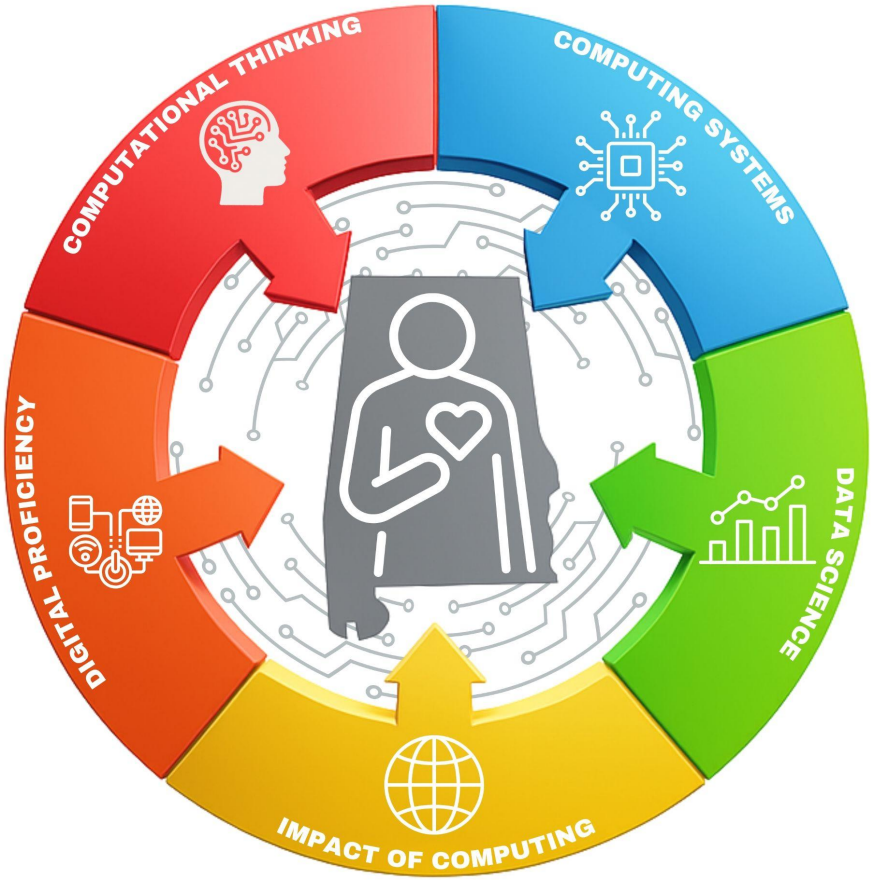
Alabama Course of Study:
Digital Literacy and Computer Science



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Alabama Course of Study: Digital Literacy and Computer Science
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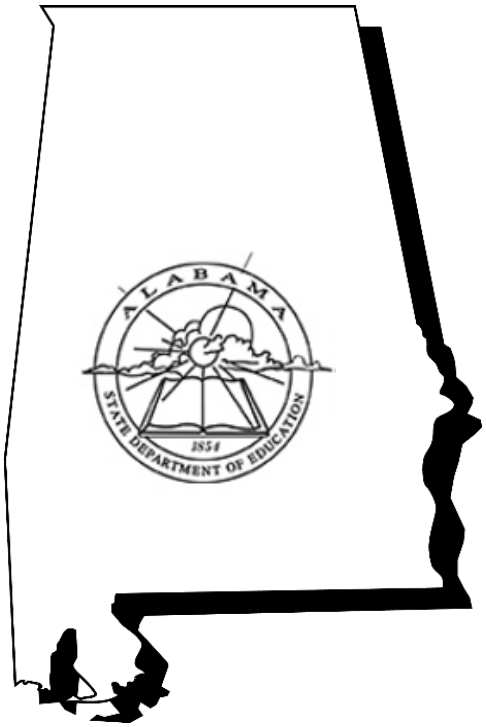

Eric G. Mackey
State Superintendent of Education

STATE SUPERINTENDENT OF EDUCATION'S MESSAGE

Dear Alabama Educator:

To be truly educated, students develop an understanding of the world around them, an essential aim of education. Today's society and the workplace require that all Alabama students develop strong computational thinking, problem-solving abilities, and digital literacy skills.

