovative products that are shared with others.	**6-8.4.a.** Students engage in a design process for generating and testing ideas and developing innovative products to solve problems.	**9-12.4.a.** Students know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.
Sample Student Performance			
•Students use a design process to identify and solve problems. *•Students explain their learning from using a design process through a live or recorded presentation.*	*Students, with guidance, explore and engage in a design process for generating and testing ideas and developing innovative products to solve problems.* *•Students present a possible solution, and redesign to improve the possible solution.*	*•Students select a specific design process (e.g., engineering design, Scientific and Engineering practices, writing process) and articulate the reasons for their selection.* *•Students apply their chosen process to identify a problem, brainstorm, design, test, and modify possible solutions, and communicate results.*	*•Students intentionally apply a process for solving real-world problems and designing unique solutions that includes defining the problem, brainstorming ideas, and creating and refining prototypes (e.g., digital design tools, 3D print product, robotics, virtual simulations, portfolio creation).*

Standard 4. Innovative Designer - Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions.			
Indicator 4.b.			
K-2	**3-5**	**6-8**	**9-12**
K-2.4.b. Students, with guidance, use age-appropriate digital and/or non-digital tools to describe the steps in a design process.	**3-5.4.b.** Students, in collaboration with an educator, use digital and/or non-digital tools to plan and manage a design process.	**6-8.4.b.** Students select and use digital tools to support a design process and expand their understanding to identify constraints and trade-offs and to weigh risks.	**9-12.4.b.** Students select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.
Sample Student Performance			
•Students reflect on the design process and use digital and/or non-digital tools to describe the steps used to solve problems (e.g. demonstration, model, drawing, list of steps, presentation, video, concept map).	*•Students use digital and/or non-digital tools to organize the design process (e.g., brainstorm, graphic organizer, storyboard).* *•Students engage in a design process (e.g., project management, task tracking, timelines) participating in various roles throughout the activity.*	*•Students identify and use digital tools to plan and ideate, manage the project, coordinate teamwork, and share decision making.* *•Students consider design constraints (e.g., time, budget, materials) within their problem-solving processes.* *•Students analyze trade-offs, then make decisions based on calculated risks and probable outcomes.*	*•Within a process/project, students use digital tools (e.g., brainstorming tools, curation/design software, project management tools) to systematically observe and track data.* *•Students assess constraints such as time, money, and potential barriers, and evaluate decisions accordingly.*

Standard 4. Innovative Designer - Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions.			
Indicator 4.c.			
K-2	**3-5**	**6-8**	**9-12**
K-2.4.c. Students, with guidance, use a design process to develop ideas or creations, test their design, and redesign as necessary.	**3-5.4.c.** Students, in collaboration with an educator, engage in a cyclical design process to develop, test and refine prototypes and reflect on the role that trial and error plays.	**6-8.4.c.** Students engage in a design process to develop, test, and revise prototypes, embrace the iterative process of trial and error, and understand setbacks as potential opportunities for improvement.	**9-12.4.c.** Students develop, test and refine prototypes as part of a cyclical design process.
Sample Student Performance			
•*Students plan, test, and iterate designs/creations to solve problems.*	•*Students design and create prototypes and engage in trial and error to refine them (e.g., 3D printers, cameras and video equipment, presentation software, circuits, coding software).* •*Students generate, develop, test, and communicate design ideas and decisions throughout the design process (e.g., survey, poll, spreadsheet, data analysis software, notes, and annotation).*	•*Students develop prototypes (i.e., preliminary models) in forms such as drawings, descriptions, physical models, and simulations.* •*Students test solutions, gather, and analyze data (e.g., using surveys, notes, and spreadsheets), and refine prototypes.*	•*Students evaluate a design solution using conceptual, physical, digital, and mathematical models at various intervals of the design process in order to check for proper design (e.g., check the design solutions against criteria and constraints).* •*Students test, reflect, and refine design elements in subsequent iterations to improve the product/solution.*

Standard 4. Innovative Designer - Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions.			
Indicator 4.d.			
K-2	**3-5**	**6-8**	**9-12**
K-2.4.d. Students demonstrate perseverance when working to complete a challenging task.	**3-5.4.d.** Students demonstrate perseverance when working with open-ended problems.	**6-8.4.d.** Students demonstrate an ability to persevere and handle greater ambiguity as they work to solve open-ended problems.	**9-12.4.d.** Students exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.
Sample Student Performance			
•Students ask questions and use digital feedback tools to clarify understanding of problems, develop a plan of action, and monitor personal progress when working with a challenging task.	*•Students apply effort and persistence when solving open-ended problems.* *•Students seek feedback from a variety of sources (e.g., peers, teacher, self, community members, digital co-learners)* *and evaluate the products, processes, edits, and then retry.*	*•Students apply effort and persistence when solving open-ended or ambiguous problems and confronting setbacks.* *•Students seek feedback from a variety of sources (e.g., peers, teacher, self, community members, digital co-learners).* *•Students learn from mistakes and failed attempts.*	*•Students grapple with open-ended problems that may not have a clear "right" or "wrong" answer.* *•Students work creatively with an open mind and "keep going" when proposed solutions don't work as planned.* *•Students adopt a mindset of using failed attempts as learning opportunities.*

