



NORTH DAKOTA DEPARTMENT OF
PUBLIC INSTRUCTION

North Dakota
Computer Science and Cybersecurity
Content Standards
Grades K–12
Draft 1 2024

North Dakota Department of Public Instruction
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Document Revision Log

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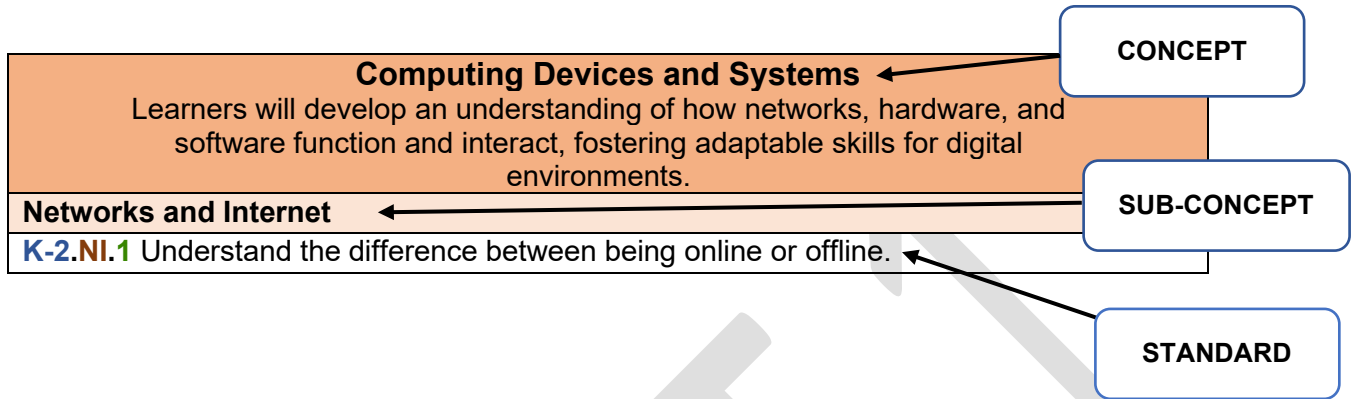
Superintendent's Foreword

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How to Read the Standards

The standards are organized into five main concepts: Computing Devices and Systems, Algorithms and Computational Thinking, Impacts of Computing, Digital Citizenship, and Security, broken into smaller sub-concepts under each main concept and finally into individual standards under each sub-concept. The standards are organized by grade level to allow more focus on skills at particular levels.



CODING EXAMPLE

K-2 – Grade Span

NI – Sub-Concept

1 – Standard Number

DRAFT 1

Kindergarten – Second Grade

Computing Devices and Systems Learners will develop an understanding of how networks, hardware, and software function and interact, fostering adaptable skills for digital environments.
Networks and Internet
K-2.NI.1 Understand the difference between being online or offline.
K-2.NI.2 Identify devices that can be connected to the internet.
K-2.NI.3 Understand that you can store and share information online.
Hardware and Software
K-2.HS.1 Use software to accomplish a task.
K-2.HS.2 Identify the components and basic functions of a computer system.
K-2.HS.3 Recognize that digital information can be organized, stored, and retrieved.
Algorithms and Computational Thinking Learners will develop and apply a basic understanding of algorithms and computational thinking, enhancing problem-solving and critical-thinking skills.
Developing and Designing Algorithms
K-2.DD.1 Break a task into smaller steps to identify patterns or solve problems. (Algorithm)
K-2.DD.2 Create an algorithm that uses a sequence to solve a problem.
K-2.DD.3 Find examples of patterns and conditionals in daily life.
Analyzing and Problem Solving
K-2.AP.1 Organize collected data to make a prediction with or without a computing device.
K-2.AP.2 Identify and correct errors in algorithms or processes to solve problems.
K-2.AP.3 <i>Standard begins in grade 6.</i>
Impacts of Computing Learners will understand how technology shapes individuals and the world and influences safety policy, law, and ethics.
Policies and Laws
K-2.PL.1 Demonstrate an understanding that creative works are protected by law. (Library Media 2.IP.1)
K-2.PL.2 Understand the purpose of and comply with responsible and acceptable use policies. (Library Media 2.RU.1)
K-2.PL.3 <i>Standard begins in grade 6.</i>
Ethics
K-2.E.1 Describe the good and bad uses of information technology.
K-2.E.2 Identify facts and opinions. (Library Media 2.E.1)
Societal Impacts
K-2.S.1 Identify technology's positive and negative impacts on how people live, work, and interact.
K-2.S.2 Identify how current and emerging technologies impact individuals.