To meet these expectations, educators must commit to the guiding philosophy of "Every Child. Every Chance. Every Day." This ensures that children in Alabama's public schools become informed, productive, and responsible citizens. Alabama teachers must focus on teaching as a way of *doing* as well as *knowing*, utilizing educational practices in their classrooms.

The 2025 *Alabama Course of Study: Digital Literacy and Computer Science* reflects this vision. The standards are written to support access, promote innovation, and foster creativity in learning for each and every student across Alabama.

Eric G. Mackey, EdD
State Superintendent of Education

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Alabama Course of Study: Digital Literacy and Computer Science

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PREFACE

The 2025 *Alabama Course of Study: Digital Literacy and Computer Science* provides the framework for Kindergarten - Grade 12 digital literacy and computer science programs in Alabama's public schools. Content standards in this document are minimum and required (*Code of Alabama,* 1975, §16-35-4). They are fundamental and specific, but not exhaustive. When developing local curriculum, school systems may include additional content standards to reflect local needs and philosophies. Systems are encouraged to add implementation guidelines, resources, and activities based upon the content standards in the digital literacy and computer science course of study.

The 2025 Alabama Course of Study Committee and Task Force conducted extensive research during the development of this course of study, analyzing digital literacy and computer science standards and curricula from other states, the previous versions of Alabama courses of study, and national standards. The Committee and Task Force also reviewed information from professional journals and Internet sites, listened to and read comments from interested individuals and industry groups throughout the state, considered suggestions from independent reviewers, sought input from advisory councils, and thoroughly discussed each issue and standard among themselves. The Committee and Task Force reached consensus and developed what members believe to be the best digital literacy and computer science course of study for students in Alabama's public schools.

ACKNOWLEDGMENTS

This document was developed by the 2025 Alabama State Digital Literacy and Computer Science Committee and Task Force, composed of Grades K-12 and college educators appointed by the Alabama State Board of Education and business and professional persons appointed by the Governor (*Code of Alabama*, 1975, §16-35-1). The Committee and Task Force began work in February of 2025 and submitted the document to the Alabama State Board of Education for adoption at its December 2025 meeting.

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GENERAL INTRODUCTION

Cultivating computational thinking and digital proficiency is essential to preparing Alabama students for success in a rapidly evolving, technology-driven digital world. As Alabama emerges as a leader in highly technical industries such as automotive manufacturing, aerospace, healthcare, and cybersecurity, the need for a digitally skilled workforce is more urgent than ever. To meet this demand, the state is committed to ensuring that all students, regardless of background or location, have access to high-quality digital literacy and computer science education.

The Computer Science for Alabama Act (Act 2019-389) requires all K-12 public schools to offer computer science courses or integrate computer science instruction into their curriculum by the 2022-2023 school year. By the 2023-2024 school year, 94 percent of Alabama high schools had met this requirement – far exceeding the national average of 60 percent. In 2024, updates to the Alabama Administrative Code strengthened the state's commitment to digital literacy and computer science by establishing the completion of a state-approved computer science course as a graduation requirement, beginning with the class of 2032. These efforts underscore Alabama's resolve to cultivate students who think critically, act responsibly, and lead confidently in shaping the future they will inherit.

The 2025 *Alabama Course of Study: Digital Literacy and Computer Science* defines what learners should know and be able to achieve after completing each grade level in order to become critical thinkers, ethical digital citizens, and innovative problem-solvers who can use and create technology responsibly. This document was created by the Alabama State Digital Literacy and Computer Science Committee and Task Force, consisting of educators representing all levels from Kindergarten through higher education, as well as industry and community leaders. Teachers with expertise in special populations were present with the Committee and Task Force to offer advice, perspective, and professional insight as the group considered the supports which are needed for students with special needs. The Committee and Task Force reviewed multiple reports and examined other states' standards, particularly those recognized for high performance, to ensure clarity, meaningful content knowledge, and the development of high-quality standards tailored to Alabama's needs.

