



Indiana Content Standards for Educators

COMPUTER EDUCATION

Computer education teachers are expected to have a broad and comprehensive understanding of the knowledge and skills needed for this educator license, and to use that knowledge to help students prepare for the challenges and opportunities of the twenty-first century. This requires the ability to identify, comprehend, analyze, synthesize, and evaluate the basic principles, fundamental concepts, and essential content defined in these standards, and to apply that knowledge to the tasks of planning and delivering effective instruction and assessment.

Table of Contents

Computer Education Educator Standards 1

Selected Bibliography of Standards and Sources Related to
Computer Education 5

Alignment of Educator Standards with State and National Standards 7

Computer Education Educator Standards

Standard 1: Operations and Concepts Related to Computers and Technology

Computer education teachers have a broad and comprehensive understanding of operations and concepts related to computers and technology.

Standard 2: Hardware and Software Resources

Computer education teachers have a broad and comprehensive understanding of the management of hardware and software resources.

Standard 3: Use of Technology Resources

Computer education teachers have a broad and comprehensive understanding of concepts and skills related to the use of technology resources.

Standard 4: Computer-based Learning Environments

Computer education teachers have a broad and comprehensive understanding of the design, development, and uses of computer-based learning resources, tools, and environments.

Standard 5: Computer Programming

Computer education teachers have a broad and comprehensive understanding of concepts and skills related to computer programming.

Standard 6: Social, Ethical, Legal, and Human Issues

Computer education teachers have a broad and comprehensive understanding of the appropriate use of computer technology and the interrelationships between technology and society.

Standard 7: Instruction and Assessment

Computer education teachers have a broad and comprehensive understanding of content-specific instruction and assessment in computer education.

The Indiana Educator Standards for Computer Education describe the knowledge and skills that teachers need to help students achieve the learning outcomes defined by the Indiana Academic Standards for Computer Applications, Desktop Publishing, Web Design, and Computer Programming. Links to relevant portions of the Indiana Academic Standards can be found below.

[Computer Applications \(Advanced\)](#)

[Computer Programming](#)

[Web Design](#)

[Desktop Publishing](#)

Computer Education Educator Standards

Standard 1: Operations and Concepts Related to Computers and Technology

Computer education teachers have a broad and comprehensive understanding of operations and concepts related to computers and technology, including:

- 1.1** terminology and concepts related to computers and technology
- 1.2** the operation of multimedia computer systems
- 1.3** the use of peripherals, imaging devices, and other electronic devices
- 1.4** the uses of computers and technology in homes, education, business, and industry
- 1.5** terminology and concepts related to computer networks

Standard 2: Hardware and Software Resources

Computer education teachers have a broad and comprehensive understanding of the management of hardware and software resources, including:

- 2.1** types of software used in educational and administrative settings, including open source software
- 2.2** criteria for evaluating technology systems and software for use in classroom and laboratory settings
- 2.3** the installation, configuration, and troubleshooting of hardware and software
- 2.4** the organization, management, and security of technology resources
- 2.5** types and uses of adaptive assistive technology resources used in classroom and laboratory settings
- 2.6** policies, procedures, and practices related to the management of technology resources

Standard 3: Use of Technology Resources

Computer education teachers have a broad and comprehensive understanding of concepts and skills related to the use of technology resources, including:

- 3.1** word processing and desktop publishing software, including formatting and page layout
- 3.2** spreadsheet and database software
- 3.3** multimedia content and multimedia and hypermedia authoring software, including presentation software
- 3.4** the manipulation of audio, video, text, and graphics
- 3.5** utility and classroom management software
- 3.6** telecommunications tools for communicating, sharing, accessing, retrieving, and publishing information
- 3.7** the integration of productivity applications and technology to produce products and support problem solving
- 3.8** appropriate technology tools for conducting research, solving problems, and presenting information and concepts
- 3.9** techniques for researching and evaluating online information

Standard 4: Computer-based Learning Environments

Computer education teachers have a broad and comprehensive understanding of the design, development, and uses of computer-based learning resources, tools, and environments, including:

- 4.1** Internet concepts and terminology
- 4.2** security issues related to Internet technology
- 4.3** current and emerging electronic devices and learning resources
- 4.4** current and emerging strategies, tools, and environments for creating digital content
- 4.5** basic principles of instructional design associated with developing digital learning materials
- 4.6** principles of graphic and Web page design
- 4.7** Web page formatting and elements
- 4.8** Web servers, client/server interactions, and scripting

Standard 5: Computer Programming

Computer education teachers have a broad and comprehensive understanding of concepts and skills related to computer programming, including:

- 5.1** characteristics and functions of computer hardware and operating systems
- 5.2** characteristics and evolution of programming language paradigms
- 5.3** concepts related to the software development process, including principles and patterns of software design, object-oriented design, and strategies for testing software
- 5.4** computational thinking, including abstraction, iteration, and debugging, and its application in design and problem solving in real-world contexts
- 5.5** integrated software development environments
- 5.6** file management and principles of data input/output and data manipulation
- 5.7** syntax, semantics, control structures, and data representations in high-level programming languages
- 5.8** abstraction mechanisms and principles of modularization
- 5.9** fundamental algorithms, such as sorts and searches, and algorithm design techniques

Computer Education Educator Standards

Standard 6: Social, Ethical, Legal, and Human Issues

Computer education teachers have a broad and comprehensive understanding of the appropriate use of computer technology and the interrelationships between technology and society, including:

- 6.1** historical development and important trends affecting the evolution of technology
- 6.2** important trends and evolving roles of technology in society
- 6.3** the effects of technology on society and on student development and learning
- 6.4** the ethical, legal, safe, appropriate, and healthy use of technology resources
- 6.5** the ethical and appropriate use of digital information, including issues related to copyright, intellectual property, and source documentation
- 6.6** equitable use of digital information and technology for all students
- 6.7** ethical, legal, and equity issues related to purchasing and policy decisions
- 6.8** activities, resources, and professional organizations and groups that support professional growth in the field of computer education

Standard 7: Instruction and Assessment

Computer education teachers have a broad and comprehensive understanding of content-specific instruction and assessment in computer education, including:

- 7.1** the Indiana Academic Standards for Computer Applications, Desktop Publishing, Web Design, and Computer Programming
- 7.2** the NCATE Program Standards for Educational Computing and Technology and the ISTE National Educational Technology Standards
- 7.3** strategies for designing instruction that meets content and technology standards
- 7.4** instructional strategies related to computer education that meet the needs of diverse student populations
- 7.5** instructional strategies for using technology-based learning experiences that develop students' higher-order thinking and problem-solving skills
- 7.6** strategies for actively engaging students in using technology to support their own learning
- 7.7** strategies for planning classroom and laboratory learning environments and for managing student learning and resources in technology-enhanced environments
- 7.8** strategies for effectively assessing students' understanding and mastery of skills and concepts related to computer education
- 7.9** instructional strategies for teaching concepts and skills related to the programming process
- 7.10** strategies for facilitating individual and collaborative projects and investigations involving technology and virtual environments
- 7.11** guidance roles and enrichment activities related to computers and technology
- 7.12** the use of documentation and other help resources to support technology instruction

Selected Bibliography of Standards and Sources Related to Computer Education

State and National Standards and Curriculum Frameworks

1. Indiana Department of Education. (2008). *Indiana academic standards for computer applications, desktop publishing, Web design, and computer programming*.
<http://dc.doe.in.gov/Standards/AcademicStandards/PrintLibrary/docs-BMIT/ComputerApplicationsAdvanced.pdf>
<http://dc.doe.in.gov/Standards/AcademicStandards/PrintLibrary/docs-BMIT/WebDesign.pdf>
<http://dc.doe.in.gov/Standards/AcademicStandards/PrintLibrary/docs-BMIT/DesktopPublishing.pdf>
<http://dc.doe.in.gov/Standards/AcademicStandards/PrintLibrary/docs-BMIT/ComputerProgramming.pdf>
2. Indiana Department of Education. (1996). *NCATE program standards for educational computing and technology*. <http://www.doe.in.gov/educatorlicensing/pdf/NCATEEducationalComputingAdvanced.pdf>
3. International Society for Technology in Education (ISTE). (2008). *National educational technology standards for teachers*. http://www.iste.org/Libraries/PDFs/NETS_for_Teachers_2008_EN.sflb.ashx

Sources on Computer Education Content

4. Beekman, G., & Beekman, B. (2010). *Tomorrow's technology and you, complete 9th edition*. Upper Saddle River, NJ: Prentice Hall.
5. Dale, N., & Lewis, J. (2009). *Computer science illuminated* (4th ed.). Sudbury, MA: Jones & Bartlett Learning.
6. Preston, J., Preston, S., & Ferrett, R. L. (2010). *Computer literacy for IC3 Unit 2: Using productivity software*. Upper Saddle River, NJ: Prentice Hall.
7. Ribble, M., & Bailey, G. (2007). *Digital citizenship in schools*. Eugene, OR: International Society for Technology in Education.
8. Robbins, J. N. (2007). *Learning Web design: A beginner's guide to (X) HTML, style sheets, and Web graphics*. Sebastopol, CA: O'Reilly Media.
9. Roblyer, M. D., & Doering, A. H. (2009). *Integrating educational technology into teaching* (5th ed.). Boston, MA: Allyn & Bacon.
10. Soloman, G., & Schrum, L. (2010). *Web 2.0 how-to for educators*. Eugene, OR: International Society for Technology in Education.

