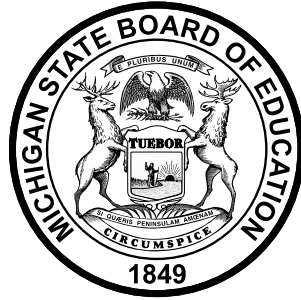




Michigan Assistive Technology Guidelines for Teachers of Students Who Are Blind or Visually Impaired

Grades 9-12



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Introduction

The *Michigan Assistive Technology Guidelines for Teachers of the Blind and Visually Impaired* is an expanded document to specifically guide teachers of students who are Blind or Visually Impaired (BVI) in pre-kindergarten through grade 12 with assistive technology (AT). This guide is based on the International Society for Technology in Education (ISTE) Standards to which the Michigan Integrated Technology Competencies for Students (MITECS) connects.

These guidelines follow six key concepts:

- Technology Operations and Concepts
- Creativity and Innovation
- Communication and Collaboration
- Critical Thinking and Problem Solving
- Research and Information Technology
- Digital Citizenship

Appendix:

- Assistive Technology Glossary
- Assistive Technology Resources
- Assistive Technology Tools and Applications Sample Listing
- Assistive Technology Tools Record Keeping Chart
- Use the guidelines to help develop specific individualized education program (IEP) goals.
- An AT Glossary, AT Resources, AT Tools, and AT Tools Table can be found after each grade-level guideline.
- Use the key below to track student progress.

Please Note: Some skills and teacher activities may be addressed through collaboration with Secondary LEA teachers or utilizing an assignment from the secondary teacher. It is desirable that students at this level know how to functionally use accessible technologies. If not review, PreK- Grade 8 AT Guidelines to help with beginners or novices getting to know how to use accessible technologies and adaptive devices.

Assistive Technology Guidelines Protocol

Student Progress Key

A = Formal Assessment

O = Teacher Observation

P = Portfolio Evidence

C = 21st Century Technology Class

Acknowledgments

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- Pat Love-Sypho, Consultant for Students With a Visual Impairment, MDE-LIO
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I. Technology Operations and Concepts: Grades 9-12

Awareness, exploration, and opportunities to use 21st-century digital tools.

Student Progress Key

A = Formal Assessment

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P = Portfolio Evidence

C = 21st Century Technology Class

Student Details

Student Name:

Teacher Name:

School:

#	Skill (To Be Completed by the End of Grade 12)	Suggested Teacher Activities to Aid the Student	Key	Grade	Date Achieved	Notes/ Equipment
1	Identify examples of accessible technologies and devices. Describe their purposes and uses.	<ul style="list-style-type: none"> Discuss and identify examples of current accessible technologies and devices. Describe their purposes and demonstrate their uses, including any assistive technology devices (ATDs) as needed. For example, screen readers such as JAWS, NVDA, ChromeVox, VoiceOver, and TalkBack. The screen reader's purpose is to enable a student who is severely Blind or Visually Impaired to use/ access computers and smart mobile devices by converting text, images, buttons, and other screen elements into speech or braille. 				
2	Describe uses of existing or emerging technology and resources (e.g., podcasting, webcasting, videoconferencing, video discussion boards, online file sharing, global positioning software, social networking, and cloud collaboration tools). Demonstrate an understanding of how changes in technology impact the classroom, workplace, and society.	<ul style="list-style-type: none"> Discuss and demonstrate uses of existing and emerging technology and resources such as webinars, online tutorials, virtual learning environments, podcasting, videoconferencing, global positioning software, online file sharing, smart workspaces, electronic games, vocabulary websites, wearable tech, haptic technologies, artificial intelligence (AI), coding, etc. Use the student's accessible technologies and ATDs as needed. Discuss and create a digital chart, table, or media presentation to share how changes in technology impact the classroom, workplace, and society, using the student's accessible technologies and adaptive devices as needed. 				

#	Skill (To Be Completed by the End of Grade 12)	Suggested Teacher Activities to Aid the Student	Key	Grade	Date Achieved	Notes/ Equipment
3	Describe how accessible technologies can benefit all individuals' universal design methods.	<ul style="list-style-type: none"> Discuss, describe, and share the importance of accessible technologies with examples of individual experiences, including the benefits of accessible technologies and adaptive devices when necessary. 				
4	Demonstrate the ability to correctly select and use accessible technologies to achieve learning outcomes.	<ul style="list-style-type: none"> Discuss, demonstrate, and practice, selecting from a variety of accessible technologies and devices, the tool(s) required to accomplish an assignment. For example, ask which tool(s) from the student's toolkit will be needed to complete a writing assignment. One student may require a recording device. Another student may require a keyboard, and another student may require a switch or braille display. Create scenarios requiring students to use the devices within their toolkits. 				
5	Describe strategies for troubleshooting technical issues of routine hardware, software, and application problems.	<ul style="list-style-type: none"> Discuss, demonstrate, practice, and describe strategies for troubleshooting technical issues with hardware, software, and applications, such as restarting a device, installing and updating software applications and mobile apps, transferring work from one device to another, connectivity (audio/video, cables, internet), and syncing devices, using the student's accessible technologies with adaptive devices as needed. By the end of Grade 12, students demonstrate independent troubleshooting skills. 				

#	Skill (To Be Completed by the End of Grade 12)	Suggested Teacher Activities to Aid the Student	Key	Grade	Date Achieved	Notes/ Equipment
6	Describe ways to free up space and remove clutter and grime from accessible technologies and devices to make them run faster and more efficiently.	<ul style="list-style-type: none"> Remove clutter from devices, such as computers, tablets, braille devices, recording devices, etc. Check for unused files, extensions, folders, and applications. Clear the web browser regularly, empty the cache, and clear unused bookmarks or favorites. Regularly back up data to prevent data loss. Remove dust, grime, and fingerprints from all accessible technology devices with appropriate cleansing tools. 				
7	Assess and solve hardware and software problems by using one or more methods to resolve or repair an issue (e.g., online help, user documentation, or tech support).	<ul style="list-style-type: none"> Demonstrate how to analyze a problem, create an address book of contacts, generate a generic Q&A script, and practice contacting tech support (e.g., HumanWare, Freedom Scientific, Vispero, American Printing House for the Blind) by phone to solve hardware, software, or mobile application problems. Practice assessing the ability to solve hardware and software problems by using online user documentation (manual) or contacting tech support, using the student's accessible technologies with adaptive devices as needed. Create problem scenarios for the student to solve, such as connecting a disconnected power source, reinstalling disabled customized features, finding misplaced documents and files, checking compatibility issues, and rebooting to factory default. Note: Student perseverance and patience may need to be encouraged to independently get results. 				

#	Skill (To Be Completed by the End of Grade 12)	Suggested Teacher Activities to Aid the Student	Key	Grade	Date Achieved	Notes/ Equipment
8	Explain the differences between freeware, open source, proprietary, and shareware software.	<ul style="list-style-type: none"> Discuss and identify the differences between freeware (internet browsers, Adobe Reader), open source (Firefox, Linux, Python), proprietary (Microsoft Windows, macOS, Google Earth, iTunes), and shareware (adware, crippleware, trialware, donationware, nagware, freemium) software, using the student's accessible technologies and adaptive devices as needed. 				
9	Identify common graphic, audio, and image file extensions and video file formats (e.g., jpeg, gif, bmp, mpeg, wav, wmv, mp3/4, flv, avi, pdf, Common Raster Image file format, and Common Vector Image file formats).	<ul style="list-style-type: none"> Discuss and identify common graphic, audio, and image file extensions and video file formats (e.g., jpeg, gif, bmp, mpeg, wmv, mp3/4, flv, avi, pdf, Daisy, AMR-WB+, wma, tiff, png, "Flash" file format, iOS file formats, Common Vector Image file formats, Common Raster Image file format) using the student's accessible technologies and adaptive devices as needed to create a "cheat sheet" or vocabulary list. Resource: Complete File Extension List (bit.ly/3ikE1lf) 				
10	Use accurate current technology terminology for a variety of digital/ electronic devices. Develop a technology vocabulary.	<ul style="list-style-type: none"> Practice using accurate technology vocabulary that relates to accessible technologies, adaptive devices, accessibility features, 3D technology, coding, artificial intelligence (AI), virtual environments, and haptics. Create a vocabulary list, using the student's accessible technologies and adaptive devices as needed. 				

#	Skill (To Be Completed by the End of Grade 12)	Suggested Teacher Activities to Aid the Student	Key	Grade	Date Achieved	Notes/ Equipment
11	<p>Demonstrate the ability to complete class activities, work assignments, daily living skills, and leisure activities by using a keyboard, navigational keys, mouse, joystick, or switch with digital/ electronic devices, touch-screen tablets, mobile devices, accessible technologies, and adaptive devices specific to the student's needs.</p>	<ul style="list-style-type: none"> Continue to practice and assess the use of proper keyboarding posture, finger positions, and touch-typing techniques to improve accuracy, speed, and general efficiency in operating a computer with a goal of 55-65 words per minute (wpm) at 90% accuracy using the touch-typing method. Use correct buttons on adaptive devices and proper finger gestures on a tablet with 90% accuracy. Practice and assess accuracy of tablet finger gestures and iOS rotor gestures. Practice and assess accuracy using shortcut key commands on computers, tablets (external keyboard/ braille display), and adaptive devices. Note: <ul style="list-style-type: none"> A joystick or switch user will be assessed on scanning techniques to improve speed, accuracy, and general efficiency, which can impact the goal of 55-65 wpm. It is suggested that the set goal is monitored and/or assessed at least three times per school year, as the student's performance may change. 				
12	<p>Demonstrate how to import/export text, images, graphics, video, audio, and animated files.</p>	<ul style="list-style-type: none"> Demonstrate, practice, and assess how to import/export text, images, graphics, video, audio files, music, and animation, using the student's accessible technologies and adaptive devices as needed. For example, remix a project and add music, dubbing, graphics, images, etc. 				

#	Skill (To Be Completed by the End of Grade 12)	Suggested Teacher Activities to Aid the Student	Key	Grade	Date Achieved	Notes/ Equipment
13	Demonstrate how to create and organize data in appropriate graphs, Word docs, charts, diagrams, images, media presentations, or code.	<ul style="list-style-type: none"> Discuss, demonstrate, and practice creating and organizing data collected into a graph, Word doc, chart, diagram, table, image, spreadsheet, mind map, or code, using the student's accessible technologies and adaptive devices as needed. For example, using a survey app (such as SurveyMonkey), a student can create a survey pertaining to a topic of their choice. After collecting the results, the student can create a summary and conclusion in Word, including a support graph, chart, or table to share. Apply basic design elements that include font, color, alignment, white space, and layouts, as well as template layouts, to improve the presentation content. 				
14	Demonstrate the ability to use collected data to format and insert into a spreadsheet. Select appropriate spreadsheet tools.	<ul style="list-style-type: none"> Discuss and demonstrate the process of inserting data into a formatted spreadsheet. Excel, Numbers (iOS), and other spreadsheet programs offer a variety of plotting, analysis, modeling, and calculation tools. Demonstrate how to format a cell, row, column, worksheet, or chart using the formula bar (e.g., adding title, adjusting cell widths, and aligning data in the cell). Include the insert function, sum, average, total, product, "IF," "Count," and sort and filter, using the student's accessible technologies and adaptive devices as needed. Note: There are many "how-to" videos that can assist in teaching a student how to create a spreadsheet. 				

#	Skill (To Be Completed by the End of Grade 12)	Suggested Teacher Activities to Aid the Student	Key	Grade	Date Achieved	Notes/ Equipment
15	Proofread and edit a file or document using the built-in spelling and grammar check function, examine accessibility functions and commands on adaptive devices, or examine proofreading and editing features on an app or braille device.	<ul style="list-style-type: none"> Demonstrate, practice, and assess proofreading and editing a file or document using the rotor on an iOS device or using the commands on a PC, Android, portable braille device, or mobile device. Use the student's accessible technologies and adaptive devices as needed. 				
16	Complete at least one online (credit or non-credit) course or other online learning experience.	<ul style="list-style-type: none"> Demonstrate how to take online credit and non-credit courses. With guidance, participate in and complete at least one online credit or non-credit course or online learning experience, using the student's accessible technologies and adaptive devices as needed. For example: webinar, virtual learning environment, podcast, iTunes U, Hadley.edu, Perkins eLearning, American Printing House for the Blind's Virtual ExCEL Academy, Khan Academy, skillshare.com, or an online course from a college or university. 				
17	Use an online tutorial and discuss the benefits and disadvantages of this method of learning.	<ul style="list-style-type: none"> Through discussion, demonstrate, participate, and analyze the advantages and disadvantages of the online tutorial experience, including the use of accessible technologies and adaptive devices. Provide opportunities to access a learning management system, using the student's accessible technologies and adaptive devices as needed, to actively participate within the educational or business environment (e.g., Google classroom, Canvas, Schoology). 				

#	Skill (To Be Completed by the End of Grade 12)	Suggested Teacher Activities to Aid the Student	Key	Grade	Date Achieved	Notes/ Equipment
18	Participate in a virtual learning environment as a strategy to build 21st-century learning skills and networks, and customize learning environments to increase student engagement as well as the learning process.	<ul style="list-style-type: none"> Discuss, demonstrate, practice, and support participation in a virtual environment, such as a flipped classroom, online course, mobile learning application, or learning management system (LMS) platform (e.g., Blackboard, Moodle, Canvas, Seesaw, Schoology, virtual field trips and tours, local or global collaboration experiences, virtual immersive space, or games and apps). Use the student's accessible technologies and adaptive devices as needed. 				
19	Explore career opportunities related to STEM and STREAM concepts (science, technology, reading, engineering, art, mathematics, and music), and identify their related technology skill requirements.	<ul style="list-style-type: none"> Demonstrate, practice, and assess the use of one or more digital resources (e.g., American Foundation for the Blind's CareerConnect®, O*NET OnLine, or CareerOneStop) to explore career opportunities and identify related technology skills required for career choices, using the student's accessible technologies and adaptive devices as needed. Provide opportunities to assess and use a variety of job-seeking apps to explore career opportunities, such as Snagajob, LinkedIn, and Indeed. Participate in opportunities associated with technology-related careers, such as experiences with experts in the field (e.g., special guest speakers, videoconferencing, listening to podcasts, exploring online career sites such as CareerConnect®, job shadowing, and taking notes). Use the student's accessible technologies as needed, including adaptive devices. 				