Standard 5. Computational Thinker - Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.			
Indicator 5.a.			
K-2	**3-5**	**6-8**	**9-12**
K-2.5.a. Students, with guidance, identify a problem and select appropriate technology tools to explore and find solutions.	**3-5.5.a.** Students, in collaboration with an educator, identify, explore or solve problems by selecting technology for data analysis, modeling, and algorithmic thinking.	**6-8.5.a.** Students practice defining and solving problems by selecting technology for data analysis, modeling, and algorithmic thinking.	**9-12.5.a.** Students formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models, and algorithmic thinking in exploring and finding solutions.
Sample Student Performance			
• *Students solve an identified problem through self-selecting appropriate digital resources (e.g., virtual manipulatives, pictures, videos, educator-provided resources, block-coding, robotics).*	•*Students identify problems that can be solved more efficiently through the use of technology and algorithmic thinking.* •*Students use digital tools and compare data to create visually appropriate graphical representation of the data (e.g., line graphs, circle graphs, bar graphs, etc.).*	• *Students ask questions in order to understand and specify a problem that can be solved with technology.* • *Students describe how technology supports data analysis, model development, and algorithmic thinking.*	•*Students identify and unpack problems with solutions that can be/have been assisted by technology (e.g., automation, statistical analysis).* •*Students ask questions to understand the problem.* •*Students can thoroughly and precisely describe a problem.*

Standard 5. Computational Thinker - Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.			
Indicator 5.b.			
K-2	**3-5**	**6-8**	**9-12**
K-2.5.b. Students, with guidance, analyze age-appropriate data and look for similarities in order to identify patterns and categories.	**3-5.5.b.** Students, in collaboration with an educator, select effective technology to represent and organize data.	**6-8.5.b.** Students find and organize data and use technology to analyze and represent it to solve problems and make decisions.	**9-12.5.b.** Students collect data or identify relevant data sets, use digital tools to analyze them, and represent data in various ways to facilitate problem-solving and decision-making.
Sample Student Performance			
• *Students find patterns and explore the meaning of charts, graphs, and tables.*	•*Students, with guidance, collect data from a variety of sources (e.g., surveys, measurement, observations, existing data sets) and create charts/graphs, either individually or collectively, as a class.* •*Students, with guidance, analyze data using digital tools (e.g., spreadsheets, data visualization tools, mapping applications) to identify patterns and/or draw conclusions.*	•*Students collect data from a variety of sources (e.g., surveys, measurement, observations, existing data sets).* •*Students analyze data using digital tools (e.g., spreadsheets, data visualization tools, mapping applications) to identify patterns and/or draw conclusions.* •*Students use digital tools to organize and present data in ways that are useful in decision-making and problem solving (e.g., graphs, charts, words, images).*	•*Students use digital tools to collect data and/or locate online sources of data (e.g., government databases, live data).* •*Students use digital tools (e.g., spreadsheet, data visualizations, statistical analysis software) to analyze data.* •*Students use digital tools to create a meaningful depiction of the data (e.g., data visualization, filtering, chart, graph, word cloud, interactive data map) to assist with decision-making.*

Standard 5. Computational Thinker - Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.			
Indicator 5.c.			
K-2	**3-5**	**6-8**	**9-12**
K-2.5.c. Students, with guidance, break a problem into parts and identify ways to solve the problem.	**3-5.5.c.** Students, in collaboration with an educator, break down problems into smaller parts, identify key information, and propose solutions.	**6-8.5.c.** Students break problems into component parts, identify key pieces, and use that information to solve problems.	**9-12.5.c.** Students break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.
Sample Student Performance			
• *Students explain parts of a problem.* • *Students identify ways that they can solve a problem.*	•*Students, with guidance, break complex problems into a series of smaller, more manageable problems in order to find relevant and useful information to reduce complexity and better understand the problem.* •*Students create multimedia presentations to demonstrate understanding of a problem and possible solutions.*	•*Students break complex problems into a series of smaller, more manageable problems (i.e., decomposition).* •*Students identify common features of problems that have been previously solved (i.e., pattern recognition, generalization).* •*Students identify relevant and useful information to reduce complexity and better understand the problem (i.e., abstraction).* •*Students generate representations to foster deeper understanding of the problem and possible solutions (e.g., simulation).*	•*Given a large problem to solve, students break it down into smaller, more manageable problems.* •*Students recognize information that is necessary vs. extraneous to solving a problem.* •*Students develop models that illustrate complex and interdependent systems.*