Selected Bibliography of Standards and Sources Related to Computer Education

Sources on Student Learning and Pedagogical Methodology

11. Jenkins, H. (2009). *Confronting the challenges of participatory culture (John D. and Catherine T. MacArthur Foundation reports on digital media and learning)*. Cambridge, MA: The MIT Press.
12. Jonassen, D. H., Howland, J., Marra, R. M., & Crismond, D. P. (2007). *Meaningful learning with technology* (3rd ed.). Upper Saddle River, NJ: Prentice Hall.
13. Means, B. (2010). Technology and education change: Focus on student learning. *Journal of Research on Technology in Education* 42(3), 285–307.
14. Neiderhauser, D. S., & Lindstrom, D. (2006). Addressing the NETS for students through constructivist technology use in K–12 classrooms. *Journal of Educational Computing Research*, 34(1), 91–128.
15. Schrum, L. (2010). *Considerations on teaching and teachers: The best of JRTE*. Eugene, OR: International Society for Technology in Education.
16. Wulf, T. (2005). Constructive approaches for teaching computer programming. Conference on Information Technology Education. *Proceedings of the 6th conference on information technology education, SESSION: Standards, pedagogy and requirements*. New York, NY: Association for Computing Machinery.

Alignment of Educator Standards with State and National Standards

Indiana Educator Standards for Computer Education	Indiana Academic Standards for Computer Applications, Desktop Publishing, Web Design, and Computer Programming	NCATE (ISTE) Standards for Educational Computing and Technology	ISTE National Educational Technology Standards
<p><u>Standard 1: Operations and Concepts Related to Computers and Technology</u></p> <p>Computer education teachers have a broad and comprehensive understanding of operations and concepts related to computers and technology.</p>	<p>CAA 1.1.3; CAA 1.1.5; CAA 1.1.6; CAA 1.1.7; CAA 1.1.8; CAA 1.1.9</p>	<p>1.1</p>	<p>3a</p>
<p><u>Standard 2: Hardware and Software Resources</u></p> <p>Computer education teachers have a broad and comprehensive understanding of the management of hardware and software resources.</p>	<p>CAA 1.1.1; CAA 1.1.2</p>	<p>1.1.1; 1.2.5; 3.2</p>	<p>3a</p>
<p><u>Standard 3: Use of Technology Resources</u></p> <p>Computer education teachers have a broad and comprehensive understanding of concepts and skills related to the use of technology resources.</p>	<p>CAA 3–6; DTP 1–4; WD 5.1.1; WD 5.1.6</p>	<p>1.2; 1.3.1; 2.2; 2.3; 2.4</p>	<p>1b; 3a, 3d; 5a</p>
<p><u>Standard 4: Computer-based Learning Environments</u></p> <p>Computer education teachers have a broad and comprehensive understanding of the design, development, and uses of computer-based learning resources, tools, and environments.</p>	<p>WD 1–4; WD 6; CP 12–21</p>	<p>1.3.1; 1.3.2; 1.3.3; 2.2.6; 2.3.1</p>	<p>2a, 2b; 3a, 3b, 3c</p>
<p><u>Standard 5: Computer Programming</u></p> <p>Computer education teachers have a broad and comprehensive understanding of concepts and skills related to computer programming.</p>	<p>CP 1–11</p>	<p>Computer Science 2.0</p>	
<p><u>Standard 6: Social, Ethical, Legal, and Human Issues</u></p> <p>Computer education teachers have a broad and comprehensive understanding of the appropriate use of computer technology and the interrelationships between technology and society.</p>	<p>CAA 1.1.4; CAA 2; WD 5.2; WD 5.3; WD 5.4; WD 5.5</p>	<p>1.2.6; 1.3.4; 1.3.5; 2.1</p>	<p>4a–4c; 5c, 5d</p>

Alignment of Educator Standards with State and National Standards

Indiana Educator Standards for Computer Education	Indiana Academic Standards for Computer Applications, Desktop Publishing, Web Design, and Computer Programming	NCATE (ISTE) Standards for Educational Computing and Technology	ISTE National Educational Technology Standards
<p><u>Standard 7: Instruction and Assessment</u></p> <p>Computer education teachers have a broad and comprehensive understanding of content-specific instruction and assessment in computer education.</p>		1.2.7; 1.3.2; 1.3.3; 1.3.4; 3.1	1a–1d; 2a–2d; 3b, 3d, 4d; 5a, 5b