#	Skill (To Be Completed by the End of Grade 12)	Suggested Teacher Activities to Aid the Student	Key	Grade	Date Achieved	Notes/ Equipment
20	Describe security issues related to e-commerce and apply them appropriately. For example, use anti-virus software, anti-malware, a firewall, SSL certificates, and secure password rules.	<ul style="list-style-type: none"> Describe, discuss, and explain security issues related to e-commerce and assess appropriate use of security measures when accessing an e-commerce site (e.g., anti-virus software, anti-malware, a firewall, and SSL certificates, secure password rules). For example, a student can research most-used passwords and create model passwords with more than six letters, capital letters, and punctuation with no personal information (e.g., name, birth date, social security number, phone number, address). The student can develop a password list to save in a secure place and back up. Use the student's accessible technologies and adaptive devices as needed. 				



II. Creativity and Innovation: Grades 9-12

Designing and creating meaningful products is enhanced and extended through the use of technology.

Student Progress Key

A = Formal Assessment

O = Teacher Observation

P = Portfolio Evidence

C = 21st Century Technology Class

Student Details

Student Name:

Teacher Name:

School:

#	Skill (To Be Completed By the End of Grade 12)	Suggested Teacher Activities to Aid the Student	Key	Grade	Date Achieved	Notes/ Equipment
1	<p>Apply advanced software features (e.g., graphics; table of contents; translating documents; hyperlinks; converting to and saving as PDF; document, website, and PDF accessibility; data validation; kerning (the spacing between letters or characters in text); extensions; template styles) to redesign the appearance of word processing documents, spreadsheets, and multimedia presentations.</p>	<ul style="list-style-type: none"> • With demonstration and practice, support advanced software features to redesign the appearance of word processing documents, spreadsheets, and multimedia presentations while using the student’s accessible technologies and adaptive devices as needed. For example: <ul style="list-style-type: none"> • Table of contents • Hyperlinks • Smart art • Add-ins • Symbols • Footnotes • Charts • Graphics • Captions • Formulas • Audio • Video • Template styles • Research and citations • Illustrations and 3D models • Transitions, animations, and iOS rotor features 				

#	Skill (To Be Completed By the End of Grade 12)	Suggested Teacher Activities to Aid the Student	Key	Grade	Date Achieved	Notes/ Equipment
2	<p>Illustrate a content-related concept using microlessons to communicate complex ideas clearly and effectively. Create or use a variety of digital objects, such as artifacts, visualizations, models (concept mapping), simulations (coding), games, art, or music.</p>	<ul style="list-style-type: none"> • Support, with discussion, demonstration, and practice, how to simplify a content-related complex idea using a microlesson. • The student practices, designs, and shares a microlesson to represent a content-related concept, using the student’s accessible technologies and adaptive devices as needed. Examples: <ul style="list-style-type: none"> • “The Benefits of Conserving Water”: Search for, link, and embed models and simulations, such as coded representations, artifacts, concept mapping, graphics, illustrations, 3D, animation, audio, video, games, art and/or music. • Remix an existing project to illustrate a new concept. • Use microlearning techniques, such as microlessons, to simplify a concept into smaller chunks, such as “Making a Nutritional Food Plan,” which could include roadblocks to progress (e.g., peer pressure, poor role modeling, portion sizes, meal deals, time limitations, celebrity endorsements). • Create a comparison infographic to share. For example, compare the benefits of organic and non-organic produce. • Note: These activities could be connected to independent living skills and the expanded core curriculum. 				

#	Skill (To Be Completed By the End of Grade 12)	Suggested Teacher Activities to Aid the Student	Key	Grade	Date Achieved	Notes/ Equipment
3	<p>Demonstrate using a variety of media and platforms to design, develop, publish, and present a virtual streaming project or game. For example, a newsletter, website, audiocast/podcast, video (such as augmented reality (AR) or immersive video/virtual reality (VR)), photo gallery, animation, art, or music.</p>	<ul style="list-style-type: none"> • Demonstrate and practice using a variety of media and formats to design, develop, publish, and present projects (e.g., newsletter, website, presentation, storytelling, photo gallery, audiocast, podcast, video, animation, art, or music). Use the student’s accessible technologies and adaptive devices as needed. Projects could include: <ul style="list-style-type: none"> • Video tutorial • Music files and lyrics • Free or open-source applications • YouTube story • App mashing • Media mashup or remix using an app such as Animoto, Project Mash, or ThingLink • For storytelling, writing, and art, consider using Apple Books, Kindle, Book Creator, Creative Commons, Canvas, Amazon, Teen Ink, or Celebrating Art 				

#	Skill (To Be Completed By the End of Grade 12)	Suggested Teacher Activities to Aid the Student	Key	Grade	Date Achieved	Notes/ Equipment
4	<p>Demonstrate how to use a specific design process (e.g., project-based learning, scientific method, or engineering design process) for generating ideas, testing theories, creating innovative artifacts, or solving authentic problems.</p>	<ul style="list-style-type: none"> • Discuss, demonstrate, and use the project-based learning design process to actively engage the student in a personally meaningful project. First, the student identifies a unique challenge, problem, or question related to a personal, real-world topic. The student then researches and designs a plan for the project and creates a schedule (allocate time for the project using a digital calendar). The student collects data and artifacts to support theories using digital resources, hard copies, images, etc. The student can work collaboratively with a peer or group. • Have the student draw conclusions, summarize, and share findings through a media presentation or recording (use the student's accessible technologies and adaptive devices as needed). For example, design a digital walking tour using the project-based learning design process. Collaborate with orientation and mobility specialists or other professionals on the tour (e.g., the Municipal Public Works Department) if needed. • An alternative project may be to discuss, demonstrate, and practice a scientific method design process by asking a question (test a theory), researching background, constructing a hypothesis, planning (experimental and control groups), collecting data, analyzing the data results, and drawing a conclusion(s). Ask: Is rethinking, rewriting, and retesting the design required to make a conclusion? Discuss the importance of trial and error. Use the student's accessible technologies and adaptive devices as needed. 				

#	Skill (To Be Completed By the End of Grade 12)	Suggested Teacher Activities to Aid the Student	Key	Grade	Date Achieved	Notes/ Equipment
5	Select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.	<ul style="list-style-type: none"> Discuss, demonstrate, and practice the engineering design process (EDP) to imagine, create, and improve a situation. Follow these steps: ask, imagine, plan, create, and improve upon a design. Ask: What should I change, what should I keep the same, and what would be the outcome? Use the student's accessible technologies and adaptive devices as needed. 				
6	Develop, test, and refine prototypes as part of a cyclical design process.	<ul style="list-style-type: none"> Discuss, demonstrate, and practice providing a prototype theme, tools, and materials; creating a prototype; creating something to interface with it; and sharing it in a digital format, including time for comments. Test, reflect on the design, ask what was learned, and use what was learned for the next prototype. For example, concoct a new beverage, food, or scrambled eggs. Use the student's accessible technologies and adaptive devices as needed. 				
7	Exhibit a tolerance for ambiguity, perseverance, and the capacity to work with open-ended problems.	<ul style="list-style-type: none"> Discuss an open-ended problem that needs a solution. Discuss the materials available for a successful solution. In groups, design a model to fix the problem. Plan, design, build with available materials, test, reflect, change or keep features, and share results with classmates and/or other audiences. Create a video to share, including how the team coped with ambiguity, which stages needed perseverance, and what it was like to work with an open-ended task. Use the student's accessible technologies and adaptive devices as needed. 				

#	Skill (To Be Completed By the End of Grade 12)	Suggested Teacher Activities to Aid the Student	Key	Grade	Date Achieved	Notes/ Equipment
8	Using a specific design process, create and design a program with block or text code, such as a game, animation, interactive stories, dance steps, treasure map steps, background music, and/or mobility tasks.	<ul style="list-style-type: none"> • Discuss and review a design process. Create and design an idea, choose a character, and tell a story. Then, add movements, objects, artwork, music, etc. Use the student's accessible technologies and adaptive devices as needed. Topic ideas for students: <ul style="list-style-type: none"> • Choose an everyday hero from your own life and build a story or game using code that gives your hero superpowers. • Pick a name or word and bring the letters to life through animation, sound, and music. • Two characters meet in a world and discover a surprising object. Decide what happens next by creating a story with code. • Working with a friend, tell the story of how your friendship started and imagine a company together. • Build a fashion-themed program, including a fashion walk, a stylist tool, and a pattern maker. • Create animations, interactive artwork, photo filters, and other artistic projects using code. • Use computer science to simulate extreme sports, make a commercial, and/or create commentary for a sporting event. • Create a gaming story. Use basic video game coding concepts by making different types of games, including racing, platform, and launching. 				

#	Skill (To Be Completed By the End of Grade 12)	Suggested Teacher Activities to Aid the Student	Key	Grade	Date Achieved	Notes/ Equipment
9	<p>Create a desktop or mobile webpage/ website using an existing website-building platform such as WordPress, Weebly, Edublog, Wix, or Blogger (for mobile devices, use Airsite, Universe, SimDif, or Wix).</p>	<ul style="list-style-type: none"> • Explore and discuss the website builder. Use the student's accessible technologies and adaptive devices as needed. Discuss and demonstrate the steps for building a website. Questions to consider: What is its purpose, function, and personal appeal? What software features are needed (simplistic or hosting platform)? Is the platform free or paid? Will you use free or paid quality templates? Does the builder select and host the domain or may you use your own domain name? Will it be an e-commerce site? • Support, with demonstration and practice, the creation of a webpage. Use software that is compatible with the student's accessible technologies and adaptive devices as needed (e.g., WordPress, Weebly, Edublog, Wix, Blogger). For iOS and Android mobile devices, use Airsite, Universe, SimDif, or Wix. 				
10	<p>Create an augmented reality (AR), virtual reality (VR), or looping video project. In augmented reality, the user interacts with the real world. In virtual reality, the user does not interact with the real world. Looping videos allow the video to play in a repeat mode without skipping to the next frame.</p>	<ul style="list-style-type: none"> • Discuss, demonstrate, and practice creating AR, VR, or looping video of a content-related concept. Share with classmates or other audiences. For example: Use AR to decorate spaces and virtually try on items such as eyewear, sneakers, masks, lipsticks, and hats. Use VR to show a space with the user at the center of the content, letting them look in any direction using their phone or a VR headset. Use the student's accessible technologies and adaptive devices as needed. 				



III. Communication and Collaboration: Grades 9-12

Communication is enhanced and extended through the use of technology.

Student Progress Key

- A = Formal Assessment
- O = Teacher Observation
- P = Portfolio Evidence
- C = 21st Century Technology Class

Student Details

Student Name:

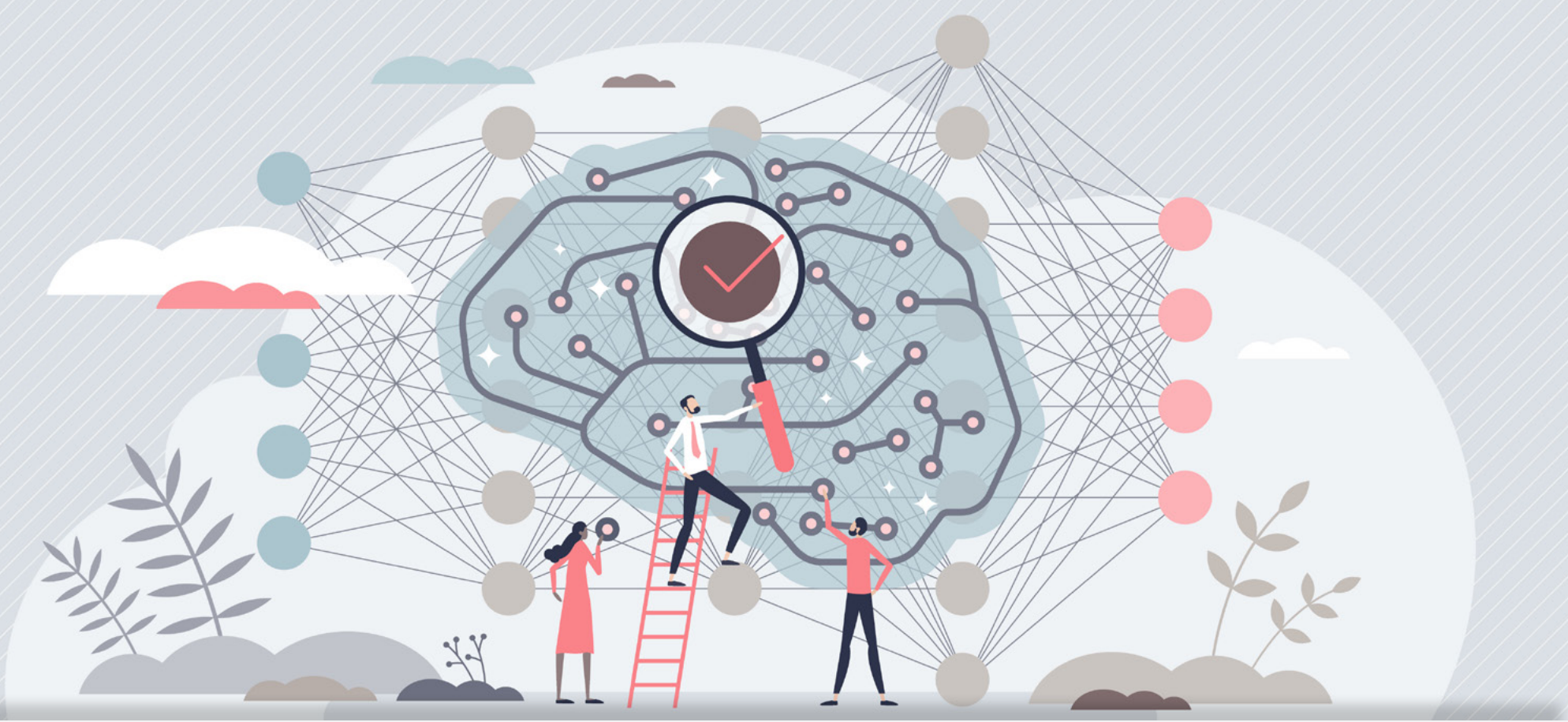
Teacher Name:

School:

#	Skill (To Be Completed By the End of Grade 12)	Suggested Teacher Activities to Aid the Student	Key	Grade	Date Achieved	Notes/ Equipment
1	<p>Use digital/electronic resources and collaboration tools to explore common curriculum content with local and global learners (e.g., discussion groups, webinars, online class experiences, blogs, podcasts, videoconferences, applications, and virtual field trips) to connect and share knowledge and culture with peers, experts, and other audiences.</p>	<ul style="list-style-type: none"> Support, with discussion, demonstration, and practice, the use of digital/electronic resources to collaborate with local and global peers, experts, and other audiences. Use resources such as virtual platforms, webinars, videoconferences, chats and instant messaging, learning management systems, blogs, podcasts. Use the student's accessible technologies and adaptive devices as needed. Participate in an online collaboration using digital/electronic resources with peers, experts, and other audiences. Use the student's accessible technologies and adaptive devices as needed. 				
2	<p>Identify effective uses of digital/electronic technology to enhance communication, share cultures, and examine issues and problems from multiple viewpoints with peers, family, school personnel, and global learners.</p>	<ul style="list-style-type: none"> Discuss, demonstrate, identify, and use digital/electronic resources (e.g., desktop conferencing, email, videoconferencing, instant messaging, social media, video chat, visualizations, models, simulations) to collaborate and communicate. Use the student's accessible technologies and adaptive devices, such as voice-activated devices, as needed. Sign up for and use services such as email, Instagram, Facebook, Twitter, and/or a messaging service to communicate with others on a class assignment or for leisure activities. Use the student's accessible technologies and adaptive devices as needed. 				