The Alabama State Department of Education made extensive efforts to engage partners and community members in the development of the 2025 *Alabama Course of Study: Digital Literacy and Computer Science.* Public comments were solicited on multiple occasions, and all submissions were carefully reviewed and considered. Experts and practitioners in the field reviewed the contents, and their valuable expertise enhanced the development of the standards. The Committee and Task Force members express their gratitude to all who contributed perspectives, questions, and recommendations throughout the review process.

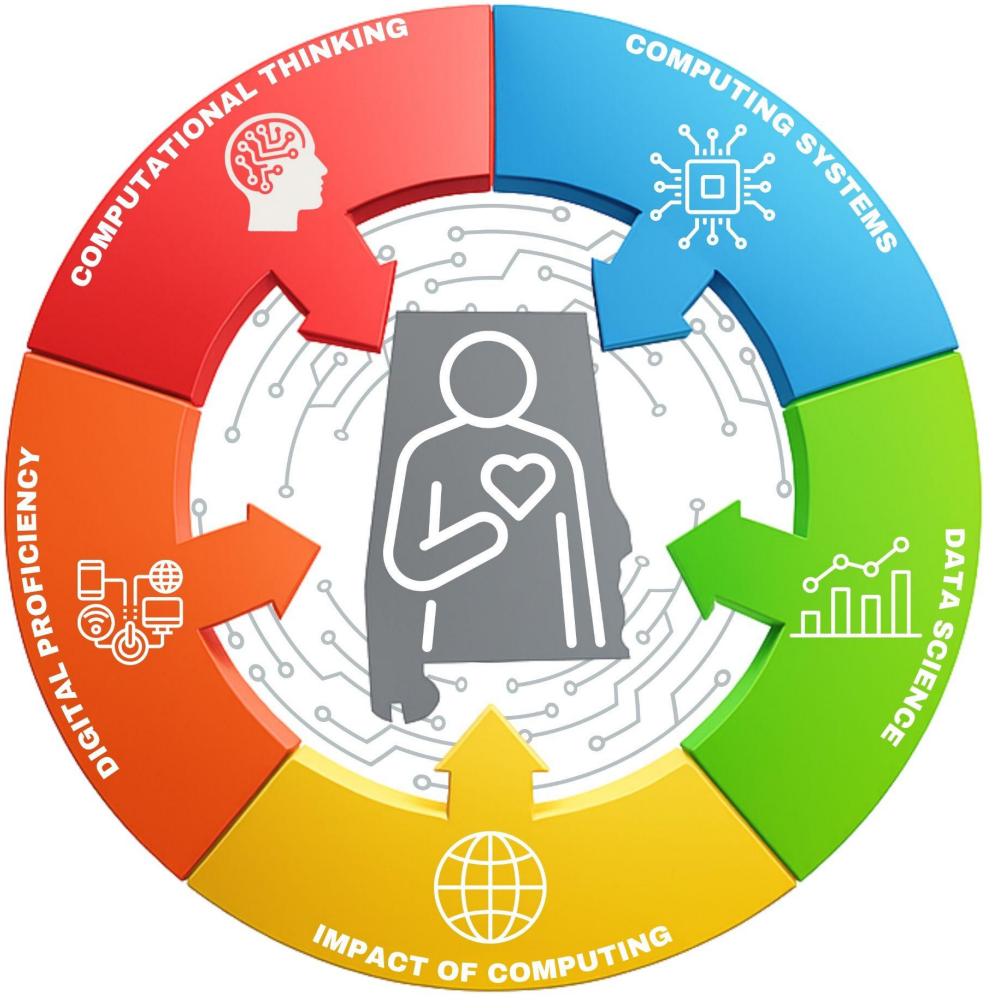
The 2025 *Alabama Course of Study: Digital Literacy and Computer Science* standards emphasize building students' capacity for computational thinking and ethically using technology to help students become problem solvers, responsible digital citizens, and empowered digital participants. The standards also emphasize the development of essential skills, including creativity, critical thinking, adaptability, growth mindset, digital ethics, and lifelong learning. Standards are designed to be integrated into all grades and subjects as part of regular instruction by classroom teachers.

