

**Computer Technology
Standards of Learning
for Virginia's Public Schools
Grades 9-12**

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Computer Technology Standards of Learning

**Board of Education
Commonwealth of Virginia**

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Introduction

As the new century has unfolded, various studies have postulated about the likely competencies that will be needed in the workplace of tomorrow; one consistent conclusion is that technology will be integrated into every facet of business and life.

The Educational Technology Plan for Virginia: 2010-15 focuses primarily on one specific component of 21st century skills—information and communications technology (ICT) literacy. The most recognized definition for this topic was formulated in 2002 by the International ICT Literacy Panel: “ICT literacy is using digital technology, communications tools, and/or networks to access, manage, integrate, evaluate, and create information in order to function in a knowledge society.”

Educational Technology Plan for Virginia: 2010-15

The Computer Technology Standards of Learning define the essential knowledge and skills necessary for students to access, manage, evaluate, use, and create information responsibly using technology and digital resources. They provide a framework for digital literacy and include the progressive development of technical knowledge and skills, intellectual skills for thinking about and using information, and skills needed for working responsibly and productively both individually and within groups. Digital literacy is not an end in itself but lays the foundation for deep and continuous learning. It focuses on using technology to learn rather than learning about technology.

To become technologically proficient, students must develop these skills through integrated activities across all K-12 content areas. These skills should be introduced and refined collaboratively by all K-12 teachers as an integral part of the learning process. Teachers can use these standards as guidelines for planning technology-based activities in which students achieve success in learning and communication—preparing them to meet the challenges of today’s knowledge-based society.

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Grades 9-12

Basic Operations and Concepts

- C/T 9-12.1 Demonstrate an operational knowledge of various technologies.
- A. Use various types of technology devices to perform learning tasks.
 - Demonstrate the ability to perform a wide variety of complex tasks using technology, including creating and using models and simulations, developing multipage documents and multimedia presentations, capturing and manipulating video, and constructing spreadsheets that use mathematical or logical functions to manipulate and present data.
 - B. Communicate about technology with appropriate terminology.
 - Use an expansive technology vocabulary in daily practice.
- C/T 9-12.2 Identify and use available technologies to help complete specific tasks.
- A. Identify the specific uses for various types of technology and digital resources.
 - Apply knowledge of different types of technology and digital resources to routine and complex tasks.
 - B. Use content-specific tools, software, and simulations to approach projects.
 - Use specialized tools to assist with learning in various content areas.
 - Use models and simulations to learn complex concepts, solve problems, and make decisions.
- C/T 9-12.3 Demonstrate an understanding of the strengths and weaknesses of various technologies for supporting different tasks (e.g., writing, research, presentations, creating artwork, statistical analysis).
- A. Make appropriate choices when determining how to use different technologies for different purposes.
 - Demonstrate the ability to choose appropriate resources when completing assignments in various content areas.
 - Make use of self-help tutorials and manuals to troubleshoot and explore unfamiliar features in various tools.
 - B. Explore career opportunities in technology-related careers, and consider the roles technology will play in future career choices.
 - Explain how various careers incorporate technology.
 - Investigate careers that focus on inventing or developing technology.
- C/T 9-12.4 Incorporate new and emerging technologies as appropriate.
- A. Demonstrate knowledge of current advancements in information technologies.
 - Identify and describe the impact of new and emerging technologies and their applications.
 - Debate ethical issues related to new technologies.

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- B. Develop and apply strategies to evaluate new and emerging technologies as potential tools for learning.
 - Research and report on new and emerging technologies and how these impact daily life, with a focus on learning.

Social and Ethical Issues

- C/T 9-12.5 Make responsible decisions—grounded in knowledge of digital safety and security best practices—that pertain to various digital communication tools and methods.
- A. Discuss and debate appropriate legal, ethical, and responsible behaviors concerning information and technology.
 - Investigate current issues related to legal, ethical, and responsible use of various types of technology and information.
 - B. Model appropriate legal, ethical, and responsible behaviors when using information and technology.
 - Use best practices for online safety as defined by the division’s online safety program.
 - Demonstrate responsible behavior, such as using strong passwords and avoiding high-risk activities.
 - Model responsible behavior when using technology tools and software as well as various types of networks.
 - Identify personal responsibilities in virtual relationships and demonstrate an understanding of the connection to legal, ethical, and responsible behavior.
 - Identify positive and negative uses of social media and develop strategies to avoid risky or negative situations as well as how to report such situations to authorities.
- C/T 9-12.6 Exhibit personal responsibility for appropriate, legal, and ethical conduct.
- A. Demonstrate an understanding of “fair use” and copyright law.
 - Apply knowledge of “fair use” and copyright law when developing presentations, products, and papers.
 - Identify copyright laws that impact student work.
 - B. Respectfully collaborate with peers, experts, and others to contribute to an electronic community of learning.
 - Demonstrate advocacy for and a personal commitment to respectful online interaction.
 - Contribute in various ways to an online community.
 - Model respect for the privacy of others.
 - C. Demonstrate knowledge of cyber crime and cyber security issues.
 - Identify the use of digital resources and tools for illegal activity.
 - Compare and contrast various state, federal, and international policies designed to stem the illegal use of technology.