#	Skill (To Be Completed By the End of Grade 12)	Suggested Teacher Activities to Aid the Student	Key	Grade	Date Achieved	Notes/ Equipment
3	<p>Illustrate a content-related concept to communicate complex ideas clearly and effectively by creating or using a variety of digital objects, such as visualizations, models (concept mapping) or simulations (coding), and remixing media.</p>	<ul style="list-style-type: none"> • With discussion, demonstration, and practice, support searching, linking, and embedding models, simulations (such as coded representations/designs/schemes/systems), concept mapping, graphics, images, audio, music, animations, and videos that represent a content-related concept. Use the student's accessible technologies and adaptive devices as needed. • Discuss, demonstrate, practice, and create a remix or mashup. Remixing can be done using digital audio workstation (DAW) software or apps such as GarageBand, Mixcraft, Logic, Pro Tools, Sony Acid Music Studio, DJ Studio, or DJ Mixer. 				
4	<p>Plan and implement a collaborative content-related project that integrates a variety of media (e.g., print, audio, music, video, graphics, images, blog, animation, simulations and models) and telecommunication platforms and tools (e.g., ePals, Pencast, tablets, discussion boards, online groups, groupware, interactive websites, videoconferencing).</p>	<ul style="list-style-type: none"> • Guide the participation in planning, implementing, and sharing a collaborative content-related project by integrating and mixing a variety of media using telecommunications platforms and tools. Use the student's accessible technologies and adaptive devices as needed. Examples: making a commercial, telling a story, teaching a dance, gaming, dubbing, fandubs, and fansubs. 				

#	Skill (To Be Completed By the End of Grade 12)	Suggested Teacher Activities to Aid the Student	Key	Grade	Date Achieved	Notes/ Equipment
5	Describe the potential risks and dangers associated with online communications.	<ul style="list-style-type: none"> Describe the importance of personal security and the potential risks and dangers associated with online communications. Share examples of social and/or academic experiences that relate to the risks and dangers of online communication. Use the student's accessible technologies and adaptive devices as needed. Examples: Describe and generate a list of rules and conduct for online communications; engage in a pro-and-con debate about digital footprints and their permanence; or share ideas and feelings about actions having consequences and speaking or commenting positively about someone's work. 				
6	Demonstrate using technology tools to manage and communicate personal information (e.g., contact information, schedules, purchases, correspondence).	<ul style="list-style-type: none"> Introduce, demonstrate, practice, implement, guide, and assess independent implementation of technology tools for managing and communicating personal information and understanding the security measures related to e-commerce (e.g., contact information, purchases, payment options, delivery options, tracking options and correspondences). Use the student's accessible technologies and adaptive devices as needed. 				



IV. Critical Thinking, Problem Solving, and Decision Making: Grades 9-12

Thinking skills are enhanced or strengthened through the use of technology.

Student Progress Key

A = Formal Assessment

O = Teacher Observation

P = Portfolio Evidence

C = 21st Century Technology Class

Student Details

Student Name:

Teacher Name:

School:

#	Skill (To Be Completed By the End of Grade 12)	Suggested Teacher Activities to Aid the Student	Key	Grade	Date Achieved	Notes/ Equipment
1	Analyze the capabilities and limitations of digital resources, such as accessible tools and adaptive devices. Evaluate the tools' potential to help meet the student's needs, whether personal, academic, social, lifelong learning, or career-based.	<ul style="list-style-type: none"> Discuss, analyze, evaluate, and share the capabilities, limitations, and potential of accessible tools and devices (and adaptive devices) to address personal, academic, social, lifelong learning, and career needs. For example, design a visualization (e.g., chart, graphic, infographic, table, video, audio), using online or print surveys, interviews, comments, reflections, or experiences, showing the effectiveness of accessible tools and adaptive devices for meeting a student's needs. Use the student's accessible technologies and adaptive devices as needed. 				
2	Demonstrate the use of digital resources (e.g., educational software, simulations, models) for problem solving and independent learning.	<ul style="list-style-type: none"> Demonstrate, practice, and assess the use of a variety of digital resources for problem solving and independent learning (e.g., educational software, simulations, and models, including handheld devices, personal navigation devices, tablet applications, sound navigation devices, robotic navigation devices, and 3D, tactile, or haptic technologies), using the student's accessible technologies and adaptive devices as needed. Note: Collaborate with orientation and mobility specialists for all components related to independent mobility and orientation activities. 				

#	Skill (To Be Completed By the End of Grade 12)	Suggested Teacher Activities to Aid the Student	Key	Grade	Date Achieved	Notes/ Equipment
3	<p>Demonstrate the use of digital/electronic resources to facilitate problem-solving strategies through predicting, strategizing, applying, and evaluating problem-solving decisions.</p>	<ul style="list-style-type: none"> • Discuss, demonstrate, and practice making predictions, developing strategies, and evaluating decisions to assist with solving a problem, using the student's accessible technologies and adaptive devices as needed. For example, use a classroom assignment to predict the outcomes from survey data, online data sets, physical measurements, portfolios, multimedia presentations, projects, video demonstrations, coded games or puzzles, and/or databases. • Think of a concept and gather information to build the concept. Refine, test, and finish the product after review of information. For example, use a coded obstacle course, gather player information (e.g., orientation, movement, direction, and the player's objective), and create a faster way to complete the course. Using trial and error, strategize and run the code to achieve the level faster. Evaluate the strategy and make revisions, if necessary. Apply the strategy to the next levels to complete the game. Share results. Use the student's accessible technologies and adaptive devices as needed. 				

#	Skill (To Be Completed By the End of Grade 12)	Suggested Teacher Activities to Aid the Student	Key	Grade	Date Achieved	Notes/ Equipment
4	<p>Evaluate available digital/electronic resources and select the most appropriate applications to accomplish a specific assignment. (e.g., word processor, tables, charts, outlines, spreadsheets, annotation tools, aggregating apps/platforms, and/or presentation programs).</p>	<ul style="list-style-type: none"> Practice and demonstrate the evaluation of digital/electronic resources. For example, use the Currency, Relevance, Authority, Accuracy, and Purpose (CRAAP) Test. The CRAAP Test is a handy checklist to use when evaluating web resources or any resources. Practice and demonstrate selecting the appropriate applications to accomplish a task (e.g., word processing, tables, charts, outlines, spreadsheets, annotation tools, aggregating apps/platforms, presentation programs) or create a media-rich document/project. Use the student's accessible technologies and adaptive devices as needed. 				
5	<p>Collect data (or identify relevant data sets) and examine data patterns. Select and use digital/electronic tools to plan and manage a design process that considers design constraints and calculated risks. Analyze information and represent data in graphs, charts, words, images, infographics, or patterns to facilitate problem-solving and decision-making.</p>	<ul style="list-style-type: none"> Support, with demonstration and practice, employing a systematic approach, such as project-based learning, the scientific method, or the engineering design process (EDP), to gather data, examine patterns (such as coding, steps, quantitative and qualitative data), and apply information for decision making, using available digital/electronic resources. Use the student's accessible technologies and adaptive devices as needed. For example, use a data-mining site or gather relevant data from public access information (e.g., Library of Congress, National Archives, and Michigan eLibrary), surveys, and/or private databases. Analyze data using databases, visualizations, mapping tools, and text analysis tools. Share results with an audience. 				

#	Skill (To Be Completed By the End of Grade 12)	Suggested Teacher Activities to Aid the Student	Key	Grade	Date Achieved	Notes/ Equipment
6	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.	<ul style="list-style-type: none"> • Discuss, demonstrate, and practice collecting, organizing, processing, analyzing, and visualizing real-world data, using spreadsheets, databases, and other similar digital tools. Discuss how a problem can have many solutions, and that solutions can be adapted or modified to solve similar problems. Develop steps to solving the problem and generate possible decision-making solutions using models, simulations, or prototypes to refine solutions after testing. Use the student's accessible technologies with adaptive devices as needed. • Assist the student with an information technology project to develop a plan and gather and identify relevant data sets from credible research (e.g., interviews such as Vox Pop videos, questionnaires, experiments, scientific research, medical research, ethnographic research, or other credible online research). For example, design a simulation of relevant data sets, ask questions, experiment, include variables and controls, and evaluate and analyze results to solve a problem or make a decision. Use the student's accessible technologies with adaptive devices as needed. • To emphasize research, try using online scrapbooks to capture images and photos. Use the student's accessible technologies with adaptive devices as needed. 				

#	Skill (To Be Completed By the End of Grade 12)	Suggested Teacher Activities to Aid the Student	Key	Grade	Date Achieved	Notes/ Equipment
7	Demonstrate how to break real-world problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem solving.	<ul style="list-style-type: none"> Discuss, demonstrate, and practice breaking real-world problems into component parts, extracting key information, and developing descriptive models to understand complex systems or facilitate problem solving. For example, have students discuss and choose a relevant real-world topic to explore (e.g., online behaviors regarding fact versus fiction, right versus wrong, or kindness versus mean-spirited actions). Find the component parts, extract the key information, describe a model solution, brainstorm ways to solve the problem, and share solutions (charts, choice boards, list of do's and don'ts, or rules). Use the student's accessible technologies and adaptive devices as needed. 				
8	Describe how computers work and use algorithmic thinking to develop a sequence of steps to create and test computer-aided solutions.	<ul style="list-style-type: none"> Discuss, demonstrate, and practice a computer-aided solution that uses a sequence of steps to solve a problem or achieve a goal, using the student's accessible technologies and adaptive devices as needed. For example, describe a set of rules or code used for a computer-aided solution that completes a task. 				

#	Skill (To Be Completed By the End of Grade 12)	Suggested Teacher Activities to Aid the Student	Key	Grade	Date Achieved	Notes/ Equipment
9	Describe how automation (repetitive tasks done by machines/computers) works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.	<ul style="list-style-type: none"> Discuss, demonstrate, practice, and guide algorithmic thinking using math-based problem-solving activities. Algorithmic thinking helps students break down math problem steps into manageable parts to solve a problem and allows students to find meaning in math. For example, learn how to solve math problems by applying a series of automated steps that are replicated. Students can develop and test automated code to practice solving problems, such as moving around a treasure map that requires a repetitive code to find the treasure. Put the steps into writing, a media presentation, or a recording. Use the student's accessible technologies and adaptive devices as needed. 				
10	Formulate real-world problems using data analysis, abstract models, algorithmic thinking in exploring code, and finding solutions using code.	<ul style="list-style-type: none"> Discuss, demonstrate, and practice, with guidance, formulating a series of code to explore algorithmic thinking that finds an end solution. For example, challenge students, in groups, to develop a series of movements, dance steps, or paths to a destination. Assist students with writing the code to move the icon or character to an end solution. Use the student's accessible technologies and adaptive devices as needed. 				

#	Skill (To Be Completed By the End of Grade 12)	Suggested Teacher Activities to Aid the Student	Key	Grade	Date Achieved	Notes/ Equipment
11	Execute coding and programming skills by transitioning from block to text code.	<ul style="list-style-type: none"> • Provide opportunities for students to explore, practice, and transition from block to text coding and programming through use of CS First, Raspberry Pi Foundation, Blackbird Code, and/or Playgrounds. • Explore, practice, and graduate to fundamental coding skills (via tools such as Grasshopper and SoloLearn for Javascript; Python 3.6; or Python for Android with the LearnPython Programming Guide app). • Write and run test code, making changes if necessary. Use the student's accessible technologies and adaptive devices as needed. Note: Collaborate with an orientation and mobility specialist regarding orientation terminology. 				



V. Research and Information Literacy: Grades 9-12

Awareness, exploration, and opportunities to experience the internet and digital resources.

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A = Formal Assessment

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Student Details

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#	Skill (To Be Completed by the End of Grade 12)	Suggested Teacher Activities to Aid the Student	Key	Grade	Date Achieved	Notes/ Equipment
1	<p>Demonstrate the ability to use a search engine and determine differences between major search engines (e.g., Google, Bing, Yahoo!, Ask.com, DuckDuckGo).</p>	<ul style="list-style-type: none"> Discuss, demonstrate, and practice using a search engine to research a topic, using the student's accessible technologies and adaptive devices as needed. Create a scenario in which the student has to gather information on a real-world topic, produce a media presentation comparing at least 2-3 major search engine results, and cite creditable sources. 				
2	<p>Identify, evaluate, and select appropriate online sources to answer content-related questions.</p>	<ul style="list-style-type: none"> Discuss, demonstrate, and practice identifying, evaluating, and selecting appropriate online sources to answer content-related questions, using the student's accessible technologies with adaptive devices as needed. Investigate and practice using online sources such as Yahoo! Answers, HippoCampus.org, Hippocampus.education, Answerology, Ask a Librarian, Free Math Help, Ask Philosophers, Ask a Linguist, Ask a Geologist, QandA, Quora, Ask Me Help Desk, or Lumos Comprehend. Note: Teacher monitoring may be required. Demonstrate and practice using online surveys (e.g., SurveyMonkey, Typeform, Survio, SurveyPlanet) to collect answers to specific questions generated to identify the quality of the source's format and appropriateness. Use the student's accessible technologies with adaptive devices as needed. 				