The 2025 *Alabama Course of Study: Digital Literacy and Computer Science* is organized into five core conceptual themes: Computational Thinking, Data Science, Computing Systems, Impact of Computing, and Digital Proficiency. Each theme includes specific focus areas that are aligned across grade bands, allowing for a coherent, developmentally appropriate progression from foundational skills in the early grades to advanced applications in high school. To prepare students for artificial intelligence and other features of the rapidly changing technological landscape, the course of study includes Emerging Technology as a dedicated focus area. The course of study's comprehensive structure allows all Alabama students to actively develop the skills needed to solve real-world problems and thrive in a digitally connected environment.

Effective implementation of this course of study requires local education agencies to research and adopt curriculum that will address the minimum required content set forth in this document. Local systems may include additional content, but no standards may be omitted. Systems should also adopt implementation guides, resources, and activities which not only fulfill the requirements of the standards but also provide opportunities to go beyond them.

Professional learning is required to ensure that teachers become familiar with the standards, structure, and organization of the 2025 *Alabama Course of Study: Digital Literacy and Computer Science.* Familiarity with the course of study will help educators to select curricular materials and plan effective instruction.

CONCEPTUAL FRAMEWORK



CONCEPTUAL FRAMEWORK

In Alabama's vision for the 2025 *Alabama Course of Study: Digital Literacy and Computer Science*, the student is at the heart of the learning experience, which is designed to create digital citizens equipped to navigate and shape a rapidly evolving digital and interconnected world. The conceptual framework graphic portrays the state of Alabama surrounded by five themes: Computational Thinking, Data Science, Computing Systems, Impact of Computing, and Digital Proficiency. These themes point to a future where students are equipped not just to keep pace, but to shape what comes next.

The student's heart is a central visual and philosophical element of the framework. It represents empathy, a key component for the meaningful communication, collaboration, creativity, and analytical reasoning that lead to positive change. In today's interconnected world, empathy is not just a soft skill – it is a vital tool for understanding multiple perspectives, engaging ethically with technology, and contributing positively to society. The framework emphasizes that progress in digital literacy and computer science begins with understanding the human condition and being open to new ideas and experiences.

The course of study is grounded in the conviction that technology is more than a tool; it is a transformative force. Students are expected to move beyond basic digital proficiency as they seek to develop a deep understanding of how digital tools work and why they matter. The standards include topics like artificial intelligence, cybersecurity, and data science, preparing students to engage with the technologies that shape our institutions and economies. With the prevalence of social media and digital platforms, students must learn how to navigate online spaces safely and responsibly.

The colorful segments of the border reinforce the multi-vectored nature of digital literacy and computer science. The five themes encircling the state of Alabama depict the elements that students embrace to be effective global and digital communicators. The underlying belief is that Alabama students will play a prominent role in producing technological and societal advancements for the state. These thematic elements underscore the conviction that students are not just users of technology – they are also analysts and designers who will shape the future.

Ultimately, the 2025 *Alabama Course of Study: Digital Literacy and Computer Science* aims to equip students with the cognitive and technical skills needed to locate, evaluate, create, and communicate information effectively and ethically. By integrating digital literacy and computer science principles with real-world applications and societal impact, the course of study prepares Alabama's students not just for college and careers, but for thoughtful, responsible participation in a digital world.

POSITION STATEMENTS

The 2025 *Alabama Course of Study: Digital Literacy and Computer Science* defines the minimum content in terms of what students should know and be able to do at the end of each grade. Educators and leaders at school and district levels must engage with the standards and utilize them systematically to create excellent digital literacy and computer science programs that meet the needs of their students.

Certain fundamental understandings are integral to educators' comprehension and application of the course of study. The Committee and Task Force present the following position statements to elaborate upon the expectations under which local education agencies should work as they select and write curriculum and other materials they will use to implement the course of study. The statements below express what the authors consider to be foundational to successful instruction as embodied in the 2025 *Alabama Course of Study: Digital Literacy and Computer Science.*

Students must develop digital literacy skills to use technology safely and responsibly.