Kindergarten – Second Grade

Digital Citizenship	
Learners will practice responsible digital consumption, creation, communication, and interaction.	
Digital Well-Being	
K-2.DW.1	Identify proper times to use technology and times to be screen-free. (Library Media 2.RU.5)
K-2.DW.2	Discuss the potential impact of technology use on one’s learning and relationships.
Digital Identity	
K-2.DI.1	With guidance, understand that using technology builds one’s digital identity. (Library Media 2.DI.1)
Social Interactions	
K-2.SI.1	Identify social interactions that can impact self and others. (Library Media 2.SI.2)
K-2.SI.2	Discuss appropriate online behavior and how it affects individuals and model age-appropriate responses.
Security	
To protect individuals and organizations, learners will gain a foundational understanding of data and system security practices, including information, network, and physical security.	
Personally Identifiable Information	
K-2.PI.1	Identify public versus private information, listing examples of information that needs to be protected.
Threats and Vulnerability	
K-2.TV.1	Understand that cybersecurity threats exist (e.g., phishing, malware, clickbait). (Library Media 2.RU.3)
K-2.TV.2	Understand that apps and devices can be updated.
Security Controls	
K-2.SC.1	Describe the concept of a good password and its importance.
K-2.SC.2	Describe methods to maintain digital privacy and security when accessing technology (e.g., password, PIN, multi-factor authentication). (Library Media 2.RU.2)

Third - Fifth Grade

Computing Devices and Systems Learners will develop an understanding of how networks, hardware, and software function and interact, fostering adaptable skills for digital environments.
Networks and Internet
3-5.NI.1 Understand that information is sent and received across physical or wireless paths.
3-5.NI.2 Identify devices that can be connected to the internet and may collect and share data.
3-5.NI.3 Identify locations to store and share information, both offline and online.
Hardware and Software
3-5.HS.1 Use software features to accomplish a task.
3-5.HS.2 With guidance, apply basic troubleshooting strategies.
3-5.HS.3 With guidance, organize, store, and retrieve digital information efficiently.
Algorithms and Computational Thinking Learners will develop and apply a basic understanding of algorithms and computational thinking, enhancing problem-solving and critical-thinking skills.
Developing and Designing Algorithms
3-5.DD.1 Construct a simple algorithm that uses a sequence of instructions.
3-5.DD.2 Create a simple algorithm to solve problems using coding constructs such as loops, conditionals, functions, or variables.
3-5.DD.3 List examples of loops, conditionals, functions, or variables in daily life.
Analyzing and Problem Solving
3-5.AP.1 Organize collected data to highlight comparisons and support a claim.
3-5.AP.2 Identify and correct errors in algorithms or processes, considering multiple strategies to solve problems.
3-5.AP.3 <i>Standard begins in grade 6.</i>
Impacts of Computing Learners will understand how technology shapes individuals and the world and influences safety policy, law, and ethics.
Policies and Laws
3-5.PL.1 With guidance, demonstrate an understanding of copyright and fair use. (Library Media 5.IP.1)
3-5.PL.2 Understand the purpose of and comply with responsible and acceptable use policies. (Library Media 5.RU.1)
3-5.PL.3 <i>Standard begins in grade 6.</i>
Ethics
3-5.E.1 Describe motivations that influence the ethical use of information technology tools.
3-5.E.2 With guidance, understand that biases exist and distinguish between facts and opinions in various sources. (Library Media 5.E.1)
Societal Impacts
3-5.S.1 Examine technology's positive and negative impacts on how people live, work, and interact.
3-5.S.2 Examine how current and emerging technologies impact individuals and local communities.