#	Skill (To Be Completed by the End of Grade 12)	Suggested Teacher Activities to Aid the Student	Key	Grade	Date Achieved	Notes/ Equipment
3	Using information and communication technology resources, devise a research question or hypothesis, analyze the findings to make a decision based on the findings, and report the results.	<ul style="list-style-type: none"> • Discuss, demonstrate, and practice devising a research question or hypothesis and reporting the analyzed results to share with an audience (for example, learning how to state a problem to be solved). Use the student’s accessible technologies and adaptive devices as needed. Make sure the hypothesis clearly defines the topic and the focus of the experiment. Try to write the hypothesis as an if-then statement. With teacher guidance, if needed, the student can select the best tool(s) to do the following: <ul style="list-style-type: none"> • Form a question • Perform background research • Create a hypothesis • Design an experiment • Collect data • Analyze the results • Draw conclusions • Communicate the results • Discuss and define the variables, using communication and information technology resources to break problems into component parts; extract key information; analyze the findings; make a decision based on the findings; and report the results using the student’s accessible technologies and adaptive devices as needed. Example hypothesis: If you get at least 6 hours of sleep, you will do better on tests than if you get less than 6 hours of sleep. 				

#	Skill (To Be Completed by the End of Grade 12)	Suggested Teacher Activities to Aid the Student	Key	Grade	Date Achieved	Notes/ Equipment
4	Demonstrate the ability to use library and online databases for accessing information (e.g., Michigan eLibrary, ProQuest, Infospace, United Streaming).	<ul style="list-style-type: none"> • Provide guidance for teachers and school library media specialists to support the student's use of search strategies for locating information from digital resources, using a variety of accessible tools to construct knowledge and methods for creating artifact collections that demonstrate meaningful connections or conclusions for classroom assignments. Use the student's accessible technologies and adaptive devices as needed. Example resources: <ul style="list-style-type: none"> • Varied sources (e.g., digital, online, print) • Library databases and catalogs • Advanced tools and criteria searches • Online bookmarking and/or note-taking tools • Digital assets and media, such as photos, clip art, videos, and audio clips • Implementing the CRAAP Test when locating information and other resources • Online public access catalog (OPAC) such as MSU Libraries - Collections and Libraries (lib.msu.edu/general/collections), Library of Congress Catalog (catalog.loc.gov), and National Archives - Educator Resources (archives.gov/education) • Create scenarios for students to use a variety of free library online databases for research and citing sources. 				

#	Skill (To Be Completed by the End of Grade 12)	Suggested Teacher Activities to Aid the Student	Key	Grade	Date Achieved	Notes/ Equipment
5	Demonstrate the knowledge that using information from a single internet source might result in reporting erroneous facts, and that multiple sources must always be researched to diminish the effects of bias.	<ul style="list-style-type: none"> Discuss, demonstrate, and practice the concept that researching a topic using multiple internet sources is better than using one source. Use the student's accessible technologies and adaptive devices as needed. Provide opportunities for the student to research and cite a variety of resources related to the topic. 				
6	Distinguish between fact, opinion, point of view, and inference.	<ul style="list-style-type: none"> Discuss, demonstrate, and practice ways to use strategies to distinguish between facts, opinions, point of view, and inferences, using the student's accessible technologies and adaptive devices as needed. Create a comparison chart of fact versus opinion for a specific topic, in a document or in a table format (e.g., a fact is something that can be verified or proven to be true, versus opinion, which refers to a judgment or belief about something). Identify key differences between points of view and inferences on a topic through short video segments, a media presentation, or Word document, and share. Use the student's accessible technologies and adaptive devices as needed. 				

#	Skill (To Be Completed by the End of Grade 12)	Suggested Teacher Activities to Aid the Student	Key	Grade	Date Achieved	Notes/ Equipment
7	Evaluate information found in selected online sources on the basis of accuracy and validity.	<ul style="list-style-type: none"> • Demonstrate and practice strategies to evaluate academic and leisure information from online resources, using the student’s accessible technologies and adaptive devices as needed. • Develop strategies to distinguish and evaluate between credible facts and opinions for accuracy and bias. • Independently evaluate information from online sources for accuracy and bias. Support practice strategies to evaluate academic and leisure information from online resources, using the student’s accessible technologies and adaptive devices as needed. Suggested activities: <ul style="list-style-type: none"> • Gather information regarding virus transmission from human to human, human to animal, or animal to human. • Investigate if drinking water is a healthy behavior. • Investigate if dogs really need exercise. Some investigative sources may be Google Scholar, Microsoft Academic, Google Books, Microsoft Academic Search, WorldWideScience, Science.gov, Wolfram Alpha, Educational Resources Information Center, Virtual Learning Resources Center, and iSeek. Use the student’s accessible technologies and adaptive devices as needed. 				

#	Skill (To Be Completed by the End of Grade 12)	Suggested Teacher Activities to Aid the Student	Key	Grade	Date Achieved	Notes/ Equipment
8	Evaluate resources for stereotyping, bias, misinformation, and misrepresentation.	<ul style="list-style-type: none"> • Demonstrate and practice strategies to evaluate academic and leisure resources for stereotyping, bias, misinformation, and misrepresentation. Investigate sources such as Project Implicit (implicit.harvard.edu/implicit). Create a digital chart, table, or media presentation providing answers to the following questions to help students assess online sources for stereotyping, bias, misinformation, and misrepresentation of information. Use the student's accessible technologies and adaptive devices as needed. <ul style="list-style-type: none"> • What is the author's political point of view? • What does the author stand to gain? • Who is paying for the website? • Does the author present alternate points of view? If so, are those views presented objectively, or with scorn? • Does the author present a limited view of the topic? 				



VI. Digital Citizenship: Grades 9-12

The ethical use of technology is an essential element of responsible citizenship.

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A = Formal Assessment

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Student Details

Student Name:

Teacher Name:

School:

#	Skill (To Be Completed by the End of Grade 12)	Suggested Teacher Activities to Aid the Student	Key	Grade	Date Achieved	Notes/ Equipment
1	<p>Discuss and describe acceptable and responsible use of digital/electronic technology. Engage in the use of positive, safe, legal, and ethical behavior while using technology, including during online social interactions or while using networked devices.</p>	<ul style="list-style-type: none"> • Discuss, describe, demonstrate, and practice acceptable and responsible use of digital/electronic technology to include positive, safe, legal, and ethical behavior. Reflect, develop, and practice positive online social interactions and positive feedback among classmates. Use the student's accessible technologies and adaptive devices as needed. Activity examples for acceptable and responsible use of digital/electronic technology: <ul style="list-style-type: none"> • In groups, develop a list of rules for positive online behavior and comments to use and share with others. • Create and share T-Charts of rules, such as right versus wrong, or do's and don'ts for using networked devices in school, at home, and in the community. • Develop a quiz to share about online privacy. • Record a podcast or video regarding sharing personal information. • Remix a video about legal and ethical behavior. • Make a commercial discussing protection from viruses. • Make a game or treasure map related to secure file sharing. • Create a musical presentation about the differences between public and private Wi-Fi access. • Make digital graphic art posters about positive online behavior. 				

#	Skill (To Be Completed by the End of Grade 12)	Suggested Teacher Activities to Aid the Student	Key	Grade	Date Achieved	Notes/ Equipment
2	<p>Demonstrate an understanding of, and respect for, rights and obligations involved in using and sharing intellectual property. Identify legal and ethical issues related to the use of information and communication technologies (e.g., right to use resources; properly selecting, acquiring, and citing resources). Provide accurate citations when referencing information sources.</p>	<ul style="list-style-type: none"> • Discuss, demonstrate, and incorporate practice activities, abiding by copyright and fair-use rules, citing resources, receiving or giving permission to use content, avoiding plagiarism, and using Creative Commons to share work. For example, students can discuss and research fair-use and copyright rules in groups. Create a chart for these rules from Creative Commons. To accurately cite sources and avoid plagiarism, consider using platforms such as Turnitin, NoodleTools, Scribble, Plagiarism Checker Chrome extension to help students. Use the student's accessible technologies and adaptive devices as needed. • Discuss, demonstrate, and practice adherence to fair-use policies and copyright guidelines. Also discuss and demonstrate the importance and obligation of citing another author's work. For example, use Creative Commons resources, search, meta search, application programming interface (API) search, or Google or Bing searches to find fair-use and copyright policies. Practice using Creative Commons to find the fair use of a group of pre-selected photos. 				

#	Skill (To Be Completed by the End of Grade 12)	Suggested Teacher Activities to Aid the Student	Key	Grade	Date Achieved	Notes/ Equipment
3	Describe possible long-range effects of unethical uses of technology (e.g., virus spreading, file pirating, and hacking) on cultures and society.	<ul style="list-style-type: none"> • Discuss, demonstrate, and practice the possible long-range effects of unethical uses of technology on cultures and society. Practice activities that include researching the history of public, private, business, or personal account breaches, and the lasting effects of the breaches. For example, create digital presentations that describe: <ul style="list-style-type: none"> • The illegal collection of school records. • The hacking of home computers and mobile devices, which compromises personal information. • Viruses embedded in computers, mobile devices, and braille personal digital assistant (PDA) devices through instant/text messaging, emails, and pop-ups. • Unauthorized public Wi-Fi access to personal data. • File sharing through unsecured platforms. • Using unsecured websites, breach of copyright, and/or breach of community utilities to compromise utility systems. Use the student's accessible technologies and adaptive devices as needed. 				

#	Skill (To Be Completed by the End of Grade 12)	Suggested Teacher Activities to Aid the Student	Key	Grade	Date Achieved	Notes/ Equipment
4	Describe digital footprint permanence and long-term ramifications of participating in questionable online activities that affect digital identity and reputation (e.g., cyberbullying or making threats to others, animal abuse, threatening posts that include firearms/ weapons, school security threats, posting photos of risqué poses or underage drinking).	<ul style="list-style-type: none"> Discuss, describe, and demonstrate the long-term ramifications and permanence of a digital footprint. Share ideas and experiences, and reflect on the effects of participating in questionable online activities. Demonstrate, with voiceover (adding voice on top of existing content), that what is posted does not go away. Examples: cyberbullying, illegal activities, animal abuse, threatening posts that include firearms/weapons, posting unauthorized photos, posting photos of risqué poses, making threats to others, underage drinking, or school security threats. Use the student's accessible technologies and adaptive devices as needed. 				

#	Skill (To Be Completed by the End of Grade 12)	Suggested Teacher Activities to Aid the Student	Key	Grade	Date Achieved	Notes/ Equipment
5	<p>Describe the potential risks associated with online communications. Demonstrate how to manage personal data to maintain digital privacy and security, and how data-collection technology is used to track navigation online.</p>	<ul style="list-style-type: none"> • Discuss and demonstrate the importance of personal security as well as the potential risks associated with online communications. • Identify legal rights and ethical issues related to personal information, such as personal data being collected and shared, if allowed, on mobile applications. • Research and make a list of rules for online security, such as changing passwords regularly; clearing the history, cookies, and cache; using secure URLs (https versus http); reviewing and deleting location services; reading privacy policies to understand user rights; and being mindful of accepting privacy agreements. • Reflect and share examples of social and/ or academic personal privacy and security experiences. • Create a media presentation that shows how to diminish the risks of personal information being collected and used during online navigation. Use the student's accessible technologies and adaptive devices as needed. 				

Assistive Technology Glossary

ASCII (American Standard Code for Information Interchange):

Pronounced “ask-ee,” it is the built-in binary code for representing characters in all computers except IBM mainframes, which use the EBCDIC coding system. A standard coding scheme specifically oriented toward data processing applications, ASCII was developed in 1963 and modified in 1967 by the American National Standards Institute (ANSI).

App:

App is short for “application.” App software can be downloaded from the internet onto smartphones, tablets, computers, or other digital and electronic devices.

Assistive Technology Device:

An assistive technology device, as defined by IDEA, is any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve the functional capabilities of children with disabilities (20 U.S.C. 1401(1)).

Audio File:

A file containing compressed digital audio that may be found in various formats, such as a compact disc, MP3, or other ATD.

Avatar:

A graphical representation of the user, or an alter ego of the user.

AVI:

AVI stands for Audio Video Interleave. It is a multimedia format that was introduced by Microsoft in 1992. AVI files contain both audio and video.

Block-Based Coding Programming:

Block-based coding is used as an introduction to coding and incorporates “blocks” of instructions. The blocks instruct the moves and can be arrows for direction, colors, and actions. The student drags the blocks to the instructions to complete tasks.

Blog:

Blog is short for “weblog.” Someone who blogs is called a “blogger.” A blog is a website where a blogger maintains a personal journal or interactive forum, much like a public discussion board. Written by one person or a group of contributors, entries contain commentary and links to other websites as well as images and videos. The term “blog” is used as both a noun and verb.

Bluetooth:

Bluetooth is a short-range wireless technology used to create Personal Area Networks (PANs) among an individual’s devices, and with other nearby devices. Note: Check electronic/digital devices for Bluetooth connectivity.

Boolean logic:

Boolean logic is a form of algebra in which all values are reduced to either TRUE or FALSE. Boolean logic is especially important for computer science because it fits nicely with the binary numbering system, in which each bit has a value of either 1 or 0. Another way of looking at it is that each bit has a value of either TRUE or FALSE.

BRF:

BRF stands for Braille Ready Format. BRF files are a widely recognized form of contracted braille. The files can be used with common braille reading devices or braille printers.

CCTV:

A low-vision closed-circuit television (CCTV) is an electronic magnifier that can magnify text, images, etc., at a much higher power than a regular magnifier. The CCTV monitor can magnify not only reading material but objects as well, such as a prescription bottle or label on a jar. NOTE: Some CCTV devices include a camera that allows viewing from a distance.

Cloud:

The cloud provides online storage that can be remotely accessed through an app. For example, cloud storage services back up documents, mail, photos, data, and gaming. Some examples of cloud services are iCloud, Google Drive, Google Docs, Google Calendar, Amazon Web Services, Dropbox, and Microsoft OneDrive. Even social networking websites such as Facebook and LinkedIn are technically cloud-based services because they store information online.

Coding:

Coding is the process of writing instructions for computer programs.

