

Performance Indicators for Technology-Literate Students Diocese of Richmond

Preface

As we educate our students for this twenty-first century and beyond, technology has become a fact of life. To prepare our future members of society, the Diocese of Richmond offers these Technology Standards for Students.

Following the lead of the International Society for Technology Education (ISTE) and its National Educational Technology Standards for Students as well as the Department of Education for the state of Virginia, these standards are divided into six categories.

Standard 1 covers basic computer operations and concepts. Standard 2 requires students to address the social, ethical, and human issues as they relate to technology. Standard 3 deals with student use of technology in creating a learning product. Standard 4 involves students in using technology as a means of communication. Standard 5 asks students to use technology as a research tool. Finally, Standard 6 has students using technology as problem-solving and decision-making tools.

We are indebted to the Arizona student technology standards.

Grades K–2 Technology Standards

Standard 1. Basic Operations and Concepts

1. Communicate about basic technology components using developmentally appropriate and accurate terminology.
2. Apply basic vocabulary related to the internal operations of the technology (e.g., mouse, keyboard, monitor, toolbar, menu, window, folder, icon, hard drive, CPU, spreadsheet, word processor, cassette player, CD player, CD-ROM, DVD, VCR).
3. Identify the components of a computer (e.g., mouse, keyboard, monitor, CPU, printer).
4. Demonstrate correct ergonomic use of technology (e.g., correct posture, position of hands and feet).
5. Use multimedia resources (e.g., interactive books, educational software, and elementary multimedia encyclopedias).
6. Access information sources (e.g., CD-ROM encyclopedias, pre-bookmarked Internet sites).
7. Operate keyboard and other common input and output devices (e.g., point and click, arrow and enter/return keys, knows locations and function of keys, begins touch-typing).
8. Retrieve and save information (e.g., text documents).
9. Print documents.

Standard 2. Social, Ethical and Human Issues

1. Demonstrate respect for other students and work cooperatively while using technology (e.g., take turns, share resources, allow peers to work uninterrupted, do not erase or damage files, do not duplicate software or documents without proper authorization).
2. Use equipment appropriately (e.g., use for schoolwork, do not send threats, no food or objects near equipment, care for floppies, CDs and USB flash drives, use proper shut down procedures).
3. Describe uses of technology in daily life.

Standard 3. Technology Productivity Tools

1. Use word processing to create a document and use editing tools.
2. Insert a graphic into a word processing document.
3. Use a spreadsheet or database application to perform simple data analysis (e.g., comparison collections, graphs, and charts).
4. Create a multimedia product with support from teachers, family or student partners (e.g., slide show, video).

Standard 4. Technology Communication Tools

1. Gather information electronically and communicate with others with support from teachers, family members or student partners (e.g., CD-ROMs, web page).
2. Plan, design, and present an academic product to classroom or community (e.g., slide show, progressive story, drawings, story illustrations).

Standard 5. Technology Research Tools

1. Identify potential sources of information about a topic (e.g., video or cassette tapes, web pages, CD-ROMs).
2. Locate information in a resource selected by the teacher (e.g., Web page, CD-ROM).

Standard 6. Technology as a Tool for Problem Solving and Decision-Making

1. Use technology resources for problem solving, self-directed learning and extended learning activities.
2. Based on a class-defined problem, use technology to do the following:
 - a) collect data
 - b) interpret data
 - c) express a conclusion.

Grades 3-5 Technology Standards

Standard 1. Basic Operations and Concepts

1. Apply basic vocabulary related to the internal operations of the technology (e.g., disks, drives, RAM, ROM, CD-ROM, DVD, and USB).
2. Demonstrate correct ergonomic use of technology (e.g., correct posture, position of hands and feet, proper height of keyboard).
3. Use touch-typing strategies to reach a minimum of 20 words per minute with accuracy.
4. Retrieve and save information (e.g., text documents, digital photos, music, video).
5. Print documents, text or image.