Third - Fifth Grade

Digital Citizenship
Learners will practice responsible digital consumption, creation, communication, and interaction.
Digital Well-Being
3-5.DW.1 Identify strategies for media balance. (Library Media 5.RU.5)
3-5.DW.2 Discuss the personal impact of technology use on one's learning and relationships.
Digital Identity
3-5.DI.1 Give examples of how using technology builds one's digital identity. (Library Media 5.DI.1)
Social Interactions
3-5.SI.1 Identify social interactions and how they impact self and others. (Library Media 5.SI.2)
3-5.SI.2 Discuss examples of cyberbullying, how it affects individuals, and model age-appropriate prevention and reporting strategies.
Security
To protect individuals and organizations, learners will gain a foundational understanding of data and system security practices, including information, network, and physical security.
Personally Identifiable Information
3-5.PI.1 Identify risks of online sharing of private information (e.g., identity theft, data collection, and personal safety). (Library Media 5.RU.4)
Threats and Vulnerability
3-5.TV.1 Explain how malicious actions (e.g., phishing, malware, clickbait, data collection, and identity theft) threaten network security.
3-5.TV.2 Understand the need to keep apps and devices up to date.
Security Controls
3-5.SC.1 Describe the role of authentication and authorization.
3-5.SC.2 Use methods to maintain digital privacy and security when accessing technology (e.g., password, PIN, multi-factor authentication). (Library media 5.RU.2)

Sixth - Eighth Grade

<p style="text-align: center;">Computing Devices and Systems Learners will develop an understanding of how networks, hardware, and software function and interact, fostering adaptable skills for digital environments.</p>
Networks and Internet
6-8.NI.1 Identify and define network connection types (e.g., WIFI, mobile data, ethernet) and how data is cross-shared.
6-8.NI.2 Evaluate the risks and benefits of the Internet of Things devices.
6-8.NI.3 Identify which information should be stored locally versus the cloud.
Hardware and Software
6-8.HS.1 Select and use software features to accomplish a task.
6-8.HS.2 Apply basic troubleshooting strategies.
6-8.HS.3 Organize, store, and retrieve digital information efficiently.
<p style="text-align: center;">Algorithms and Computational Thinking Learners will develop and apply a basic understanding of algorithms and computational thinking, enhancing problem-solving and critical-thinking skills.</p>
Developing and Designing Algorithms
6-8.DD.1 Identify patterns and repeated steps in an algorithm, problem, or process.
6-8.DD.2 Identify and explain the purpose of an algorithm, problem, or process components.
6-8.DD.3 Predict the outcome(s) of an algorithm, problem, or process.
Analyzing and Problem Solving
6-8.AP.1 Analyze the outcome of an algorithm, data set, or process to identify errors.
6-8.AP.2 Revise and improve algorithms and processes to resolve errors.
6-8.AP.3 Seek feedback from others to refine an algorithm or process.
<p style="text-align: center;">Impacts of Computing Learners will understand how technology shapes individuals and the world and influences safety policy, law, and ethics.</p>
Policies and Laws
6-8.PL.1 Properly use copyrighted works, works in the Creative Commons, and works in the public domain by applying fair use guidelines. (Library Media 8.IP.1)
6-8.PL.2 Understand the purpose of and comply with responsible and acceptable use policies. (Library Media 8.RU.1)
6-8.PL.3 Understand the purpose of specific federal, state, and local laws related to cybersecurity and privacy (e.g., FERPA, CIPA, HIPAA).
Ethics
6-8.E.1 Demonstrate ethical behaviors while using information technology tools.
6-8.E.2 Evaluate information sources to identify bias and determine reliability.
Societal Impacts
6-8.S.1 Examine the positive and negative impacts of equitable access to technology.
6-8.S.2 Analyze the global impact of current and emerging technologies.

Sixth - Eighth Grade

Digital Citizenship
Learners will practice responsible digital consumption, creation, communication, and interaction.
Digital Well-Being
6-8.DW.1 Evaluate personal media usage and apply strategies to create media balance. (Library Media 8.RU.5)
6-8.DW.2 Discuss the potential impact social media use may have on self-identity and overall wellness.
Digital Identity
6-8.DI.1 Evaluate one's digital identity and its impact online and offline. (Library Media 8.DI.1)
Social Interactions
6-8.SI.1 Determine the cause and effect of social interactions on self and others. (Library Media 8.SI.2)
6-8.SI.2 Identify strategies for responding to positive and negative online situations and discuss the impact of responses on individuals. (Library Media 8.SI.3)
Security
To protect individuals and organizations, learners will gain a foundational understanding of data and system security practices, including information, network, and physical security.
Personally Identifiable Information
6-8.PI.1 Evaluate the benefits versus risks of sharing personal information online (e.g., identity theft, data collection, and personal safety). (Library Media 8.RU.4)
Threats and Vulnerability
6-8.TV.1 Use strategies to prevent cybersecurity threats (e.g., phishing, malware, clickbait, data collection, and identity theft). (Library Media 8.RU.3)
6-8.TV.2 Explain the need to keep apps and devices up to date.
Security Controls
6-8.SC.1 Explain how authentication and authorization methods can protect users.
6-8.SC.2 Use methods to maintain digital privacy and security when accessing technology (e.g., password, PIN, multi-factor authentication). (Library Media 8.RU.2)

Ninth and Tenth Grade

NOTE: The high school standards reflect the basic knowledge and skills students should have when graduating. Students who require more advanced technology standards should follow the NDCTE standards for technology.