Coding Glossary from Swift Playgrounds by Apple:

- **Algorithm:** A step-by-step set of instructions or rules for solving a problem. For example, a list of steps used to make a cup of tea can be considered an algorithm.
- **Application:** Software, made up of code, that allows you to perform tasks. For example, you use the Messages application (app) to send and receive messages.
- **Argument:** An input value passed into a function to customize its behavior. For example, in the function call `move (distance: 3)`, 3 is an argument that specifies how many spaces to move.
- **Arithmetic Operator:** A symbol, such as +, -, *, or /, that performs a basic mathematical operation on one or more numbers. For example, `42/7` and `17 - 5` use arithmetic operators.
- **Array:** A collection that stores an ordered list of items of the same type. The same item can appear multiple times in different positions. For example, `highScores = [37, 34, 29, 26]` is an array on integers.
- **Array Out of Bounds Error:** An error caused by trying to access an array using an index that is outside of that array's boundaries. For example, the index 2 is outside of the boundaries of the following array: `[17, 42]`.
- **Assignment:** An action that sets the value of a variable or constant.
- **Assignment Operator:** The = symbol used to set the value of a variable. For example, `greeting = "hello"` sets the value of `greeting` to "hello."
- **Boolean:** A type that has a value of either true or false. For example, `9 < 7` returns a Boolean value of false because 9 is not less than 7.
- **Bug:** An error in code that prevents an application from running as expected.
- **Call:** To "call" a function in code is to instruct that function to run, performing the actions defined inside it. For example, calling the `moveForward()` function performs its actions that result in a forward move.

- **CamelCase:** A style of writing compound words in which each new word begins with a capital letter and contains no spaces. In lower CamelCase, the first letter of the entire word is lowercase. For example, the variable and function `var eyeColor` and `func checkForgems ()` use lowercase CamelCase.
- **Coding:** The act of composing commands, code structures, and algorithms to create a computer application.
- **Command:** Code that tells an application to perform a specific action.
- **Comparison Operator:** A symbol, such as `==`, `!=`, `<`, `>`, `<=`, used to compare two values. A comparison operator can be used in a condition of an “if” statement or while looping to return a Boolean value indicating whether a comparison is true. For example, `6 > 8` compares 6 and 8 and returns false.
- **Composition:** The process of combining small parts of an application to solve a larger problem.
- **Compound Assignment Operator:** An operator that combines assignment (setting the value of a variable) with another operation, such as addition or subtraction. For example, if the current value is 1, using `a += 3` adds 3 to 1 and assigns the result to `a`, so that the value of `a` is now 4.
- **Conditional Code:** Code that runs only when specific conditions are met. For example, “if” statements and “while” loops containing conditional code that runs only if or while a condition is true.
- **Constant:** A named container that stores a value that cannot be changed.
- **Debug:** To find and fix errors in code that prevent an application from running correctly.
- **Declaration:** A piece of code that creates something new in your application, such as a function, variable, custom type. For example, `let planet = “Earth”` declares a new constant, `planet`, and gives it a value of “Earth.”
- **Decomposition:** The process of breaking a large problem into smaller, more manageable pieces.
- **Define:** To provide the explicit value or behavior of a newly created piece of code, such as a function, variable, or custom type. For example, you define a function by providing a set of commands within the function to tell it what to do.
- **Dot Notation:** A form of syntax used to access the properties or call the methods of an instance. For example, `expert.toggleSwitch()` calls the `toggleSwitch()` method on the `expert` instance.
- **Else Block:** A block of code in an if statement. The else block runs if all conditions in the if statement are false.
- **Else If Block:** A block of code in an if statement, used to check a condition that is not checked by the if block or any other else if blocks.
- **Enumeration:** A type that defines a set of unique, but related, values called enumeration cases. For example, a `Direction` enumeration defines cases for each cardinal direction: north, south, east, and west. When assigning an enumeration to a variable or constant, always choose just one of its cases; for example, `let compassDirection: Direction = .north`.
- **For Loop:** A block of repeated code that runs a certain number of times.
- **Function:** A named set of commands that can be run whenever needed.
- **If Block:** The first block of code in an if statement. The if block runs if the condition in the if statement is true.
- **If Statement:** A code structure used to run code based on the value of one or more conditions. The first block of code in an if statement is the if block. An if statement might also contain other blocks that provide additional checks, such as an else block and else if block.
- **Index:** A number that represents the position of an item in an array.
- **Initialization:** The act of creating a new instance of a type, which includes setting initial values for any properties of the type.
- **Instance:** A value of a particular type. For example in `let greenPortal = Portal ()`, `greenPortal` is an instance of type `Portal`.
- **Int:** A type that stores an integer—a whole number, such as 10 or -42.

- Iteration: The act of repeating a process, such as performing the same action on each item in an array.
- Local Variable: A variable declared inside of a function, loop, or other statement. Local variables can't be accessed outside of the code in which they're defined.
- Logical AND Operator: A symbol (&&) that combines two Boolean values where both values must be true for the overall code to be true. For example, a && b is true only when both a and b are true.
- Logical NOT Operator: A symbol (!) that inverts the Boolean value of a piece of code. For example, if a is true, then ! a is false.
- Logical Operator: A symbol, such as &&, ||, or !, that modifies or combines the Boolean logic values true and false.
- Logical OR Operator: A symbol (||) that combines two Boolean values where only one value must be true for the overall code to be true. For example, a || b is true when either a or b is true (or when both are true).
- Loop: A block of code that is repeated a certain number of times (for example, a for loop) or until a condition is met (for example, a while loop).
- Method: A function, or set of commands, that is defined inside a type.
- Nest: To place one repeating block of code, such as a loop, inside another.
- Operator: A symbol, such as +, -, or &&, that represents an action on one or more values. For example, in 1 + 2, the addition operator (+) adds the numbers 1 and 2.
- Outer Loop: A repeating block of code (a loop) that contains another (inner) loop.
- Parameter: The name of an input value to a function, used in the definition of the function. For example, in move(distance: Int), distance is a parameter that takes a value of type Int.
- Pattern: A repeating set of circumstances or data.
- Property: A variable (a named container that stores a value) defined inside a type.

- Pseudocode: An easy-to-read description of an algorithm, usually written using a mix of everyday language and code.
- Reusability: A characteristic of code that allows it to be used in different situations within an application.
- Right-Hand Rule: A rule, typically used to generate maze-solving algorithms, that guides a character through a maze by following along the wall on the character's right-hand side.
- State: The stored information of a variable, application, or system at a given time.
- Statement: A structure, such as a loop or if statement, that organizes code in an application.
- String: A type that stores a series of characters, such as "Hello, world" or "dancing kittens."
- Swift: Apple's programming language, used for writing apps for iPhone, iPad, Mac, Apple Watch, and Apple TV.
- Syntax: The rules for writing code that computers can understand and run.
- Type: A named grouping of properties (the features) and methods (the behaviors) of a kind of data.
- Variable: A named container that stores a value that can be changed.

Cookies:

Cookies are small files created by some websites and stored on your computer's hard drive. The web browser's job is to handle information it receives from cookies on different websites. In fact, cookies can be managed in all modern browsers via the Options or Settings tab, and you can even choose to disable this feature altogether.

Collaborative Technologies:

Applications that facilitate teamwork and collaboration between students and experts around the globe; for example, knowledge-sharing tools, video conferencing, digital project spaces/sites, chats, collaborative schedulers.

Collaboration Platforms:

Examples of collaborative platforms include Blackboard, WhatsApp (cross-platform internet service communication app), FaceTime, Skype, and Snapchat.

CRAAP Test:

CRAAP Test stands for Currency, Relevance, Authority, Accuracy, and Purpose. Evaluating the currency, relevance, authority, accuracy, and purpose of sources you find is a crucial step in the process of writing research.

Cyberbullying:

Cyberbullying involves using the internet and related technologies to harm other people in a deliberate, repeated, and hostile manner. As it has become more common in society, particularly among young people, legislation and awareness campaigns have arisen to combat it.

DAW:

A Digital Audio Workstation, or DWA, is a digital system designed for recording and editing digital audio. It may refer to audio hardware, software, or both.

Digital Recorders/Digital Voice Assistant:

Signals can be stored as a sound file and transferred later to a text file through the use of voice recognition software. This is characterized by a clean, noise-free recording.

Digital Objects:

Any product, asset, or artifact that is digital, such as a visualization, model, or simulation.

Digital Resources:

Digital resources refers to any resource that is in digitized form and can be read and scanned by electronic media. Digital resources do not require separate space in a library, as these can be stored in a computer (locally or remotely).

Digital Text:

Digital text, or eText, is an electronic version of written text. Digital text can be found online, on your computer, or on a variety of hand-held electronic devices. With digital text, changing or customizing information to meet students' needs is easy.

Digital Tools:

Digital tools are software and platforms for teaching and learning that can be used with computers or mobile/smart devices to work with text, images, audio, and video.

E-commerce:

Electronic commerce, commonly known as e-commerce, is the buying and selling of products and services by businesses and consumers through an electronic medium without using any paper documents. E-commerce is widely considered to be the buying and selling of products over the internet, but any transaction that is completed solely through electronic measures can be considered e-commerce.

E-file:

A file acquired or accessed from the internet through an electronic format, such as computer, digital device, or electronic device.

E-reader:

An e-reader (electronic reader) is a device for reading content, such as e-books, newspapers, and documents. A standalone e-reader typically has wireless connectivity for downloading content and conducting other web-based tasks.

Electronic Device:

Any device requiring a battery or electricity to operate.

Electronic Reference:

For the purpose of research conducted using databases and webpages, these are defined as online information resources, including bibliographic databases, electronic reference books, search engines for full-text collections, digital collections of data, and data sets. This may include individual reference e-books and e-journals.

Email:

Short for “electronic mail,” email is a method of composing, sending, and receiving messages over electronic communication systems.

FaceTime:

An iOS video chat service (Apple).

Flipped Classroom:

The flipped classroom is a model of teaching in which a student’s homework is the traditional lecture viewed outside of class on a video podcast (vodcast). Class time is spent on inquiry-based learning which may include what some traditionally consider a student’s homework assignment. This term is synonymous with “reverse classroom.”

FLV Media Player:

Flash Video is a file format to deliver video over the internet using the Adobe Flash Player. The F4V format is based on ISO media file format and is also supported by Adobe Systems.

GIF:

GIF is an acronym for Graphic Interchange Format and is the widely used compressed image format developed by CompuServ in 1987. GIF has a palette of up to 256 colors, which greatly reduces the file size for quick transfer. GIF is suitable for icons, animation, and web pages, but it is unsuitable for photographic file transfer because it lacks the full color range.

GPS:

GPS is the acronym for Global Positioning System. GPS is a satellite navigation system used to determine ground position and velocity (location, speed, and direction).

Intellectual Property:

Content or ideas created by an individual or entity; for example, music, photos, narration, text, and designs.

Internet Access:

Internet Access is a service that provides access to the global system of interconnected computer networks known as the internet. For education purposes, one will use the LEA service provider.

iTunes University:

iTunes U is a section of the iTunes Store where users can download free educational course content from many colleges and universities, nonprofit educational institutions, and K-12 organizations.

JPEG:

JPEG is the acronym for Joint Photographic Experts Group; named after the group that developed the format. It is a compressed image file format. JPEG images are not limited in color range like GIF images. JPEG is best for compressing photographic images, however, some image quality is lost in compression.

Low-Vision Technology:

Low-vision technology can make it possible to read, write, browse the internet, watch TV, use the computer, access consumer information, and travel around the community.

Magnification:

The process of enlarging the size of something, as an optical image. Something that has been magnified is an enlarged representation, image, or model. Magnification software allows low-vision computer users to more easily read portions of the screen by magnifying the text.

Mashup:

Mashup's original meaning was the meshing of two different styles of music into one song, such as meshing classic rock with hip-hop. Combining different video clips from different sources is also considered a mashup. A mashup can also be a web application that combines multiple services into a single application, such as using Google Maps on a web forum with the purpose to consolidate information with an easy-to-use interface.

Mobile Learning:

The term M-Learning, or "mobile learning," has different meanings for different communities. Although related to e-learning, Edtech and distance education, it is distinct in its focus on learning across contexts and learning with mobile devices. One definition of mobile learning is "any sort of learning that happens when the learner is not at a fixed, predetermined location, or learning that happens when the learner takes advantage of the learning opportunities offered by mobile technologies."

MP4 Players:

MP4 is a file format created by the Moving Picture Experts Group (MPEG) as a multimedia container format designed to store audiovisual data. The MP4 is largely replacing earlier multimedia file formats and creating some changes in the way that vendors sell audiovisual files to the public.

MPEG:

MPEG is the acronym for Moving Picture Experts Group, which works with the International Organization for Standardization (IOS) and develops standards for audio and video compression. The files are for movies containing audio and video.

Multimedia formats:

Multimedia is the integration of multiple forms of media. This includes text, graphics, audio, video, etc. For example, a presentation involving audio and video clips would be considered a "multimedia presentation." Educational software that involves animations, sound, and text is called "multimedia software."

Multimedia Resources:

Multimedia involves integration of animation, audio, graphics, text, and full-motion video through computer hardware and software and touch screen tablet applications for education, training, or leisure/recreation. Resources include, but are not limited to, Kid Pix, Creative Writer 2, Image Blender, Inspiration, Kid Works Deluxe, Kidspiration, Nearpods, Shadow Puppet, Spiral.ac, Biteslide, Adobe Spark, Animoto, Prezi, Haduko, PowerPoint, Keynote, and Knovio, as well as YouTube and Kids YouTube.

Netiquette:

Net etiquette, or "netiquette," refers to etiquette on the internet. Good netiquette involves respecting others' privacy and not doing anything online that will annoy or frustrate other people.

Online Tutorial:

An online tutorial is a video that takes the learner through a series of steps to learn how to use a product or learn about a concept. A tutorial can also be a class or workshop that provides special (often individual or small group) instruction in a particular area. Programmed instruction provided to a user at a computer terminal may involve the use of a specific software application.

Operating System:

An operating system is a set of programs that manage computer hardware resources and provide common services for application software. The operating system is the most important type of system software in a computer system or device.

Paths To Literacy for Students Who Are Blind or Visually Impaired

Definitions:

- **Dual Media:** The use of both print and braille as modes for reading and writing. Some eye conditions in which there is a gradual loss of vision may be a factor in choosing this option.
- **General Literacy:** Speaking, listening, object communication, sign language, concept development, and an understanding of one's environment and experiences are all part of a more inclusive view of literacy.
- **Auditory Strategies:** Definitions of literacy have expanded to include auditory skills as another type of literacy. Many students with visual impairments access information from text through auditory means.
- **Struggling Readers:** Struggling readers may have learning disabilities, such as dyslexia. Emotional and behavioral challenges, such as anxiety or ADHD, may also affect literacy skills.
- **Digital Object:** Any product, asset, or artifact that is digital, such as visualizations, models, or simulations.
- **Responsibly Repurpose/Remix:** Changing the way something was originally used or combining original assets in a unique way, seeking permission to use content from the author/creator as needed, and using attributions.
- **Platform:** Mode of information delivery. For example, a blog, video, podcast, slide deck presentation, digital poster, social media site, or other online tool.
- **Digital Tools:** For example, brainstorming tools, flow charts, drawing or mark-up tools, 2D or 3D design software, note-taking tools, and project management tools.
- **Digital Tools to Connect With Learners:** Tools, such as video conferencing, chats, virtual field trips, multimedia online games, email, and social media, that are used to connect with other learners around the world.
- **Collaborative Technologies:** Applications that facilitate teamwork and collaboration between students and experts around the globe. For example, knowledge-sharing tools, video conferencing, digital project spaces/sites, chats, and collaborative schedulers.