Standard 5. Computational Thinker - Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.			
Indicator 5.d.			
K-2	**3-5**	**6-8**	**9-12**
K-2.5.d. Students discuss and develop an understanding of how technology is used to make a task easier or repeatable and can identify real-world examples.	**3-5.5.d.** Students understand and explore basic concepts related to automation, patterns, and algorithmic thinking.	**6-8.5.d.** Students understand how automation works and apply algorithmic thinking to design and automate solutions.	**9-12.5.d.** Students understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.
Sample Student Performance			
• *Students describe and provide examples of how digital tools and materials are things that help people complete a task.* •*Students understand and describe how developing a replicable sequence of steps simplifies task completion.*	•*Students define an algorithm as a sequence of instructions or rules to follow.* •*Students describe how technology can efficiently repeat a series of steps or rules in order to solve a problem.*	•*Students describe and develop a sequence of instructions or rules to follow (i.e., algorithm).* •*Students describe how technology can efficiently repeat a series of steps or rules (i.e., automation).* •*Students test automated solutions, troubleshoot, and revise as necessary.*	•*Students create an algorithm, then design and test automated solutions and iterate as necessary.*

Standard 6. Creative Communicator - Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.			
Indicator 6.a.			
K-2	**3-5**	**6-8**	**9-12**
K-2.6.a. Students, with guidance, use a variety of tools for creating something new and communicating with others.	**3-5.6.a.** Students, in collaboration with an educator, recognize and utilize the features and functions of a variety of creation or communication tools.	**6-8.6.a.** Students select appropriate platforms and tools to create, share, and communicate their work effectively.	**9-12.6.a.** Students choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication.
Sample Student Performance			
•*Students use digital tools to communicate and express their thinking, ideas, and creativity.*	•*Students identify appropriate digital learning tools and resources to produce and publish information to communicate with others.* •*Students use a variety of digital communication tools (e.g., email, discussion forums, video conferencing tools) appropriately, respectfully, and effectively.*	•*Students evaluate the effectiveness of digital platforms and tools to meet a variety of communication needs (e.g., to express one's thoughts, to teach something, to build a relationship, to collaborate on a task).* •*Students select and use an appropriate digital communication tool for the intended purpose.*	•*Students explore and evaluate a variety of digital communication and creation tools (e.g., blog, video creation, graphic organizer, infographic, presentation applications).* •*Students use appropriate tools to communicate with specific intent (e.g., to document a process, tell a story, persuade, share their learning).*

Standard 6. Creative Communicator - Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.			
Indicator 6.b.			
K-2	**3-5**	**6-8**	**9-12**
K-2.6.b. Students, with guidance, create original works using digital tools and resources.	**3-5.6.b.** Students, in collaboration with an educator, create original works and learn strategies for responsibly repurposing and remixing to create new artifacts.	**6-8.6.b.** Students create original works or responsibly repurpose digital resources into new creative works.	**9-12.6.b.** Students create original works or responsibly repurpose or remix digital resources into new creations.
Sample Student Performance			
•*Students use digital tools to communicate and express their thinking, ideas, and creativity.*	•*Students combine existing and new digital assets to create new products.* •*Students transfer the information learned from online sources into a new product.*	•*Students combine existing and new digital assets to create new products or design their own original work.* •*Students adhere to the rules and guidelines for remixing and repurposing digital resources (e.g., obtain permission from creators, cite sources, use open-source content).*	•*Students develop digital products (e.g., videos, presentations, portfolios, digital posters) that demonstrate what they've learned, illuminate their thinking, or provide an outlet for creativity.* •*Students properly attribute and cite digital resources when remixing or repurposing.*

Standard 6. Creative Communicator - Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.			
Indicator 6.c.			
K-2	**3-5**	**6-8**	**9-12**
K-2.6.c. Students, with guidance, create digital artifacts to share ideas in multiple formats.	**3-5.6.c.** Students, in collaboration with an educator, create digital artifacts using digital tools to communicate ideas visually, graphically, and/or auditorily.	**6-8.6.c.** Students create artifacts using digital tools to communicate complex ideas textually, visually, graphically, and auditorily.	**9-12.6.c.** Students communicate complex ideas clearly using various digital tools to convey the concepts textually, visually, graphically, etc.
Sample Student Performance			
•Students use a variety of digital tools and resources to communicate complex ideas.	*• Students create digital visualizations (e.g., infographics, word clouds, data map), models (e.g., concept maps, flowcharts), and simulations .* *• Students clearly communicate sophisticated ideas (e.g., presentations, multimedia design, etc.).*	*•Students communicate sophisticated ideas through independent creation of digital visualizations, models, and simulations (e.g., infographics, word clouds, flow charts).*	*•Students create various digital products (e.g., graphic organizer, concept map, 3D model, sketch note, flowchart, or storyboard) to represent and communicate big ideas, data, processes, or the relationship among ideas.*