Standard 2. Social, Ethical and Human Issues

1. Describe and practice respect for other students while using technology (e.g., report behaviors that threaten the ability of others to legitimately use resources, allow peers to work uninterrupted, do not erase or damage files, documents or projects).
2. Use equipment appropriately (e.g., use for assignments and schoolwork versus personal pleasure, do not send threats).
3. Describe and practice legal and ethical behaviors when using technology (e.g., do not make illegal copies of CDs and DVDs, no peer-to-peer file sharing of copyrighted material).
4. Understand personal consequences of inappropriate use of technology.
5. Provide complete citations from electronic media (e.g., use age-level appropriate, reference formats for citing source of information).
6. Demonstrate and practice safe and correct security procedures (e.g., protect password).
7. Describe three-to-five uses of technology in daily life.
8. Discuss the positive and negative impact of technologies such as television and computers on daily life (e.g., negative health impact, safe Internet use, knowing what information is safe to share when using e-mail, "talking" to strangers).

Standard 3. Technology Productivity Tools

1. Use word processing editing tools to revise a document (e.g., cut and paste, tabs and margins, font size, font style, delete and undo, spell check, click and drag).
2. Design a word processing document with graphical elements (e.g., clip art, photographs, using text wrap, cropping, re-sizing, drawing tools).
3. Design a word processing document with columns or tables.
4. Create and use a spreadsheet to analyze data (e.g., use formulas, create charts and graphs).
5. Design and create a presentation.

Standard 4. Technology Communication Tools

1. Communicate information electronically.
2. Use technology tools for individual and collaborative communication activities to share products with audiences inside and outside the classroom (e.g., talk to an author, approved electronic bulletin boards and chats).
3. Plan, design, and present an academic product to classroom or community (e.g., slide show, progressive story, video production, digital images).

Standard 5. Technology Research Tools

1. Identify potential sources and locate information about a topic using available electronic research resources (e.g., video or cassette tapes, electronic card catalog, web pages, CD-ROMs, electronic books and encyclopedias, appropriate Internet resources).
2. Identify the components of a URL to determine the source of the information.
3. Identify the author, copyright date and publisher of information located in Internet and other electronic resources and determine whether the author is an authority, displays bias and is a primary or secondary source.

Standard 6. Technology as a Tool for Problem Solving and Decision-Making

1. Use technology resources for problem solving, self-directed learning and extended learning activities.
2. Based on a class-defined or student selected problem, use technology to:
 - a) collect data
 - b) interpret data
 - c) express a conclusion

Grades 6-8 Technology Standards

Standard 1. Basic Operations and Concepts

1. Use basic vocabulary related to technology (e.g., RAM vs. ROM, fire wire, USB, parallel, serial, scanning, digitizing, OCR).
2. Use basic vocabulary related to systems (e.g., network, infrastructure, Internet, intranet, LAN, WAN, Ethernet, firewall, server).
3. Understand bits, bytes, kilobytes, megabytes and gigabytes.
4. Correlate units of measure with respect to storage devices (floppies, USB flash drives, hard drives, CDs).
5. Distinguish between input, output, storage and processing hardware.
6. Attach and detach various peripherals of a computer.
7. Use touch-typing strategies to reach a minimum of 30 words per minute with accuracy.
8. Retrieve and save information remotely (e.g., network servers, Internet, intranet, peripheral devices).
9. Demonstrate functional operation of technology devices (e.g., presentation devices, digital cameras, scanners, document cameras, and scientific probes).
10. Use troubleshooting strategies to solve application problems, basic hardware problems and basic connectivity problems (e.g., online help strategies, documentation, and collaboration with others).