Platform:

Mode of information delivery. For example, a blog, video, podcast, slide deck presentation, digital poster, social media site, website, or other online tool.

PDF:

Portable Document Format (PDF) is a multi-platform file format developed by Adobe Systems in 1991. A PDF can capture a document's text, font, image, and formatting from other documents. A PDF will look the same on PC and Apple devices. PDFs are accessible to screen readers such as JAWS.

Peripherals:

Peripherals are any external devices that provide input or output for the computer. For example, a keyboard and mouse are input peripherals, whereas a monitor and printer are output peripherals. Some peripherals provide both input and output for a computer such as an external hard drive.

Personal Digital Assistant (PDA) Note-Takers:

Any electronic note-taking device that may or may not include a braille display or features that include word processing, audio input/output, calculator, book reader, web browser, email, streaming audio, chat, media player, etc.

Pop-Ups:

Pop-up ads, or "pop-ups," are forms of online advertising that are intended to attract web traffic or capture email addresses.

Power Strip:

An electrical device consisting of a cord with a plug on one end and several sockets on the other. A power strip (also known as an extension block, power board, plug board, trailer lead, and many other variations) is a block of electrical sockets that attaches to the end of a flexible cable (typically with a main plug on the other end), allowing multiple electrical devices to be powered from a single electrical socket.

Programming

Programming is the process of taking coded instructions and making the target act according to them.

Refreshable Braille:

A refreshable braille display, or braille terminal, is an electro-mechanical device for displaying braille characters, usually by means of raising dots through holes in a flat surface. A braille display provides access to information on a computer or tablet screen by electronically raising and lowering different combinations of pins in braille cells.

Responsibly Repurpose or Remix Digital Resources:

Changing the way something was originally used or combining original assets in a unique way and, as needed, seeking permission to use content from the author/creator and using proper attributions.

RTF:

RTF stands for Rich Text Format. It is a universal format that can be read by most processors. It is a document file format standardized by Microsoft for encoding text and graphics.

Screen-Reading Software:

Software that reads the contents of a computer and tablet screen, converting the text to speech. Screen readers are designed for specific operating systems and generally work with most applications.

Scrum:

Scrum is a framework for project management that emphasizes teamwork, accountability, and iterative progress toward a well-defined goal. The framework begins with a simple premise: Start with what can be seen or known. After that, track the progress and tweak as necessary. The three pillars of Scrum are transparency, inspection, and adaptation.

SD Card:

A Secure Digital (SD) card is a tiny memory card used to store data in devices such as digital cameras, mobile phones, PDAs, portable music devices, and digital voice recorders. An SD card is a removable electronic chip that can hold data and transfer data from one electronic device to another.

Sideloading:

Sideloading is a term similar to upload and download, but in reference to transferring data between two devices, such as a computer and a mobile device via USB, Bluetooth, or SD card.

Skype:

An internet communication video service.

Smartpen:

An electronic ballpoint pen that digitizes, stores, and transfers what is written or drawn to the computer. Instead of a mouse, a digital pen provides a very natural way to hand-write and hand-draw on a computer. Because it stores everything internally, the data transfer to the computer via wireless or USB can be done at a later time if needed. Digital pens may also include audio recording.

Smart:

“Smart” refers to speaker devices that are voice-assisted, voice-controlled, and voice-activated systems for independent living. Smart speaker devices include Amazon Echo (Dot and Spot) and Google devices. Voice-controlled systems include Siri, Alexa, Google Now, Microsoft’s Cortana, and Apple’s HomePod. Voice-activated devices that are household appliances, including refrigerators, thermostats, robotic vacuums, and TVs, feature voice-activation software and apps.

Social Media:

Social media is a common term for a variety of internet applications that allow users to create content and interact with each other. This interaction can take many forms, but some common types include:

- Sharing links to interesting content produced by third parties.
- Public updates to a profile, including information on current activities and even location data.
- Sharing photos, videos, and posts.
- Commenting on photos, posts, updates, videos, and links shared by others.
- Email and apps, such as Instagram, Twitter, and Facebook. Please note: Adult supervision is suggested with students in kindergarten through grade 12.

Surge Protector:

Surge protectors safeguard against irreparable damage to sensitive devices and equipment (such as computers) by preventing electrical spikes and surges from reaching their internal components. A surge protector is plugged into a wall outlet and allows the user to plug other electronic devices into it.

Tablet:

A tablet is a portable computer that uses a touch screen as its primary input device. Most tablets are slightly smaller and weigh less than the average laptop.

Text-Based Coding:

Text-based coding is writing instructions using text to program a task.

Tutorial:

A tutorial is created as a learning tool. Tutorials help people learn new skills by using a step-by-step process. Tutorials can be found online for do-it-yourself help, troubleshooting support, how-to instructions, and more.

URL:

URL is the acronym for “Uniform Resource Locator.” A URL is the address of a specific website or file on the internet. It cannot have spaces or certain characters, and it uses forward slashes to denote different directories.

Video Conferencing:

Conducting a conversation or meeting between two or more participants at different sites by using computer networks to transmit audio and video data. Each participant has a device with a video camera, microphone, and speakers.

Video Magnifier:

A video magnifier is an electronic magnifier that uses a camera and a screen to make text easier to read. The camera image will be magnified and the contrast can be increased, making it even easier to read. A video magnifier or CCTV system can be handheld or stand-mounted to project a magnified image onto a video monitor, TV screen, tablet screen, or computer monitor. Cameras with zoom lenses provide variable magnification.

Virtual Environment:

A computer-generated, three-dimensional representation of a setting in which the user perceives him- or herself to be, and within which interaction takes place. This also called virtual landscape, virtual space, or virtual world. This computer-simulated environment enables its users to create virtual representations of themselves, called avatars, through which the user interacts with the “world.”

Voice Assistant:

A voice assistant is a digital assistant that uses voice recognition, natural language processing, and speech synthesis to aid users through phones and voice recognition applications (for example, Siri from Apple). Voice assistants are integrated into smart speaker devices like Google Home and Amazon Echo, and directly into iOS operating systems like Apple's Siri and Microsoft's Cortana. Voice assistants are also in vehicles, home environment systems (such as heating and lighting controls), TVs, appliances, and speaker systems.

Voice Command Device:

A voice command device (VCD) is a device controlled with a voice user interface. Voice user interfaces (software and apps) have been added to cars, home automation systems, computer operating systems, and home appliances like robotic vacuums, washing machines, microwave ovens, and TV remote controls. VCDs are also known as smart speaker devices, voice-assisted devices, and voice-activated devices. Voice-activated devices are the primary way of interacting with virtual assistants on smartphones and smart speakers. For example, Amazon Echo and Google Home devices.

WAV:

Waveform Audio File Format (WAVE, more commonly known as WAV due to its filename extension) is used to store sound data. It is the main format used on Windows systems for raw and typically uncompressed audio. It is similar to AIFF (iOS) format, and both WAV and AIFF (and most DAW applications and audio programs) can read and write both formats.

Webcast:

Using the internet to broadcast live or delayed audio and/or video transmissions, much like traditional television and radio broadcasts. The data transmission goes one way and does not allow interaction between the presenter and the audience.

Webinar:

Short for web-based seminar, a presentation, lecture, workshop, or seminar that is transmitted over the web. A key feature of a webinar is its interactive element, including the ability to give, receive, and discuss information.

While Loop:

A block of code that runs for as long as a given condition is true. When the condition changes to false, the loop stops running.

Wi-Fi Access:

A mechanism that allows electronic devices to exchange data wirelessly over a computer network. A device enabled with Wi-Fi, such as a personal computer, video game console, smartphone, tablet, or digital audio player, can connect to a network resource such as the internet via a wireless network access point. A Wi-Fi-enabled device can connect to the internet when it is within range of a wireless network.

Wireframe:

An outline of an item, such as a gem, switch, or block in the puzzle world. A wireframe is used to indicate the possibility that the item could randomly appear each time the puzzle is run.

WMV:

Windows Media Video (WMV) is a based on Microsoft Advanced Systems Format (ASF) container format and compressed with Windows Media compression. Apple users can use QuickTime to play WMV files.

Assistive Technology Resources

AbleNet, Inc.

AbleNet provides an essential selection of assistive technology and curricula used around the world every day. AbleNet products include switches, speech-generating devices, activity supports, accessible toys, apps and software, assistive technology kits, and computer and tablet access. AbleNet acquired IntelliTools in 2014 and offers the accessible keyboard IntelliKeys® with the device's accompanying products.

ablenetinc.com

Alt+Shift

Alt+Shift collaborates with districts to create and sustain accessible educational environments. Alt+Shift offers professional training, equipment lending library, technical assistance, and implementation planning to improve student outcomes.

altshift.education

American Council of the Blind (ACB)

The American Council of the Blind (ACB) is a national organization of Blind, Visually Impaired, and sighted individuals whose purpose is to work toward independence, security, equality of opportunity, and improved quality of life for all people who are Blind or Visually Impaired (BVI). Currently, ACB works with technology vendors to ensure accessibility to information and communication. ACB also partners with municipalities to design and build accessible infrastructure. The organization also works to ensure educational accessibility for people who are BVI and strives for equal participation of people who are BVI in all areas of social and civic life.

acb.org

American Foundation for the Blind (AFB)

AFB provides research from *The Journal of Visual Impairment and Blindness*, guides businesses to create accessible products and websites, advocates for policies in the work environment, classroom resources, and equal opportunity. AFB's monthly publication, *AccessWorld® Magazine*, offers news, reviews, and trends in technology and visual impairment.

afb.org

American Printing House for the Blind (APH)

APH is the world's largest nonprofit organization creating educational, workplace, and independent living products and services for people who are Blind and Visually Impaired. Products include Learn Keys and Talking Typer. Fred's Head, an APH blog, includes stories and interviews, product reviews, and information about new technology.

aph.org

Apple Accessibility Support

Learn about the many accessibility features built into your Mac, iPhone, iPad, and iPod Touch. Turn on accessibility features such as VoiceOver, Guided Access, and AssistiveTouch. Find out more about supported braille displays and hearing aid compatibility.

support.apple.com/accessibility

A T Guys

A T Guys, based in Kalamazoo, Michigan, provides affordable technology solutions for consumers, businesses, and educational customers. A T Guys' product line includes mobile phone software and accessories, portable electronics, screen readers, braille translation software, and accessible games.

atguys.com/store

Blackboard

Create powerful learning experiences, design customized learning paths, and influence performance in real-time. Accessibility in HTML for improved reading on mobile phones, electronic braille for people who are visually impaired, and audio for learning on the go. Blackboard Learn makes navigation easier for users who are visually impaired, and Ally automatically scans your original content. Blackboard Collaborate is a collaborative, innovative, and mobile learning platform that allows the creation of virtual classrooms and online meetings.

- blackboard.com
- [Blackboard Collaborate](http://blackboard.com/teaching-learning/collaboration-web-conferencing/blackboard-collaborate) (blackboard.com/teaching-learning/collaboration-web-conferencing/blackboard-collaborate)

The Blind Geek Zone

The Blind Geek Zone is hosted by Rick Harmon, who lost his sight in 2004. Harmon offers sources to the Blind/Visually Impaired community for information, audio tutorials, sharing user-submitted podcasts, gadget demonstrations, useful links to products, services, and resources. The Blind Geek Zone is on Twitter and Facebook.

blind-geek-zone.net

Boardmaker

In 2014, Dynavox was purchased by the Tobii Group, headquartered in Stockholm, Sweden. Shortly after the acquisition, the company launched Boardmaker Online as a subscription service. Today, Boardmaker Online is on cloud-based software and has more than 30,000 individual picture symbols available in different styles (Classic, ThinLine, High Contrast, and Persona). They have been translated into 44 languages and are being developed continuously.

goboardmaker.com

Bookshare®

Bookshare® makes reading accessible for people with dyslexia, blindness, cerebral palsy, and other reading barriers. Readers can use Bookshare to customize their experience to suit their learning style and find virtually any book they need for school, work, or leisure reading. Membership is free to schools and individual students. A Bookshare membership offers unlimited access to accessible books, textbooks, newspapers and magazines. Additionally, free access technology makes it easy to read books on devices.

bookshare.org

Braille and Audio Reading Download (BARD) Service from the National Library Service (NLS) for the Blind and Physically Handicapped

Eligible users (must be a member of NLS) may download and read any book, magazine, or other material found on the BARD website. BARD contains books, magazines, and music scores in audio and braille formats, with new selections added daily.

nlsbard.loc.gov

Future Aids: The Braille Superstore

An online store that carries braille, tactile, audible, and talking products for anyone who is Blind/Visually Impaired or has low vision. Braille Superstore has hundreds of daily living aids, writing supplies, and recreational items. Products include Talking Typing Teacher.

braillebookstore.com

Braille Innovations

Braille Innovations provides tools for classroom teachers and resources for teaching braille. Offerings include Know Thyself and Others for secondary students, Rhythm's Oh So Sweet (braille songs and rhythms), Categorized Braille Resource Cards (American English braille code cards), Bee Bop Braille (teaching the code through categories), Beginning Braille (supplemental braille materials) and Armed With Knowledge (teaching your school team about Blindness and Visual Impairment).

sites.google.com/site/brailleinnovations

Carroll Center for the Blind

The Carroll Center serves all ages and all stages of vision loss. The Carroll Center has provided help for individuals who are Blind/Visually Impaired since 1936 and offers services that include vision rehabilitation, vocational and transition programs, assistive technology training, educational support, and recreation opportunities.

carroll.org

Claro Software

Claro Software develops assistive technology software for people with print and reading disabilities like dyslexia. Since 2018, Claro Software has been owned by Lingit AS, a Norwegian assistive technology company. Products include text-to-speech software, speech synthesis, word prediction, spell check, and switch access, and it can be used with Microsoft Windows, Apple iOS, Google Chromebook, iPad, iPhone, Android, and on the web.

clarosoftware.com

Code Factory

Code Factory's expertise is applied in a wide range of industries, from mainstream consumer electronics to assistive technology. Code Factory partners with organizations and companies to provide speech synthesis technology to products and digital accessibility for products. Some of the companies Code Factory partners with are Nuance, Verizon, Sprint, Microsoft, and Nokia.

codefactoryglobal.com

Code Jumper™

Code Jumper™ is an innovation that teaches computer coding to students who are Blind or Visually Impaired. Children learn basic programming basics such as sequence, iteration, selection, and variables. The Code Jumper™ kit includes a carrying case with a hub and assortment of pods, plugs, and cords, an app, a quick-start sheet (in print and braille), and online student and teacher lesson plans. Code Jumper™ was designed by Microsoft and developed by APH.

codejumper.com

Common Sense Education

Common Sense is a nonprofit organization dedicated to providing trustworthy research-backed information, curricula, lesson plans, activities, and training for educators, parents, and advocates. Common Sense's mission is to ensure digital wellbeing for children. Common Sense has a digital citizenship curriculum with free lesson plans, tutorials, and activities for teachers. It also includes guidance, posters, toolkits, lesson plans, social media awareness, and cyberbullying prevention, identification and response.