Standard 6. Creative Communicator - Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.			
Indicator 6.d.			
K-2	**3-5**	**6-8**	**9-12**
K-2.6.d. Students, with guidance, select the appropriate technology for sharing their ideas with intended audiences.	**3-5.6.d.** Students, in collaboration with an educator, learn about and consider the intended audience when creating and publishing digital artifacts and presentations.	**6-8.6.d.** Students publish or present content designed for intended audiences and select platforms that effectively convey their ideas.	**9-12.6.d.** Students publish or present content that customizes the message and medium for their intended audiences.
Sample Student Performance			
•*Students discuss needs and identify digital communication tools appropriate to the task and situation.*	•*Students, with guidance, select a digital tool that most effectively conveys a message for the targeted audience.* •*Students utilize and follow basic copyright guidelines when creating and publishing digital content.*	•*Students select an appropriate tool to clearly and creatively convey a message to a targeted audience.* •*Students present or publish work on a digital platform (e.g., social media, video sharing platform, web presentation) to reach an intended audience.*	•*Students communicate and engage with an authentic audience (e.g., parents, administrators, peers, community members).* •*Students consider the content and tools that will most effectively convey the message to the audience.*

Standard 7. Global Collaborator - Students use digital tools to broaden their perspectives and enrich their learning by collaborating with others and working effectively in teams locally and globally.			
Indicator 7.a.			
K-2	**3-5**	**6-8**	**9-12**
K-2.7.a. Students, with guidance, use digital tools to work with other learners and get to know people within their local community and beyond.	**3-5.7.a.** Students, in collaboration with an educator, use digital tools to work with other learners, including those from a variety of backgrounds and cultures.	**6-8.7.a.** Students use digital tools to interact with others to develop a richer understanding of different perspectives and cultures.	**9-12.7.a.** Students use digital tools to connect with learners from a variety of backgrounds and cultures, engaging with them in various ways that broaden mutual understanding and learning.
Sample Student Performance			
•*Students utilize digital tools to connect and communicate for learning.*	•*Students, with guidance, use synchronous (e.g., video conferencing, web meeting) and asynchronous (e.g., discussion forums, e-mail) communication tools to connect with others from diverse cultures and geographic areas.* •*Students, with guidance, use digital tools (e.g., translation tools) to break down communication barriers such as language differences.*	•*Students use synchronous and asynchronous communication tools to connect respectfully with others from diverse cultures and geographic areas.* •*Students use digital tools (e.g., translation tools) to break down communication barriers such as language differences.*	•*Students initiate and/or engage in digital communication (e.g., video conference, discussion board, social media, collaboration tools) with others who have different backgrounds in order to understand a different point of view.* •*Students engage with digital tools to achieve a deeper understanding of a given topic and gain a different perspective.*

Standard 7. Global Collaborator - Students use digital tools to broaden their perspectives and enrich their learning by collaborating with others and working effectively in teams locally and globally.			
Indicator 7.b.			
K-2	**3-5**	**6-8**	**9-12**
K-2.7.b. Students, with guidance, use technology to communicate with others and to look at problems from different perspectives.	**3-5.7.b.** Students, in collaboration with an educator, use technology to connect with others, including peers, experts, and community members, to explore different points of view on various topics.	**6-8.7.b.** Students use collaborative technologies to connect with others, including peers, experts and community members, to learn about issues and problems or to gain a broader perspective.	**9-12.7.b.** Students use collaborative technologies to work with others, including peers, experts and or community members, to examine issues and problems from multiple viewpoints.
Sample Student Performance			
•*Students collaborate using online software so that multiple perspectives can be captured.*	•*Students utilize a variety of synchronous and asynchronous tools to communicate and learn from others (e.g., students in another class, school, or country, community members, subject experts, authors).* •*Students use appropriate and effective online discussion strategies that encourage respectful sharing of diverse perspectives.*	•Students use a variety of digital tools to learn with and from others (e.g., students in another class, school, or country, community members, subject experts, authors). •Students engage in meaningful digital academic experiences to advance learning (e.g., discussion forums, debate).	•Students engage in digital discussion and debate (e.g., online forum, teleconference, social media, collaboration tools) with a variety of stakeholders with different perspectives, in order to better understand local/global issues.

Standard 7. Global Collaborator - Students use digital tools to broaden their perspectives and enrich their learning by collaborating with others and working effectively in teams locally and globally.			
Indicator 7.c.			
K-2	**3-5**	**6-8**	**9-12**
K-2.7.c. Students, with guidance, take on various team roles and use age-appropriate technology to complete projects.	**3-5.7.c.** Students, in collaboration with an educator, take on various assigned team roles, contributing their knowledge of technology and content to complete a project or solve a problem.	**6-8.7.c.** Students perform a variety of roles within a team, using age-appropriate technology to complete a project or solve a problem.	**9-12.7.c.** Students contribute constructively to project teams, choosing various roles and responsibilities to work effectively toward a common goal.
Sample Student Performance			
•*Students assume roles and work collaboratively to create a digital product.*	•*Students engage in online collaborative projects with students in other classrooms and schools.* •*Students participate as an accountable team member in specific assigned roles to accomplish group goals.*	•*Students participate as an accountable team member (e.g., providing peer feedback) in a specific or assigned role to accomplish team goals.* •*Students use digital tools to manage collaborative work (e.g., track tasks, manage timelines, store information, take notes).*	•*Students use project management tools to organize individual and group tasks/timelines.* •*Students each assume a valuable role to productively contribute to the team project.* •*Students evaluate team performance by reflecting on participation and goal completion.*