Standard 2. Social, Ethical and Human Issues

1. Discuss basic issues related to responsible use of technology and information and describe personal consequences of inappropriate use.
2. Describe and practice safe Internet/intranet usage (e.g., does not post inappropriate or harmful material, do not reveal personal information, follow Acceptable Use Policy).
3. Describe and practice "netiquette" when using the Internet and electronic mail (e.g., use appropriate language; don't "shout" in communications).
4. Follow the rules for deciding when permission is needed for using the work of others (e.g., some sites specify whether permission is required or not, some work is in public domain).
5. Obtain permission to use the works of others, when applicable.
6. Provide complete citations from electronic media (e.g., use appropriate standardized reference formats for citing source of information) for all technology and non-technology projects.
7. Explain copyright laws and "fair use" guidelines (e.g., in relationship to print, video, computer software, multimedia project, music).
8. Describe copyright guidelines for multimedia creation and Internet development.
9. State personal consequences (e.g., fines, arrest, loss of privileges, grade reduction, academic probation) related to violations of the following:
 - a) copyright (e.g., CDs, DVDs, peer-to-peer file sharing, print, video, images)
 - b) password security
 - c) privacy (e.g., student files on a network, hard drive and removable media).
10. Discuss the negative impact of unauthorized intrusions into networked data and describe actions to prevent these intrusions.
11. Compare information technologies from past to present and describe the implications of computer power doubling every 18 months (Moore's Law) (e.g., size, speed, cost).
12. Describe the impact of technology use on individuals at home and in the workplace (e.g., computer has replaced the TV for some individuals, free time is spent using technology versus outdoor activities, jobs have been created and/or eliminated due to technological advances, possible infringement of privacy).

13. Discuss the social implications of the "Digital Divide" (e.g., homes and schools with much technology and connectivity versus those with less or none).

Standard 3. Technology Productivity Tools

1. Use word processing editing tools to revise a document (e.g., cut, copy and paste, insert and delete, margins, indentation, page orientation, layout, alignment, font, font size, style, color, spell check).
2. Design a word processing document with graphical elements (e.g., clip art, digital photographs, symbols using text wrapping, cropping, re-sizing, or drawing tools).
3. Use technology device(s) to collect and record data (e.g., science probe, graphing calculator, PDA, alternative keyboards, webcams, GPS, Internet).
4. Create and use a spreadsheet to analyze data (e.g., use formulas, create charts and graphs) formatting as necessary (e.g., column width, row height, alignment, color).
5. Create a database with multiple fields to manipulate data in a variety of ways (e.g., sort, merge, list, report).
6. Design, create and present a multimedia presentation using multiple digital sources (e.g., from camera, video, scanner, CD-ROM, Internet).
7. Design, create and publish (where possible) a multi-link web page using multiple digital sources (e.g., from camera, video, scanner, CD-ROM, Internet).
8. Manipulate variables in a computer simulation to research a desired outcome (e.g., simulation software, Web-based simulation, textbook support software).

Standard 4. Technology Communication Tools

1. Collaborate electronically with experts, peers or others to analyze data and/or develop an academic product (e.g., e-mail, approved chat, online discussions, web environments, videoconferencing).
2. Present an academic product to share data and/or solutions (e.g., web site, multimedia presentation, video).

Standard 5. Technology Research Tools

1. Identify electronic research resources.
2. Define subject searching and devise a search strategy to locate information using available electronic research resources (e.g., electronic card catalog, online or CD-ROM reference sources, appropriate Internet resources).
3. Explain the difference between subject and keyword searching.
4. Construct keyword searches including basic Boolean logic using available electronic research resources (e.g., electronic card catalog, online or CD-ROM reference sources and appropriate Internet resources).
5. Identify the author, copyright date and publisher of information located in Internet and other electronic resources and determine whether the author is an authority, displays bias and is a primary or secondary source.
6. Obtain permission to use the work of others, when appropriate.
7. Create citations for electronic research sources following a prescribed format.
8. Gather research from a variety of electronic sources and identify the most appropriate information for answering a research question.
9. Identify the components of a URL to determine the source of the information.

Standard 6. Technology as a Tool for Problem Solving and Decision- Making

Based on a problem selected by the student, identify and use appropriate technology tools to:

- a) collect data (e.g., using a probe, online index)
- b) interpret data (e.g., using spreadsheet, database)
- c) develop a solution to the problem (e.g., using a spreadsheet, database)
- d) present findings (e.g., electronic presentation).