- commonsense.org/education
- commonsense.org

Creative Commons

Creative Commons is a nonprofit organization devoted to expanding the range of creative works available for others to build upon legally and to share. The organization has released several copyright licenses, known as Creative Commons licenses, for free to the public. These licenses allow creators to communicate which rights they reserve and which rights they waive for the benefit of recipients or other creators.

creativecommons.org

CViConnect

CViConnect is dedicated to the education, training, and support of children with CVI. It features new technologies designed for use with children with CVI and features a new and innovative iPad-based software for children with CVI.

cviconnect.co

Digital Citizenship

R U a Cyber Detective? is a digital citizenship game for secondary students from the New South Wales Department of Education in Australia. Students take on the role of a junior detective at the Cyber Detective Agency. Assigned an urgent case involving stolen identities, students are challenged to use their digital citizenship skills in a range of mock situations, including chat rooms and using webcams, as they race against time to recover the identities from Dr. Hiss. At the conclusion of the game, students make a five-point guide about staying safe online and receive a Junior Detective Award.

digitalcitizenship.nsw.edu.au/resources/r-u-a-cyber-detective

Discovery Education

Discovery Education transforms classrooms, empowers teachers, and captivates students by leading the way in providing high quality, dynamic, digital content to school districts. All content is aligned to state standards, can be aligned to custom curricula, and supports classroom instruction regardless of the technology platform.

discoveryeducation.com

Digital Resources: Internet

- *Ask*

Ask.com helps over 100 million people find answers on the internet. Ask Media Group builds digital experiences that educate and inform the millions of people who visit their sites. Ask Media Group operates dozens of websites that help curious people find the information they need.

ask.com

- *Bing*

A browser option to surf the internet. Bing is a search engine owned by Microsoft.

bing.com

- *Google*

Google's mission is to organize information and make it universally accessible and useful. Search the world's information, including webpages, images, videos and more.

google.com

- *Google Chrome*

A fast, secure, and free web browser built for the modern web. Chrome syncs bookmarks across all devices, fills out forms automatically, and more. Chrome is a web browser designed to be fast.

google.com/chrome/index.html

- *Google Docs*

Google Docs allows the creation, revision, and sharing of web-based documents, spreadsheets, and presentations. Store documents online and access them from any computer.

docs.google.com

- *Google Drive*

Google Drive is a file storage and synchronization service developed by Google. Google Drive allows users to store files on servers, synchronize files across devices, and share files. In addition to its website, Google Drive offers apps with offline capabilities for Windows, Apple computers, and Android and iOS smartphones and tablets. Google Drive offers free cloud storage for personal use.

google.com/drive

- *Google Earth*

Google Earth is a photorealistic, digital version of our planet.

earth.google.com

- *Google Maps*

Google Maps is a web-mapping service developed by Google. It offers satellite imagery, aerial photography, street maps, 360° panoramic views of streets (Street View), real-time traffic conditions, and route planning for traveling by foot, car, bicycle, or public transportation.

maps.google.com

- *Internet Explorer*

An internet browser and set of technologies created by Microsoft.

microsoft.com

- *Microsoft Edge*

The Microsoft Edge platform enhances and extends your browser experience. It runs on Windows, macOS, iOS, and Android devices. On January 15, 2020, Microsoft Edge updated to a new version. At the time of this publication, the jury is still out as to the compatibility of Edge with JAWS 2020 after field testing.

microsoft.com/en-us/windows/microsoft-edge

- *Mozilla Firefox*

Mozilla Firefox, or simply Firefox, is a free and open-source web browser developed by the Mozilla Foundation and its subsidiary, Mozilla Corporation.

mozilla.org/en-US/firefox/new

- *Safari*

Safari is a web browser that is known for its simple and minimalistic interface. Apple built Safari to be the browser for Mac, iPhone, and iPad. Safari for Mac is fast, energy efficient, and has built-in privacy features. iCloud and Safari can work seamlessly with all iOS devices.

apple.com/safari

Don Johnston

This online company has a variety of products to help struggling readers and writers achieve positive results. Products include cause-effect software.

learningtools.donjohnston.com

Edmodo

Edmodo provides teachers and students a secure place to connect, collaborate, and share content and educational applications, and access homework, grades, class discussions, and notifications.

new.edmodo.com

EdTechTeacher

EdTechTeacher's mission is to create relationships with educators and support their quest to enrich student learning experiences through emerging technologies and innovative models of classroom instruction. EdTechTeacher partners with schools; provides workshops, courses, and summits for technology training; and customizes training for specific needs.

edtechteacher.org

Edutopia

The George Lucas Educational Foundation is dedicated to transforming K-12 education so that all students can acquire and effectively apply the knowledge, attitudes, and skills necessary to thrive in their studies, careers, and adult lives. The Foundation supports students with disabilities and methods to find and select technologies that help all students reach their learning goals. Among many topics it provides is assistive technology resources, blog posts, articles, and videos related to understanding, selecting, and assessing assistive technology.

edutopia.org

EmergingEdTech

Kelly Walsh, a teacher at The College of Westchester in White Plains, NY, is the author of EmergingEdTech, a blog with a weekly newsletter offering emerging technology to engage students and teachers that can help make the shift to student-centered learning. The site provides app resources, custom training, and a wide variety of posts, such as video tutorials, cyber safety awareness, digital literacy, and the flipped classroom. Walsh conducts training sessions and workshops online or in person.

emergingedtech.com

ePals

Kids learn together in well-rounded, collaborative global classroom. ePals is a global community in which teachers, students, and parents from more than 99 countries can safely connect to classrooms by collaborating on project-based learning activities. ePals promotes digital citizenship and social and emotional learning. Included are classroom-ready projects and activities with quality, standard-aligned content from respected educational brands as well as collaborative learning tools such as blogs, wikis, and media galleries.

epals.com

FaceTime

Use FaceTime to make video and audio calls from your iPhone, iPad, or iPod Touch. Supports FaceTime audio with call waiting and Memoji faces.

support.apple.com/en-us/HT204380

Flying Blind, LLC

Flying Blind's mission is to empower individuals who are Blind/Visually Impaired (BVI) with the necessary adaptive technology solutions to make them independent and efficient in unlimited capacities. This weekly online newsletter offers adaptive technology advances for people who are BVI through posts such as Top Tech Tidbits, featuring adaptive technology advice, EyePod Technocasts on various products, YouTube videocasts, assessment advice, links to beneficial adaptive technology tools, and more. Free newsletter subscription.

flying-blind.com

Freedom Scientific

This company develops, manufactures, and markets technology-based products that provide equal access to information and computing for those with vision impairments or learning disabilities. Products include MAGic, JAWS, and ZoomText.

freedomscientific.com

Hadley

The mission of the Hadley Institute for the Blind and Visually Impaired is to promote independent living through lifelong distance education programs for individuals who are Blind or Visually Impaired, their families, and blindness service providers. Hadley offers free education to anyone with a visual impairment, as well as families and professionals serving them. Hadley's website offers distance education, instructional videos, a podcast that interviews experts on a wide range of topics unique to vision loss, discussion groups, and online courses that are free to people who are BVI.

hadley.edu

Hour of Code

The Hour of Code started as a one-hour computer science introduction that was designed to demystify “code” and show that anyone can learn the basics, and to broaden participation in the field of computer science. If you use a screen reader, the Quorum tutorial for beginners or the Quorum tutorial for comfortable students are great places to start. The Hour of Code takes place each year during Computer Science Education Week in December, but an Hour of Code can be hosted year-round.

hourofcode.com/us/learn

HIMS, Inc.

HIMS, INC. is a global manufacturer and distributor that provides braille, magnification, and accessible healthcare devices. It provides tools designed to increase productivity and independence, such as BrailleSense note takers.

hims-inc.com

HumanWare

For more than 30 years, HumanWare’s inspirational vision has resulted in a range of highly intuitive and intelligent solutions that empower people who are Blind/Visually Impaired by giving them the independence to participate effectively within a sighted world.

humanware.com/en-usa/home

iKeepSafe

iKeepSafe’s mission is to provide a safe digital landscape for children, schools, and families by supporting the protection of student privacy while advancing learning in a digital culture. iKeepSafe provides educational resources such as digital citizenship activities, privacy and security tips, and training in data privacy.

ikeepsafe.org

International Society for Technology in Education (ISTE)

Today’s students must be prepared to thrive in a constantly evolving technological landscape. The ISTE Standards for Students are designed to empower student voices and ensure that learning is a student-driven process. Connect with other educators in the ISTE Standards Community and learn how to use the standards in the classroom with the ISTE Standards for Students ebook.

iste.org/standards/for-students

Judy Lynn Software, Inc.

Judy Lynn Software is an online company that develops switch-accessible software programs for Windows, iPad, and Android tablets.

judylynn.com

LearnZillion

LearnZillion is a learning platform that combines video lessons, assessments, and progress reporting for mathematics (Grades 6-8 and Algebra 1, Geometry, and Algebra 2) and English language arts (Grades K-5). Each lesson highlights a Common Core standard. Curricula give teachers access to lesson plans with built-in student-facing materials. Teachers can spend less time preparing materials and go straight to strategizing teaching moves.

learnzillion.com

Learning Ally

Founded in 1948 as Recording for the Blind, Learning Ally serves more than 300,000 K-12, college, and graduate students as well as veterans and lifelong learners—all of whom cannot read standard print due to Blindness, Visual Impairment, dyslexia, or other learning disabilities. Learning Ally offers a collection of digitally recorded textbooks and literature, Learning Ally Lab, a student-centric approach that matches each student with instruction that works best, and pilots and partnerships. There is a membership fee for individuals and schools.

learningally.org

Media Education Lab

The Media Education Lab from the University of Rhode Island is one of the leading providers of multimedia curriculum resources for K-12 media literacy education. Take advantage of the extensive collection of free teaching resources. Topics include understanding copyright, digital media and literacy, implicit bias, propaganda, and the PBS News Hour Student Reporting Lab.

mediaeducationlab.com/curriculum/materials

Michigan Department of Education - Low Incidence Outreach (MDE-LIO)

The MDE- LIO site is home to the Michigan Assistive Technology Guidelines for Teachers of Students Who Are Blind or Visually Impaired, which offers pre-kindergarten through grade 12 guidelines for teachers as well as resources for assistive technology (AT) skills, AT assessments, teacher assistance, and apps.

mdelio.org

Michigan Integrated Technology Competencies for Students (MITECS)

MITECS is the acronym for the Michigan Integrated Technology Competencies for Students. These competencies were released in December 2017 by adapting the 2016 International Society for Technology in Education (ISTE) Standards for Students. They replace the 2009 Michigan Educational Technology Standards for Students (METS-S).

<https://goopenmichigan.org/hubs/mitecs>

Moodle

Moodle is a course management system (CMS), also known as a learning management system (LMS) or virtual learning environment (VLE). It is a free web application educators can use to create effective online learning sites. Communicate with automatic alerts on new assignments, deadlines, and forum posts, and send private messages. Participate in collaborative learning by working and learning together in forums, wikis, and quizzes, and get feedback through polls and surveys.

moodle.com

National Center for Blind Youth in Science

The NCBYS is dedicated to providing resources and information for students who are Blind/Visually Impaired to learn and understand scientific and mathematical concepts. NCBYS offers opportunities in science through demonstration projects and partnerships in public schools. It provides technical support and mentoring for projects in science and math.

blindscience.org

National Federation of the Blind (NFB)

The National Federation of the Blind is the largest membership organization of individuals who are Blind/Visually Impaired (BVI) in the United States. The National Federation of the Blind offers several programs, services, and resources for educators of students who are BVI or have low vision. The NFB assists with advocacy, education, research, technology, and programs encouraging independence and self-confidence.

nfb.org

National Library Service for the Blind and Physically Handicapped (NLS)

National Library Service (NLS) is a free braille and talking book library service as well as an equipment lending library for NLS materials. Materials are loaned to individuals who are Blind/Visually Impaired, have temporary or permanent low vision, or have a physical disability that prevents them from reading or holding the printed page.

loc.gov/nls

National Geographic

The National Geographic Society's website is useful for secondary students for research and information on countries, science, technology, explorers, and the environment. The site provides maps, photography, games, adventure, videos, movies, news, and apps. The National Geographic Kids site has activities such as games and videos, and students can explore various space and science topics in fiction and nonfiction books.

- nationalgeographic.com
- kids.nationalgeographic.com

NetSmartz

NetSmartz is NCMEC's online safety education program. It provides age-appropriate videos and activities to help children be safer online and become more aware of potential online risks. NetSmartz also empowers children to prevent victimization by making safer choices on- and offline. NSTeens teaches tweens and teens about making safer choices online. Teaching materials are free.