Computing Devices and Systems Learners will develop an understanding of how networks, hardware, and software function and interact, fostering adaptable skills for digital environments.
Networks and Internet
9-10.NI.1 Identify the advantages and disadvantages of transmitting information over the Internet, including speed, reliability, cost, and security.
9-10.NI.2 Analyze the purpose of the Internet of Things.
9-10.NI.3 Identify the advantages and disadvantages of various cloud computing models.
Hardware and Software
9-10.HS.1 Compare and contrast the appropriate device/hardware/software to complete tasks.
9-10.HS.2 Describe basic hardware and software problems using appropriate and accurate terminology.
9-10.HS.3 Compare and contrast a variety of storage options to fit a need.
Algorithms and Computational Thinking Learners will develop and apply a basic understanding of algorithms and computational thinking, enhancing problem-solving and critical-thinking skills.
Developing and Designing Algorithms
9-10.DD.1 Recognize, design, and use an algorithm to solve problems across disciplines.
9-10.DD.2 Deconstruct problems into their components to solve the original problems.
9-10.DD.3 Examine algorithms for potential inconsistencies or inefficiencies.
Analyzing and Problem Solving
9-10.AP.1 Collect and analyze complex data.
9-10.AP.2 Utilize algorithmic processes across disciplines to provide solutions to problems.
9-10.AP.3 Work collaboratively to generate multiple solutions to a task, discuss each solution's potential benefits and drawbacks, and reach a consensus on the most effective approach.
Impacts of Computing Learners will understand how technology shapes individuals and the world and influences safety policy, law, and ethics.
Policies and Laws
9-10.PL.1a Properly use copyrighted works, works in the Creative Commons, and works in the public domain by applying fair use guidelines.
9-10.PL.1b Explain how fair use, Creative Commons, and public domain materials can help or limit sharing ideas and creativity.
9-10.PL.2 Understand the purpose of and comply with responsible and acceptable use policies. (Library Media 10.RU.1)
9-10.PL.3 Explain the importance of understanding specific laws and user agreements about technology.
Ethics
9-10.E.1 Identify and navigate ethical dilemmas related to technology use, including security, privacy, and intellectual property.
9-10.E.2 Evaluate the accuracy, perspective, credibility, and relevance of information, media, data, or other resources. (Library Media 10.E.2)
Societal Impacts
9-10.S.1 Predict how technology may impact the workplace and personal lives.
9-10.S.2 Evaluate the impacts of current and emerging technologies.

Ninth and Tenth Grade

NOTE: The High school standards reflect the basic knowledge and skills students should have when graduating. Students who require more advanced technology standards should follow the NDCTE standards for technology.

Digital Citizenship Learners will practice responsible digital consumption, creation, communication, and interaction.
Digital Well-Being
9-10.DW.1 Evaluate personal media usage and apply strategies to create media balance. (Library Media 10.RU.5)
9-10.DW.2 Evaluate the potential benefits and harms social media use may have on self-identity and overall wellness.
Digital Identity
9-10.DI.1 Take ownership of one's digital identity and potential future impacts.
Social Interactions
9-10.SI.1 Use technologies to communicate and collaborate effectively to broaden perspectives and work toward common goals. (Library Media 10.SI.1)
9-10.SI.2 Demonstrate respect and integrity online. (Library Media 10.SI.3)
Security To protect individuals and organizations, learners will gain a foundational understanding of data and system security practices, including information, network, and physical security.
Personally Identifiable Information
9-10.PI.1 Monitor and manage personal information shared online about oneself and others.
Threats and Vulnerability
9-10.TV.1 Develop strategies to help resolve issues arising from cyber threats.
9-10.TV.2 Explain the different types and purposes of security and feature updates.
Security Controls
9-10.SC.1 Evaluate the benefits and risks of authentication and authorization methods.
9-10.SC.2 Implement best practices to secure personal information when accessing technology (e.g., password, PIN, multi-factor authentication). (Library Media 10.RU.2)

Eleventh and Twelfth Grade

NOTE: The high school standards reflect the basic knowledge and skills students should have when graduating. Students who require more advanced technology standards should follow the NDCTE standards for technology.