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- C/T 9-12.7 Model digital citizenship by actively participating in positive activities for personal and community well-being.
- A. Communicate respect for people when participating in group online learning activities.
- Apply knowledge about effective online communications to ensure personal communications are clear.
 - Use rules of online etiquette when communicating with others.
- B. Explore the Internet as a means of personal learning and a respectful exchange of ideas and products.
- Participate in projects that involve others digitally, working together toward a common goal.
 - Pursue individual projects using online resources.
 - Demonstrate the ability to identify diverse perspectives on issues.
- C/T 9-12.8 Understand the nature of information in a global society and how the characteristics of various media may influence others.
- A. Identify the various uses of media based on intent and audience.
- Investigate media messages in various contexts.
- B. Be able to construct and deconstruct media messages and graphical representations of data.
- Connect media messages to various writing techniques, logic models, and outcomes.
 - Develop and communicate an innovative solution to a complex problem through various types of media in collaboration with experts and peers.

Technology Research Tools

- C/T 9-12.9 Plan and apply strategies for gathering information, using a variety of tools and sources, and reflect on alternate strategies that might lead to greater successes in future projects.
- A. Use various technology and digital resources to collect information.
- Perform research using a variety of purposefully chosen technology and digital resources.
 - Use various types of content-specific technology to gather data and information.
- B. Design and implement a variety of advanced search strategies to retrieve electronic information.
- Develop search strategies based on prior knowledge and reflect on strategies to increase their effectiveness.
- C/T 9-12.10 Draw conclusions from research and relate these findings to real-world situations—investigating further, if necessary.
- A. Use digital research to support written and oral presentations.
- Apply research derived from digital resources to original work, as appropriate.

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- Demonstrate an understanding of copyright and plagiarism when using digital resources.
 - B. Apply knowledge when conducting research to develop accurate and balanced reports.
 - Determine when further research is needed based on original search results and first drafts.
 - C. Interpret digital primary sources for historical and contemporary events.
 - Apply knowledge to interpret digital primary sources for a variety of content areas.
- C/T 9-12.11 Analyze, synthesize, and evaluate information based on source validity and the appropriateness to specific tasks.
- A. Analyze and draw conclusions about the comprehensive nature and bias of electronic information sources.
 - Follow best practice guidelines for analyzing information from particular Web sites.
 - Evaluate information in the original context.
 - A. Evaluate the relevance of electronic information sources to a given situation.
 - Determine appropriate types of information sources for various situations.
 - Choose only relevant information when citing resources.
 - C. Use various digital tools to organize, analyze, and synthesize data for learning tasks.
 - Use digital tools, such as graphic organizers, spreadsheets, and databases.

Thinking Skills, Problem Solving, and Decision Making

- C/T 9-12.12 Practice reasoning skills when gathering and evaluating data.
- A. Employ technology in developing strategies for solving problems.
 - Regularly use technology tools to assist in authentic problem-solving activities.
 - Investigate and apply expert systems and intelligent agents in real-world situations.
 - B. Select resources that extend one's own capability to solve problems and make informed decisions.
 - Choose resources that extend one's own capabilities when solving problems.
- C/T 9-12.13 Demonstrate organization and persistence when completing personal and group assignments, activities, and projects.
- A. Use digital resources to assist with project planning.
 - Use various productivity tools that help with planning and time management.
 - B. Use digital resources to assist with project management.
 - Use productivity tools to assist in tracking and meeting goals.

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- C/T 9-12.14 Use models and simulations to understand complex systems and processes.
- A. Use simulations to understand complex concepts.
 - Enhance understanding of concepts and skills by using simulations.
 - B. Use various digital resources to produce graphical representations of data.
 - Complete assignments involving data by using data graphing or imaging tools.

Technology Communication Tools

- C/T 9-12.15 Communicate effectively with others (e.g., peers, teachers, experts) in collaborative learning situations.
- A. Use technology tools for individual and collaborative writing, communication, and publishing activities.
 - Use various technology resources to develop, revise, and assess written and media-based reports and projects, integrating technologies as appropriate.
 - Independently collaborate with others using digital communication tools.
 - Use digital communication tools to communicate with specific audiences.
 - B. Participate in communications among different cultures.
 - Contribute during a distance-based communication project that includes individuals from different cultures by leveraging the differences of those cultures to develop solutions to common issues.
 - C. Participate in online courses, social and learning networks, and virtual worlds.
 - Manage goals for learning in an online course.
 - Participate in activities that involve social and learning networks and virtual worlds.
- C/T 9-12.16 Apply knowledge and skills to generate innovative ideas, products, processes, and solutions.
- A. Use various creative software, programming environments, or digital tools to convey existing ideas in new and effective ways.
 - Use technology to develop innovative and effective solutions for assignments.
 - B. Add meaning to individual and group ideas and products through creative work.
 - Create a drawing, painting, or other visual image.
 - Create original music.
 - Produce a video.
 - C. Participate with peers and experts to assess projects.
 - Use peer networks to provide and receive assessments.
 - Use communication media to locate experts who can assess projects.