Digital literacy encompasses proficient use of digital tools and the implementation of digital citizenship. Digital literacy is a core life skill, serving as the foundation for student success across all fields of study as well as building college and career readiness. Therefore, students must be fluent in using a variety of tools to create, collaborate, communicate, think critically, and apply digital skills to new technologies. Students should engage with digital tools safely and responsibly, and make ethical decisions regarding their use of technology. As students encounter a broad spectrum of technologies, they must be able to identify, interpret, and critically evaluate media and digital information and recognize both the opportunities that technology offers and the limitations it presents. Students must learn and practice digital literacy skills at the earliest grades and refine them as they grow older so that they may safely interact with other people as empathetic, responsible, and productive members of society.

Students must develop a computational mindset to succeed.

Computer science is the study of computers and algorithmic processes, including foundational principles, hardware and software design, applications, and societal impact. Students benefit from an understanding and basic proficiency in computer science, which includes programming, data science and cybersecurity. Computing has become an integral part of our world, and the field of computer science consistently provides high-demand jobs in Alabama.

Computational thinking is characterized by decomposition, pattern recognition, data representation, generalization/abstraction, and the creation of algorithms. A computational mindset leads students to approach problems by breaking them down, discovering the variables involved, representing the variables using data, and using abstraction in order to produce algorithms that can be used to solve many variations of the initial problem. This logical type of thinking can help students of all ages solve everyday problems and be applied throughout life to produce results in every field of endeavor.

Students deserve access to robust digital literacy and computer science instruction, equipment, and opportunities.

Alabama's students should have access to quality learning experiences, up-to-date devices and software, and experiences that push them to excel. Access to high-speed broadband and secure, reliable, and robust infrastructure is no longer a mere convenience but an instructional necessity. Being able to use the growing digital ecosystem for instruction will allow Alabama's students to broaden their horizons and learn anywhere at any time. Furthermore, access is not only about the availability of classes, but also about how teachers are trained, how classes are taught, how students are encouraged to participate and supported to persist, and how classroom culture meets the needs of all learners. Educational leaders will need thoughtful strategies, intentional policies, and adequate budgets to decrease existing inequities and meet the needs of all students.

Students must be able to evaluate and utilize emerging technologies safely, ethically, and effectively.

Emerging technologies, such as AI, have already begun to change the way people access information, communicate, and make decisions. Students must be able to not only use current technologies but also to explore, evaluate, and adapt to emerging innovations as they are developed.

School and district leaders must provide opportunities for educators to access professional development and implement the course of study.

Schools that intentionally build pathways for teacher training and provide time for professional development are most successful in preparing students for a technology-rich world. Local education agencies play a critical role in fostering digital literacy and computer science instruction by providing both face-to-face and online opportunities for ongoing professional learning. School and district leaders must ensure that policies, plans, and resources are in place to make technology accessible and aligned with the course of study standards. Implementation plans should be created and followed to clearly outline how standards are to be incorporated across grade levels and content areas, and foster accountability at both school and district levels.

Educators must seek out and participate in ongoing, relevant professional learning.

Educators must actively engage in professional development to stay current on ever-changing technology. Effective educators leverage technology to provide authentic learning opportunities that deepen student understanding and increase student engagement and proficiency. They must receive training that allows them to amplify their own content areas while helping students become more proficient in digital literacy and/or computer science.