Standard 7. Global Collaborator - Students use digital tools to broaden their perspectives and enrich their learning by collaborating with others and working effectively in teams locally and globally.			
Indicator 7.d.			
K-2	**3-5**	**6-8**	**9-12**
K-2.7.d. Students, with guidance, use age-appropriate technology to work together to demonstrate an understanding of local or global issues and suggest possible solutions.	**3-5.7.d.** Students, in collaboration with an educator, work with others, using technology to explore local and global issues and identify possible solutions.	**6-8.7.d.** Students work with others, using collaborative technologies to explore local and global issues and investigate and advocate for possible solutions.	**9-12.7.d.** Students explore local and global issues and use collaborative technologies to work with others to investigate, develop, and advocate for solutions.
Sample Student Performance			
•*Students use age-appropriate collaborative technologies for conducting research to investigate problems and solutions.*	•*Students use digital resources to collaborate with authentic audiences to further learning, examine a global issue, and/or develop solutions.* •*Students leverage technology (e.g. virtual field trips, webcam, AR/VR) to interact with places and content otherwise not easily accessible.*	•*Students digitally interact with experts in a particular field to examine global issues.* •*Students leverage technology (e.g. virtual field trips, webcam, AR/VR) to interact with places and content otherwise not easily accessible.* •*Students use collaborative tools to work with others to develop solutions and/or work toward common goals.*	•*Students utilize communication and creation technologies (e.g., online forum, teleconference, social media, collaboration tools) with a variety of stakeholders to problem solve, develop, and present potential solutions.*

Essential Conditions*

Necessary conditions to effectively leverage technology for learning:

Shared Vision
Proactive leadership in developing a shared vision for educational technology among all education stakeholders, including teachers and support staff, school and district administrators, teacher educators, students, parents and the community.

Empowered Leaders
Stakeholders at every level are empowered to be leaders in affecting change.

Implementation Planning
A systematic plan aligned with a shared vision for school effectiveness and student learning through the infusion of ICT (Information and Communication Technology) and digital learning resources.

Consistent and Adequate Funding
Ongoing funding to support technology infrastructure, personnel, digital resources and staff development.

Access
Robust and reliable access to current and emerging technologies and digital resources, with connectivity for all students, teachers, staff and school leaders.

Skilled Personnel
Educators, support staff and other leaders skilled in the selection and effective use of appropriate ICT resources.

Ongoing Professional Learning
Technology-related professional learning plans and opportunities with dedicated time to practice and share ideas.

*From ISTE Essential Conditions for Student Learning

Technical Support
Consistent and reliable assistance for maintaining, renewing and using ICT and digital learning resources.

Curriculum Framework
Content standards and related digital curriculum resources that are aligned with and support digital age learning and work.

Student-Centered Learning
Planning, teaching and assessment centered around the differentiated needs and abilities of students.

Assessment and Evaluation
Continuous assessment of teaching, learning and leadership and evaluation of the use of ICT and digital resources.

Engaged Communities
Partnerships and collaboration within communities to support and fund the use of ICT and digital learning resources.

Support Policies
Policies, financial plans, accountability measures and incentive structures to support the use of ICT and other digital resources for learning and in district school operations.

Supportive External Context
Policies and initiatives at the national, regional and local levels to support schools and teacher preparation programs in the effective implementation of technology for achieving technology as well as ICT standards.

Digital Citizenship, Media Literacy, and Internet Safety

Digital citizens recognize and value the rights, responsibilities, and opportunities of living, learning and working in an interconnected digital world, and they engage in safe, legal and ethical behaviors.

Media literacy is the ability to access, analyze, evaluate, create and act using a variety of forms of communication.

The Educational Technology Standards Working Group recommends that districts acknowledge students as consumers and creators of information and ideas, promote cross-curricular integration of digital citizenship and media literacy and leadership instruction at all levels, and include students as active participants, role models and peer mentors to address these topics:

- Online safety, responsibility and security
- The act of bullying
- Students as digital consumers and users
- Online predators and risky communications
- Media literacy
- Production of one's own media
- Examination of how people experience media differently
- Identification of embedded values and stereotypes
- Analysis of words and images
- Evaluation of sources of information
- Legal, fair use, copyright and intellectual property
- Online identity and personal brand
- Footprint and digital persistence
- Appropriate posting
- Self-image
- Digital communications and collaboration
- Fairness and civil discourse

Glossary

3D Printing: The action or process of making a physical object from a three-dimensional digital model, typically by laying down many thin layers of a material in succession.

Acceptable/Responsible Use Policy (AUP/RUP): A school or organization's official policy statement regarding the use of the Internet or other computer networks.

Algorithm: A process or set of steps to be followed in calculations or other problem-solving operations, especially by a computer.

Application: Computer programs that help you perform a specific task such as word processing. Also called application programs, applications, programs, or software. Depending on the device, also known as "apps".