<p>Computing Devices and Systems</p> <p>Learners will develop an understanding of how networks, hardware, and software function and interact, fostering adaptable skills for digital environments.</p>
Networks and Internet
11-12.NI.1 Choose an appropriate connection to transmit information based on speed, reliability, cost, and security.
11-12.NI.2 Compare and contrast the benefits and security risks of the Internet of Things (e.g., computers, consoles, mobile devices).
11-12.NI.3 Appropriately utilize a variety of cloud computing resources to accomplish tasks.
Hardware and Software
11-12.HS.1 Choose the appropriate device/hardware/software to complete tasks and explain the choice.
11-12.HS.2 Implement systematic troubleshooting strategies to identify and fix errors.
11-12.HS.3 Develop personal procedures and policies for utilizing storage needs (e.g., backups).
<p>Algorithms and Computational Thinking</p> <p>Learners will develop and apply a basic understanding of algorithms and computational thinking, enhancing problem-solving and critical-thinking skills.</p>
Developing and Designing Algorithms
11-12.DD.1 Use and adapt common algorithms to solve computational problems.
11-12.DD.2 Deconstruct problems into components to create new solutions to existing problems.
11-12.DD.3 Assess a variety of algorithms that could be used for similar processes in real-world applications.
Analyzing and Problem Solving
11-12.AP.1 Represent complex data in multiple ways to identify errors and biases.
11-12.AP.2 Develop algorithms across disciplines to provide solutions to problems.
11-12.AP.3 Work collaboratively to analyze complex problems, develop multiple solutions, evaluate the effectiveness of each solution, and justify the reasoning behind the chosen approach.
<p>Impacts of Computing</p> <p>Learners will understand how technology shapes individuals and the world and influences safety policy, law, and ethics.</p>
Policies and Laws
11-12.PL.1a Properly use copyrighted works, works in the Creative Commons, and works in the public domain by applying fair use guidelines.
11-12.PL.1b Explain intellectual property laws' beneficial and harmful effects on innovation, creativity, and collaboration.
11-12.PL.2 Understand the purpose of and comply with responsible and acceptable use policies. (Library Media 12.RU.1)
11-12.PL.3 Explain the importance of understanding specific laws and user agreements about technology.
Ethics
11-12.E.1 Discuss and make personal judgments about the ethical use of technology.
11-12.E.2 Justify source selection based on accuracy, perspective, credibility, and relevance of information, media, data, or other resources. (Library Media 12.E.2)
Societal Impacts
11-12.S.1 Explain how technology may change cultural and environmental aspects of society.
11-12.S.2 Evaluate the impact of equity, bias, access, and influence on current and emerging technologies in a global society.

Eleventh and Twelfth Grade

NOTE: The High school standards reflect the basic knowledge and skills students should have when graduating. Students who require more advanced technology standards should follow the NDCTE standards for technology.

Digital Citizenship
Learners will practice responsible digital consumption, creation, communication, and interaction.
Digital Well-Being
11-12.DW.1 Evaluate personal media usage and apply strategies to create media balance. (Library Media 12.RU.5)
11-12.DW.2 Propose strategies for maintaining a healthy balance in social media usage.
Digital Identity
11-12.DI.1 Evaluate one's digital identity and footprint.
Social Interactions
11-12.SI.1 Use technologies to communicate and collaborate effectively to broader perspectives and work toward common goals. (Library Media 12.SI.1)
11-12.SI.2 Demonstrate respect and integrity online. (Library Media 12.SI.3)
Security
To protect individuals and organizations, learners will gain a foundational understanding of data and system security practices, including information, network, and physical security.
Personally Identifiable Information
11-12.PI.1 Monitor and manage personal information shared online about oneself and others.
Threats and Vulnerability
11-12.TV.1 Develop a sense of self-efficacy that allows one to act on and resolve issues arising from cyber threats.
11-12.TV.2 Evaluate updates for their urgency (features vs. security).
Security Controls
11-12.SC.1 Implement best practices associated with authentication and authorization methods.
11-12.SC.2 Implement best practices to secure personal information when accessing technology (e.g., password, PIN, multifactor authentication). (Library Media 12.RU.2)