- missingkids.org/NetSmartz
- nsteens.org

New York Public Library (NYPL) Digital Gallery

The NYPL Digital Gallery provides free and open access to digitized prints, photographs, maps, manuscripts, streaming videos, and images from the New York Public Library's collections.

digitalcollections.nypl.org

NVDA (NonVisual Desktop Access)

NonVisual Desktop Access (NVDA) is a free and open-source screen reader for the Microsoft Windows operating system. Providing feedback via synthetic speech and braille, NVDA enables people who are Blind/Visually Impaired to access computers running Windows for no more cost than a sighted person. Major features include support for more than 55 languages and the ability to run entirely from a USB drive with no installation. NVDA is open-source software, which means the code is accessible to anyone.

nvda-project.org

ObjectiveEd/Blindfold Games

ObjectiveEd's mission is to provide students with disabilities, and the parents and professionals dedicated to their education, digital curriculum and integrated performance monitoring and reporting tools that will help the students achieve their best educational outcomes. Features game-based digital curriculum for BVI with game-based practice in Assistive Tech skills, Braille Literacy, and IEP based skill improvement games that provide monitoring of student's goals.

objectiveed.com

Paths to Literacy

This website is a joint project between Perkins School for the Blind and Texas School for the Blind and Visually Impaired (TSBVI). The braille section of the website offers an overview, instructional strategies, pre-braille, tactile graphics, technology for braille readers, sources of print/braille books, tools for writing braille, braille production, and brailler repair. Users may post content, and there is a forum for questions and answers related to braille literacy.

pathstoliteracy.org

PBS Kids

A website for pre-K through grade 2. Play educational games, watch PBS KIDS shows and videos, and find coloring and music activities.

pbskids.org

Perkins School for the Blind

Perkins School for the Blind is committed to providing education and services that build productive, meaningful lives for children and adults around the world who are Blind, DeafBlind, or Visually Impaired with or without other disabilities. Support for teachers includes on-site, online, and self-paced tutorials. The eLearning teaching resources topics are assessment, best practices, career education, Common Core curriculum, expanded core curriculum, math, motor skills, physical education, science, social skills, and social studies. Perkins offers a lending library and over-the-phone reading service.

- perkins.org
- perkinselearning.org/scout/resources/expanded-core-curriculum

RJ Cooper & Associates

This online company develops apps, iPad and computer accessories, software, and hardware for persons with special needs. Products include computer access software, switches, iPhone and iPad Touch apps, gadgets, tools for text, TV-streaming controllers, recreation and gaming.

store.rjcooper.com

Scholastic

The corporate mission of Scholastic is to encourage the intellectual and personal growth of all children, beginning with literacy, the cornerstone of all learning. Scholastic provides teaching tools for educators, Book Fairs, classroom magazines, and books in digital and print formats for the next generation of learners.

scholastic.com

Serotek Corporation

Serotek was founded in 2002 by an entrepreneur who was Blind and wanted to create products that were powerful, intuitive, affordable, and extremely easy to use for the beginner computer user who is Blind or Visually Impaired. Serotek's products have evolved over the years, but the company remains true to its mission of providing Windows accessibility anywhere to its customers. Serotek features a premier line of software products to help you achieve maximum productivity and optimal entertainment.

- serotek.com
- [Sero \(formerly iBlink Radio\) on the App Store](https://apple.co/2li0yOe) (apple.co/2li0yOe)
- [Sero \(formerly iBlink Radio\) Apps on Google Play](https://bit.ly/38IDA3i) (bit.ly/38IDA3i)

Starfall

Starfall.com, a free public service, ensures children from preschool through grade 3 learn to read in an atmosphere of fun and enthusiasm. Starfall is screen-reader- and switch-compatible. It is supported by memberships and school licenses available at a low cost.

starfall.com

TED-Ed

TED-Ed is TED's youth and education initiative with a mission to spark and celebrate the ideas of teachers and students around the world. TED-Ed includes a library of original animated videos and a platform for teachers to create their own interactive lessons, helping students bring TED to their schools and gain presentation literacy skills.

ed.ted.com

TED Talks

TED (Technology, Entertainment and Design) is a nonprofit devoted to spreading ideas, usually in the form of short, powerful talks (18 minutes or less). TED covers topics from science to business to global issues in more than 100 languages.

ted.com/talks

Texas School for the Blind and Visually Impaired

Texas School for the Blind and Visually Impaired (TSBVI) has an array of programs that serve students throughout Texas who are Blind, Visually Impaired, or DeafBlind. TSBVI provides online courses, resources, consultations, publications, and in-person training throughout Texas.

tsbvi.edu

Tobii Dynavox

Tobii Dynavox is a US-based developer, manufacturer, and distributor of speech-generating devices and technology and tools that allow items to be used through access methods such as switches and joysticks. Augmentative and alternative communication devices, adaptive games, and software are available. Dynavox offers communication apps, speech generating devices, eye trackers and eye-gaze-enabled devices.

- tobiidynavox.com/en-US/
- goboardmaker.com

Vispero

VFO™ Vispero offers assistive products and solutions to help individuals who are Blind/Visually Impaired (BVI) remain independent at home, at school, or in the workplace. Products are offered from Freedom Scientific, Enhanced Vision (Vispero), Optelec, and The Paciello Group. Vispero offers low-vision hardware with electronic magnifiers, hardware for people who are Blind, such as refreshable braille displays, and software solutions that include screen reading and magnification for individuals who are Blind or Visually Impaired. With the addition of The Paciello Group, Vispero also provides organizations with accessibility and compliance solutions.

- Freedom Scientific: freedomscientific.com
- Optelec: us.optelec.com
- Enhanced Vision (Vispero): enhancedvision.com
- The Paciello Group: paciellogroup.com
- Vispero: vispero.com

Ed.VoiceThread

Ed.VoiceThread is a platform on which students develop critical thinking, communication, collaboration, and creativity skills. VoiceThread is a cloud application, so there is no software to install. The only system requirement is an up-to-date version of Adobe Flash. VoiceThread will work in any modern web browser and on almost any internet connection. Upload and share and discuss documents, presentations, images, audio files, and videos. More than 50 different types of media can be used in a VoiceThread.

voicethread.com

Woz ED:

Woz ED is a model for incorporating computational thinking in the K-12 classroom and accelerating the path to employment for students who choose coding as a career. Students start with block-based code in kindergarten and transition to text-based code in middle school. Students may choose elective courses in their junior and senior year through concurrent enrollment with a nationally acclaimed coding school and complete the requirement for their certificate shortly after graduation.

wozed.com/stem/coding

YouTube

YouTube has many videos for people who are Blind or Visually Impaired and is recommended for secondary students, teachers, and parents. Some YouTube sites include The Blind Life, Blind to Billionaire, Becca's World, Well Eye Never, Perkins School for the Blind, National Library Service for the Blind and Physically Handicapped, Blind Grilling, ChattyChelby, and Tommy Edison Experience.

youtube.com

ZoomText

ZoomText is a screen magnifier for Microsoft Windows, developed by Ai Squared which was acquired by Freedom Scientific in 2016. ZoomText is available in two editions: ZoomText Magnifier and ZoomText Magnifier/Reader, which includes a built-in screen reader. It also offers Fusion.

zoomtext.com

Assistive Technology Tools and Applications Sample Listing

This is a sample listing of materials and equipment that can be selected for a classroom or student's toolkit. Assistive technology items will vary from student to student, and it is not implied that all are required for any individual. The various levels, from low-tech to high-tech, may be different depending on the age, cognitive level, and skill level of the student.

For example, the Taptilo may be considered high-tech for a pre-K student and medium-tech for a first grader or beginning braille user who needs more practice, jumbo dots, or has difficulty with an advanced electronic braille display.

The coding section also provides a listing of suggested items to try with students starting with pre-K.

Low Tech (may not require a connection to an electrical source):

- Alert indicators (i.e., liquid indicators)
- Alternative specialized paper (i.e, thermoform, tree-free paper, color line paper, Brailon, swell touch paper, braille paper)
- Braille labelers
- Darken pencils, neo-lite pens, mechanical pencils, markers, 20/20 pens, etc.
- Dark-line paper
- Raised-line paper
- Writing grip tool (i.e., The Arthwriter)
- Slate and stylus

- Writing guide
- Braille writer (manual and electronic)
- Braille books
- Large print books
- Headset/headphones/earbuds
- Handheld magnifiers
- Tactile/object/symbol kits (i.e., APH Tactile Connections)
- Tracking tools (i.e., E.Z.C. Readers, color overlays, reading strips, reading rulers, etc.)
- Stylus with different grips or handles
- 2–4 choice sequencing scanners
- Reading easels, tablet stands (positioning devices)
- Page turners
- APH equipment/material
- Various enabling devices (for students who are physically impaired)
- Tactile, braille, and visually enhanced manipulatives
- Low-tech refreshable braille cubes
- Adaptive measurement tools
- Abacus
- Adaptive time devices
- Math window
- Models and three-dimensional objects
- Keyboards: adaptive, extension, ergonomic
- Keyboard guides

- Leisure/recreation (card holders)
- Rechargeable and removable batteries
- Battery chargers
- Curriculum-support software/age-appropriate software
- Graphics production tools (i.e., APH tools)
- Communication devices (augmentative and alternative communication - work with speech therapist, basic word processing)
- Cause/effect switches

Intermediate Tech (may require batteries or connection to an electrical source):

- Apeman projector
- Age-appropriate apps
- Audio books
- Braille labelers (using recordings)
- Curriculum-support software/age-appropriate software
- Daisy digital players
- Digital recorders
- E-readers/digital readers
- E-reading software
- Electronic mobility aids
- Electronic watches
- Embossers
- Eye-gazing tech
- Graphic-production devices
- iBill Money Identifier device
- iOS and Android tablets
- Keyboarding software programs
- LCD monitors/displays
- Linear programming and talking calculators
- Microphones

- MP3 players
- Optical Character Recognition (OCR) apps
- Personal digital assistant (PDA): Orbit Reader, Braille Trail Reader LE
- PenFriend device
- Reading pens (C-Pen Reader)
- Reference tools (encyclopedia, dictionary, thesaurus)
- Scanners/scan-readers
- Screen readers
- Speech Recognition
- Speech-output devices
- Speech-to-text devices/applications
- Talking money identifiers
- Talking label wand/pen
- Talking reader, portable
- Taptilo – braille device
- Text-reading software (i.e., Clicker, Kurzweil 1000)
- Text-to-speech
- Tablet apps (cause and effect – intermediate level)
- Tablet pencil/pens
- Touch-screen tech
- Transcribing software (braille, braille music, etc.)
- Video magnifiers
- Video screen display (LCD)
- Wearable devices (eyewear, gesture/motion control)
- Word-processing applications

High Tech (generally requires an electrical source/batteries):

- Android (smart devices, electronic touch tablets)
- Apple iOS devices (smart devices; i.e., iPod, iPad, iTouch, iPhone)
- Age-appropriate apps
- BLITAB tactile tablet
- Closed-circuit television (CCTV)
- Curriculum support software/age-appropriate software
- Desktops, laptops (PC or Mac)
- Graphic-production devices
- Multimedia applications
- PDA: Apex, BrailleNote Touch Plus, BrailleSense
- Publishing and design applications
- Refreshable braille displays
- Spreadsheet applications
- Voice - digital assistants
- Video - digital cameras
- Web design applications

Keyboards and Accessories:

- Adaptive mouse, joysticks
- Appropriate cables, adapters
- Braille displays
- Ergonomic and adaptive keyboards
- Keyboard overlays
- Keycaps (large print/braille)
- MIDI keyboards (music)
- Power strips, surge protectors
- Switches
- Tactile locators

Storage Devices:

- DVDs/CDs
- Memory sticks
- External hard drives
- SanDisks (mini, micro, etc.)
- Thumb/flash drives

Furniture:

- Work with occupational therapist, physical therapist

Coding:

- Code Jumper (APH)
- Drones
- Educational Games (i.e., Osmo Coding Awbie Educational Game)
- Robots
- Swift Playgrounds (Apple)

Coding Suggested Resources:

- [Apple Education: Teaching Code](https://apple.com/education/teaching-code) (apple.com/education/teaching-code)
- [Apple: Swift Playgrounds](https://apple.com/swift/playgrounds) (apple.com/swift/playgrounds)
- [Woz ED: Coding](https://wozed.com/stem/coding) (wozed.com/stem/coding)
- [Hour of Code Activities](https://hourofcode.com/us/learn) (hourofcode.com/us/learn)

*Please check into any equipment release/loan forms required for borrowing equipment. Some of the items listed above may be borrowed from [MDE-LIO's Assistive Technology Library](https://bit.ly/ATLibrary/LIO) (bit.ly/ATLibrary/LIO) or [Alt+Shift's Lending Library](https://altshift.education/lending-library) (altshift.education/lending-library).

Assistive Technology Tools Record Keeping Chart Instructions

The Assistive Technology Tool Table can be used to keep track of the student's tools. This is a simple checklist to use to collect data of any tools the student has tried. The checklist can also be used to keep track of the student's toolkit. There is added space in each category to add tools not listed. Some examples of ways to collect student tools data are:

- Record the date to document the year of acquisition.
- Record the grade and check the space next to the tool.
- Record the date and grade when the tool has been discontinued.

Example:

Low Tech

Technology	Pre-K	Elementary	Middle School	High School
Alert Indicators	X 9-13	X 9-14	Discontinued 9-19	
Specialized Paper				
Braille Labelers				

Assistive Technology Tools Record Keeping Chart

Student Details

Student Name:

Teacher Name:

Low Technology (may not require a connection to an electrical source)

Technology	Pre-K	Elementary	Middle School	High School
Alert Indicators				
Specialized Paper				
Braille Labelers				
Darken Pencils				
Neo-Lite Pens				
Mechanical Pens/Pencils				
Markers/20/20				
Dark- or Raised-Line Paper				
Writing Grips				
Slate and Stylus				

Technology	Pre-K	Elementary	Middle School	High School
Braille Writer				
Writing Guide				
Large Print Books				
Braille Books				
Cause/Effect Toys, Switches				
APH Materials for LightBox				
APH Tactile Materials (age level specific)				
Tactile Graphics Tools				
Headset/phones, earbuds				
Handheld magnifiers				
Microphones				
Stylus				
Easels/Stand				
Page Turners				
Abacus				
Math Window				
Keyboard				
Switches				

Technology	Pre-K	Elementary	Middle School	High School

Intermediate Tech (may require batteries or connection to an electrical source):

Technology	Pre-K	Elementary	Middle School	High School
Projector				
Audio Books				
Digital Recorders				
E-Readers				
Embossers				
Eye-Gaze Tech				
Tablets				
Keyboards				
Monitors				
PDA				

Technology	Pre-K	Elementary	Middle School	High School
Recording/Reading Pens				
Scanners				
Speech Recognition				
Taptilo				
Tactile Graphics				
Tactile Toolkit				
(Attainment)				
Touch Screens				
Transcription Software				
Video Magnifiers				
Wearable Devices				
Word Processing				

High Tech: (generally requires an electrical source/batteries):

Technology	Pre-K	Elementary	Middle School	High School
Android Devices				
iOS Devices				
BLITAB				
CCTV				
Computers/laptops				
PDA				
Refreshable Braille Display				
Storage Device				

Coding

Technology	Pre-K	Elementary	Middle School	High School