Grades 9-12 Technology Standards

Standard 1: Basic Operations and Concepts

1. Turn on/off a computer.
2. Log on/off the network.
3. Retrieve, revise and save electronic information remotely.
4. Demonstrate functional operation of technology device(s) (e.g., scanner, video camera, scientific probe, graphing calculator).
5. Describe computer viruses, spy ware, ad ware, and malware and ways to protect computers from them.

Standard 2: Social, Ethical and Human Issues

1. Make informed choices among technology systems, resources and services in a variety of contexts.
2. Explain personal liability issues and the impact of unauthorized intrusions related to security systems to protect technologies (e.g., passwords, encryption software, hacking, spamming).
3. Discuss individual privacy issues versus First Amendment protection (e.g., federal and state filtering and access legislation, blogs).
4. Follow the rules for deciding when permission is needed for using the work of others and obtain permission when applicable.
5. Explain copyright laws and “fair use” guidelines in relation to intellectual property (e.g., print, video, software, music, multimedia projects).
6. State personal consequences (e.g., fines, arrest, loss of privileges, grade reduction, academic probation) related to violations of the following:
 - a) copyright (e.g., CDs, DVDs, peer-to-peer file sharing, print, video, images)
 - b) password security
 - c) privacy (e.g., student files on a network, hard drive and removable media).

Standard 3: Technology Productivity Tools

1. Create documents using professional format (e.g., résumé, letter of application, electronic portfolio, research paper).
2. Integrate information from one document to another (e.g., mail merge, graph into word processing document).
3. Create a document that utilizes hyperlinks (e.g., web link in documents, linking a word to a glossary, creating an interactive index).
4. Select appropriate technology devices to collect and record data (e.g., science probe, graphing calculator, PDA, webcam, GPS).
5. Create and use a spreadsheet to analyze variables (e.g., 12-month budget, loan rates, science and math experiments, investment portfolios, grade tracker).
6. Analyze data and create a database report from information manipulated in a variety of ways to support decisions (e.g., census data, polls and surveys, annual report).
7. Design and create a multimedia presentation or web site with interactive features (e.g., animation, sound, action buttons to play, video, control devices, open other applications, link to a web site).
8. Manipulate several variables in a computer simulation to reach a desired outcome (e.g., simulation software, web-based simulation, textbook support software).

Standard 4: Technology Communications Tools

1. Create digitized material (e.g., video interviews, scanned pictures, text, graphic information) for a project when appropriate.
2. Collaborate electronically with content experts.
3. Consider several methods and choose the best for building group collaboration in research, communication and presentation among students in physically separated schools.

Standard 5: Technology Research Tools

1. Explain the difference between Internet searching using directories and search engines.
2. Construct online or electronic database searches using Boolean logic (AND, OR, NOT) and advanced features (e.g., preferences, filtering) when presented with a problem to solve.
3. Given a concept, independently select appropriate electronic resources from school, community and the world (via online) to be used to locate relevant information.
4. Adapt software for personal efficiency by setting preferences for effective use of the software.
5. Utilize evaluation criteria (e.g., authority, purpose, accuracy, credibility and/or bias of author, relevancy, timeliness) to evaluate the appropriateness and effectiveness of electronic resources.
6. Create citations for electronic research sources following a prescribed format.

Standard 6: Technology as a Tool for Problem Solving and Decision-Making

- 1) Locate and use an online tutorial and discuss the benefits and disadvantages of this method of learning.
- 2) Research a career and predict the advanced training needed to maintain success in the career.
- 3) Design and implement a personal learning plan that utilizes technology (e.g., identify a topic such as an academic interest, personal hobby, health issue, potential job source).
- 4) As a capstone experience in a content area, identify a problem and formulate a strategy to solve the problem using appropriate technology tools to:
 - a) collect data (e.g., using GPS, PDA, Internet, probeware, recordings)
 - b) interpret data (e.g., visualization, simulation, modeling software)
 - c) develop a solution to the problem
 - d) Present findings (e.g., electronic presentation, web page, professionally formatted document, computer model, audio or video presentation, web streaming).