Artificial Intelligence (AI): A branch of computer science dealing with the simulation of intelligent behavior in computers.

Asynchronous Instruction: A general term used to describe forms of education, instruction, and learning that do not occur in the same place or at the same time. It uses resources that facilitate information sharing outside the constraints of time and place among a network of people.

Augmented Reality (AR): An enhanced version of reality created by the use of technology to overlay digital information on an image of something being viewed through a device (such as a smartphone camera).

Authentic Audience: A group of people outside of the teacher and classroom that will serve as an audience for a project, sometimes experts in the field or members of the community.

Authentic Problem: A genuine, real, or original problem to be solved.

Bandwidth: The capacity of a network connection to handle the flow of information, often measured in kilobits or megabits per second, which represents the speed data travels over the network.

Blogging: The process of writing a blog, an online journal in which the writer shares their thoughts about a particular subject with readers.

Boolean logic: A logical system for advanced searching of databases and search engines using the operators AND, OR and NOT. Example: *When doing research on the country of Haiti prior to the earthquake, use the Boolean operator NOT to connect "Haiti NOT earthquake" in a search phrase*.

Browser: Software which enables users to browse or view the Internet. Examples include Safari, Internet Explorer, Google Chrome, Opera, or Firefox.

Cloud computing: The practice of storing and accessing data and programs over the Internet rather than a local server or a personal computer (e.g., iCloud, Google Cloud, OneDrive, Dropbox, etc.).

Code: A system of symbols or signals used to communicate electronically, i.e., computer code. Examples include: C, C++, JavaScript, SQL, etc. Programmers use code when creating software applications.

Collaborative tools: Instruments, devices or software applications which make it easier to work more productively together in a group or groups. This may include anything from concept maps or webs (see concept mapping tool) to a website where a group collaborates on a single document, such as Google Docs or using devices such as webcams.

Computational Thinking: Mental processes and strategies that include: decomposition (breaking larger problems into smaller, more manageable problems), pattern matching (finding repeating patterns), abstraction (identifying specific changes that would make one solution work for multiple problems), and algorithms (a step-by-step set of instructions that can be acted upon by a computer).

Content Curation: The gathering, organizing and online presentation of content related to a particular theme.

Cookies: Small computer files placed on a computer's hard drive when the user visits a website. The purpose of a "cookie" is to track information about that user.

Creative Commons: Creative Commons licenses are designed to facilitate and encourage more versatility and flexibility in copyright law.

Cyber-bullying: The act of intimidating and threatening another person while using a computer or IT devices; typically more than one occurrence.

Cybersecurity: Measures taken to protect networks, computers, programs and data from attack, damage, or unauthorized access**.**

Database: Software which allows the user to systematically search for, sort and/or input data. The Library of Congress is an example of one of the largest databases available for primary source information.

Design Process: An approach for breaking down a large project into manageable chunks.

Device: a device is a unit of hardware, outside or inside the case or housing for the essential computer (processor, memory, and data paths) that is capable of providing input to the essential computer or of receiving output or of both.

Digital citizenship: an educational concept in which everyone involved in a learning community (students, parents, et al.) gains knowledge on how to practice safe and appropriate behavior when using electronic media and IT devices.

Digital Divide: The gulf between those who have ready access to computers and the Internet, and those who do not.

Digital Footprint: The information about a particular person that exists on the Internet as a result of their online activity A *digital identity* is an online or networked identity adopted or claimed in cyberspace by an individual, organization or electronic device.

Digital Portfolio: A collection of electronic evidence assembled and managed by a user. Also known as an e-portfolio or an electronic portfolio.

Digital Simulation: A virtual simulation (imitation or replication) of a real-world process, concept, environment, or system that is displayed digitally. Digital simulations can be as simple as a simulated card game to a complex system modeled interactively. Simulations involve the ability to manipulate variables to affect outcomes.

Digital Stories: A variety of forms of digital narratives (web-based stories, interactive stories, hypertexts, and narrative computer games).

Digital Tools: Hardware and software that generate, store and process data.

Document: A digital file that is used to record, communicate, or publish information in text. Some examples of applications and programs that are used to create and view a document include: Microsoft Word, Apple's Pages, Open Office Writer, Adobe Acrobat, Notepad, and Google Docs.

Download: The process of transferring a file to one user's computer or IT device from another connected computer, network, or website. The transferred file is also referred to as a "download."

Drawing tool: Any digital tool that is used for drawing, sketching, creating, designing, painting, drafting, highlighting, writing, or annotating. Drawing tools can be found within word processing, graphic design, publishing, presentation, notebook, 3-D imaging, CAD, tablets, or paint program applications, Google Sketch-up.

Ebook: An electronic version of a printed book that can be read on a computer or handheld device designed specifically for this purpose.

Educator: Any person who positively impacts the learning of a student in an educational setting, including teachers, administrators, paraprofessionals, parents, peers, etc.

Encryption: The process of converting electronic data to an unrecognizable or encrypted form, one that cannot be easily understood by unauthorized parties.