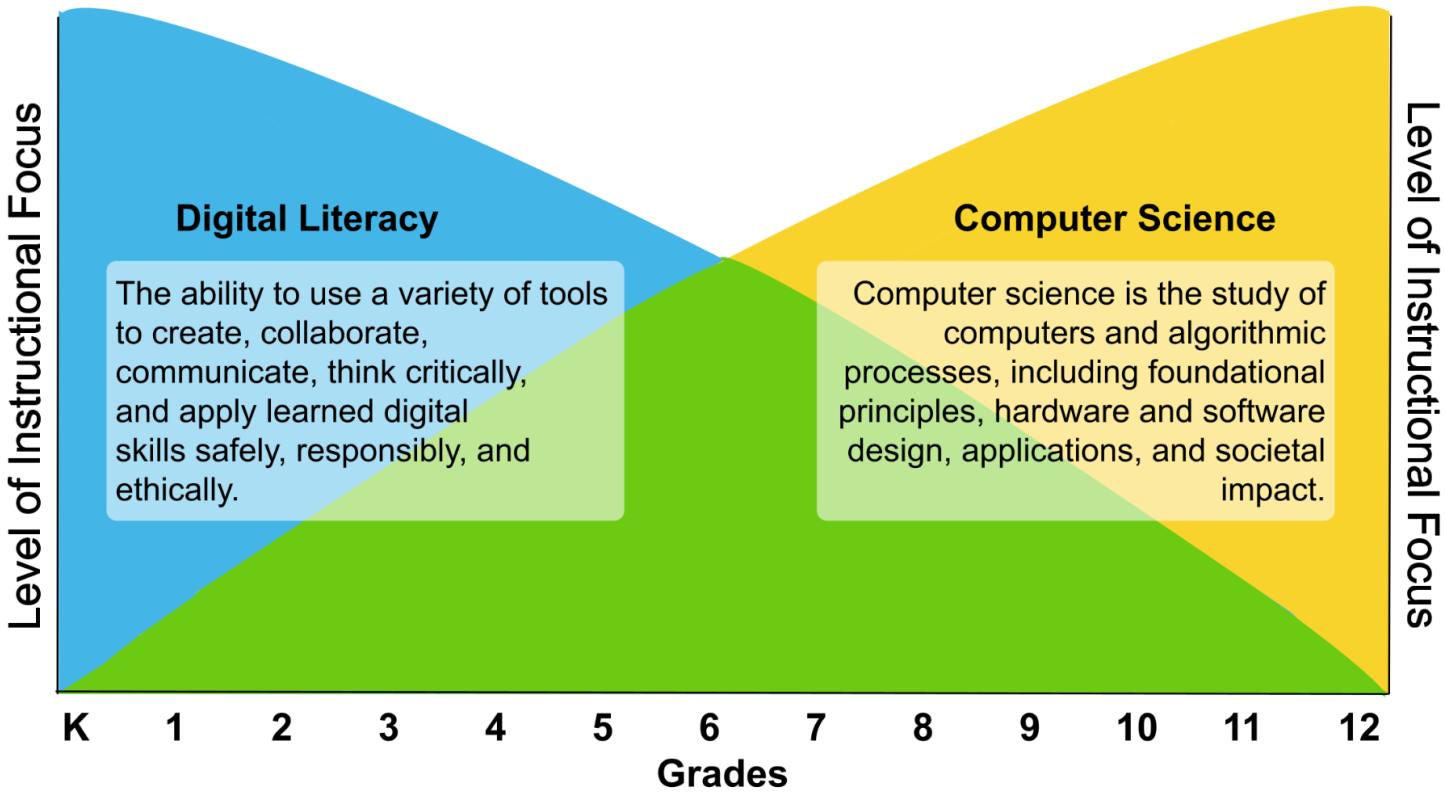
Educators must continually enrich and expand their professional knowledge in order to stay current and meet the needs of the future. Educators should consider being active members of state and national technology organizations and serve as mentors to less-experienced educators. Some state and local sources of support for implementing the course of study are:

- The Alabama Chapter of the Computer Science Teachers Association (CSTA)
- Alabama Educational Technology Conference (AETC)
- Alabama Leaders of Educational Technology (ALET)

- Alabama Learning Exchange (ALEX)
- Alabama Math, Science, and Technology Initiative (AMSTI)
- Alabama School Library Association (ASLA)
- Alabama Technology in Motion (ATIM)
- A+ College Ready
- Southeastern Center of Robotics Education (SCORE)

These organizations are leaders in providing support and resources for Alabama educators in the areas of digital literacy and computer science.

Framework for K-12 Digital Literacy and Computer Science



In the early grades, the instructional focus is on more digital literacy, the skills that students must learn with the introduction of computer science standards. In the later grades, the instructional focus transitions toward computer science while continuing to address more advanced digital literacy skills. While both focus areas are present along the entire continuum, this graph represents the transition in the level of instructional focus as students progress along the continuum.