Fair use: Guidelines under which copyrighted material can be legally used in limited situations without obtaining the permission of the copyright owner or paying royalties.

File extension: The short (usually three letter) suffix at the end of a file name that indicates the file type and the applications it is associated with. A few examples include: Microsoft Word (.doc or .docx), Microsoft PowerPoint (.ppt), a digital photo (.jpg) - JPEG format (Joint Photographic Experts Group), Adobe Acrobat (.pdf), and a presentation created in Open Office Impress (.odp).

Firewall: A hardware device or software program that filters what goes in and out of a network or computer in order to protect it against any harm,

such as viruses, from an unauthorized user.

Formatting: The way a document is presented, organized, or arranged. Examples of basic formatting options include font size, bold text, bullets, or margins. An example of advanced formatting may include manipulating images and aligning text in a document.

Global community: A term used to describe the economic, social, and political interdependence of all people and nations of the world advanced through the use of technology. *The scientific global community continually discusses global warming by blogging the issue.*

Hacking: The act of gaining illegal entry into a computer or network typically to gain access to data, steal information, identity theft or crash a system.

Hardware: The physical components of a computer or digital device. Examples of hardware on a computer include: a motherboard which holds a CPU (central processing unit), expansion cards; a power supply; a hard drive (or hard disk); input (mouse) or output (monitor) devices.

Home page: The first page a user sees when opening a web browser, or the first web page to be seen when visiting a website. Most websites of organizations, school districts, agencies, companies, etc. have a home page that serves as both an introductory page and a navigation tool (like a table of contents with links) to direct a user to the various pages within the website.

Hyperlink (also called link): An element in an electronic document or webpage which, when selected, takes the user to another location, either in the same document or to a different document, webpage, email client, or video. Links usually appear as a different color, are underlined, or can be assigned to an icon or other elements on a page.

Icon: A small picture or symbol on an IT device. Selecting an **icon** activates a function such as opening a page or a software program.

Identity Theft: A form of fraud or cheating of another person's identity in which someone pretends to be someone else by assuming that person's identity, typically in order to access resources or obtain credit and other benefits in that person's name.

Infographic: A visual image such as a chart or diagram used to represent complex information or data quickly and clearly.

Intellectual Property (copyright): Intellectual property refers to the ownership of intangible and non-physical goods. This includes ideas, names, designs, symbols, artwork, writings, and other creations. It also refers to digital media, such as audio and video clips that can be downloaded online.

Iterative: Involving the repeating of a process with the aim of approaching a desired goal, target, or result.

Learning Management System (LMS): A software application or Web-based technology used to plan, implement, and assess a specific learning process. Typically, an LMS provides an instructor with a way to create and deliver content, monitor student participation, and assess student performance.

Makerspace: A makerspace is a place where students can gather to create, invent, tinker, explore and discover using a variety of tools and materials.

Malware: The broad term to describe any malicious software designed by hackers. Malware includes viruses, worms, spyware, trojans, keyloggers, zombie programs and any other software that seeks to do one of four things: vandalize your computer in some way; steal your private information; take remote control of your computer (zombie your computer) for other ends; or manipulate you into purchasing something.

Media: A way to store, deliver or view information or data. Examples include CDs or DVDs, flash drives, video or audio recordings, interactive websites, slide presentations, and websites.

Media hosting: Online sites which house photos, videos, and other files uploaded by users. It is a repository. Examples include YouTube, Flickr, TeacherTube, and SnapFish.

Metadata: Data that describes and gives information about other data; metadata might include information about the means of creation of the data, the purpose of the data, the time and creation of the data, or the author of the data. In digital photography, metadata can include searchable information about the date and time the photo was taken, where it was taken, color depth, resolution, etc.

Microcontroller: A compact integrated circuit which is dedicated to perform one task and execute one specific application. A typical microcontroller includes a processor, memory, and input/output peripherals on a single chip.

Modules: A set of tutorials that can be presented via text, video, or online.

Multimedia: Digital products that integrate interactive text, images, sound, and color. Multimedia can be anything from a simple PowerPoint slide show to a complex interactive simulation.

Network: A group of computing devices (personal computers, phones, servers, switches, routers, and so on) connected by cables or wireless media for the exchange of information and resources.

Network storage device: A place reserved for storing digital data on a network; Often used to share or back up files from a user's individual computer. See server.

Open source: Software in which the source code is available to the general public for use and/or modification from its original design free of charge. The Linux operating system and OpenOffice are examples of open source applications.

Original work: Work that has been composed firsthand.

Password: A security measure used by individuals to access protected computers or computing systems, applications, or files. Passwords are comprised of strings of letters, numbers, and/or symbols.

Phishing: A form of fraud in which an email recipient is asked to provide sensitive personal information (bank account or credit card numbers; social security number; birth date) either by selecting a link provided within the email or by replying to the email itself.

Podcast: A media file that is distributed over the Internet using syndication feeds, for playback on portable media players and personal computers.

Pop-ups: A secondary web browser window of varying size, often containing a form of advertising, which opens outside of the primary web browser window.

Presentation software: a program used to display and share information. Examples include: Microsoft's PowerPoint, Apple's Keynote, Open Office's Impress, and Prezi.

Primary source: An original, authoritative document which represents a first-hand, eye-witness account of an event or subject. An example is an autobiography. One of the best sources is the Library of Congress.

Program: (n): A set of instructions that the computer executes in order to achieve a particular objective. Program (v): To produce a program by programming. An algorithm that has been coded into something that can be run by a machine.

Publishing: Making a file available for viewing or sharing**.** Examples include: printing a brochure or newsletter or uploading a file to the internet.

Query: The word or words used to search a topic using a search engine. Also, a search within a database.

RSS: An acronym for Really Simple Syndication; It is a family of web feed formats used to publish frequently updated works in a standardized format.

Search engine: A tool or website that allows the user to search the Internet for specific information (using keyword). The results of the search may be web pages, images, or other files. Advanced searches allow the user to limit search parameters to reduce the number of results and sometimes uses Boolean Logic. i.e. Google, Yahoo, and Bing.

Secondary sources: A document which represents a second-hand account of an event or subject that was originated by someone else. An example is a biography (a second-hand account of a person's life).

Shortcuts: A finite set of keys that invoke a software or operating system operation when triggered by the user. Special Function keys are an example or CTRL + V for “paste.”

Social Media: The broad term for any online tool that enables users to interact with thousands of other users (e.g., Facebook, Twitter, LinkedIn, Google+, Instagram, Pinterest, Snapchat, Tumblr, and Reddit).

Software: Programs that run on a computer system, computer, or other computing device.

Spam: Unwanted "junk" email sent to large numbers of people.

Speech to text: Ability of computer systems to accept speech input and act on it or transcribe it into written language.

Spreadsheet: A document that stores data in a grid of horizontal rows and vertical columns. Rows are typically labeled using numbers (1, 2, 3, etc.), while columns are labeled with letters (A, B, C, etc.). Individual row/column locations, such as C3 or B12, are referred to as cells. Each cell can store unique data. Spreadsheet examples include Microsoft Excel, Apple's Numbers, and Google Spreadsheet.

Synchronous: Synchronous transmission technique that requires a common clock (occurs at the same time). Asynchronous transmissions do NOT occur at the same time, but in sequence.

Tab: Referring to tabs in a browser. Each tab in a single browser window is a different source

Taskbar: A series of icons or graphical controls on a computer screen or IT device that enable the user to open or switch back and forth between programs. Referred to as a "dock" on a Macintosh computer.

Toolbar: A set of icons or buttons that are part of a software program's options. For example, Microsoft Word has ribbons with icons that allow the user to open, save, and print documents, as well as change the font, text size, and style of the text. In many programs, the ribbon can be customized by adding or deleting options.

Transition: In multimedia presentations, a transition is a change from one element to another. For example, you can create a transition between two slides in a presentation. Transitions are a creative way to shift from one slide to another.

Troubleshooting: A systematic approach to problem solving that is often used to find and resolve a problem, error, or fault within software or a computer system.

Upload: The process of transferring a file from one user's computer or IT device to another connected computer, network, or website. The transferred file is also referred to as an "upload."

URL: Uniform Resource Locator; the address of a website on the World Wide Web. The URL of any website can be found on the address bar of a web browser. *The URL for google is http://www.google.com.*

USB: Universal Serial Bus; a method for connecting peripherals and transferring data between devices.

Video conferencing: A real-time video session between two or more users that reside in two or more locations. This is a good use of collaboration tools. Some examples are: Skype and FaceTime.

Virtual Field Trip: A guided exploration through the World Wide Web that organizes a collection of prescreened, thematically based web pages into a structured online learning experience.

Virus: A piece of programming code inserted into other programming to cause damage. Viruses can be sent in many forms but are often transmitted via email messages that, when opened, may erase data or cause damage to your hard disk. Some viruses are able to enter your email system and send themselves to other people in your list of contacts.

Webinar: An online meeting or presentation.

Webpage: A document written in HTML (Hypertext Markup Language). A web browser interprets the HTML document and displays a webpage. There are many programs that allow a user to create HTML documents (webpages) without needing to understand HTML code.

Website: A location, or site, on the Internet that is a collection of related web pages. For example, a school website is comprised of many different web pages i.e., teacher pages, activity pages, etc.

Wi-Fi: Wireless LANs, device to device connectivity (such as peer-to-peer), and a range of technologies that support other connections.

Wiki: A wiki is a website that allows users to add and update content on the site using their own web browser. Wikis are "open source", i.e., other users can contribute collaboratively to its content. The term “wiki” comes from the Hawaiian phrase, “wiki wiki,” which means “super fast”. An example of a large wiki is Wikipedia, a free encyclopedia that approved users can edit. Examples of wiki tools include: PBworks and Wikispaces.

World Wide Web (www): A system of interlinked hypertext documents that are accessed via the Internet.

Sources referenced in the compilation of this glossary include:

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