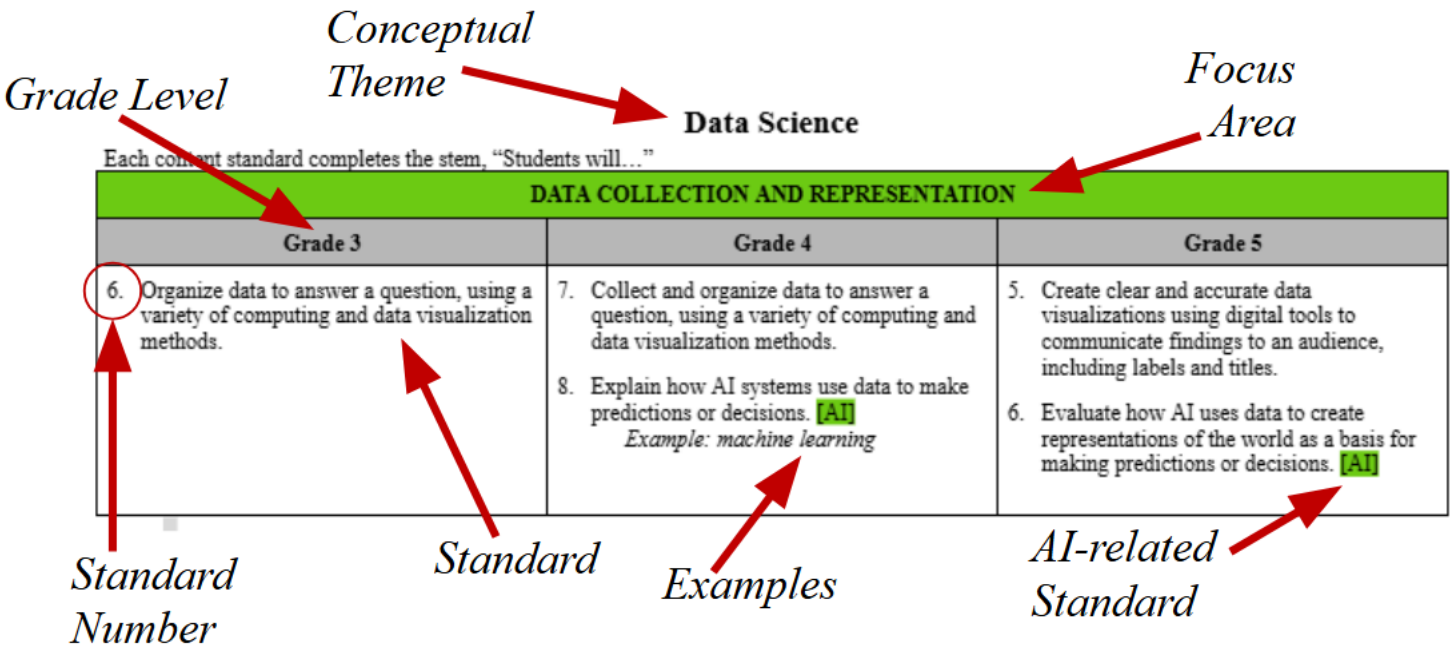
DIRECTIONS FOR INTERPRETING STANDARDS

The illustration on the following page is a guide for interpreting the Grades K-12 minimum required content outlining what students should know and be able to do at the end of a grade or course.

- When "including" appears in standards, it should be construed as "including but not limited to." The items listed after "including" must be taught; others may also be incorporated in instruction.
- Some standards contain examples to clarify their intent. Examples are not exhaustive lists; they represent some among the many examples that could be listed. Examples are not required to be taught.
- Standards are not provided for very early grades when they would not be developmentally appropriate. In these rare instances, the cells for the omitted standards have a gray background and contain the statement, "Standards for this focus area are developmentally appropriate beginning in Grade __."

The course of study does not dictate curriculum, teaching methods, or sequence. The order in which standards are listed within a grade is not intended to convey the order for instruction. Even though one topic may be listed before another, the first topic does not have to be taught before the second. A teacher may choose to teach the second topic before the first, to teach both at the same time to highlight connections, or to select a different topic that leads to students reaching the standards for both topics.

The standards in each grade are to be used as a minimal framework and should encourage innovation. Local education agencies (LEAs) may add standards to meet local needs and incorporate local resources. Each LEA should create its own curriculum and pacing guide based on the course of study.


Conceptual Theme
Grade Level
Data Science
Focus Area
Each content standard completes the stem, "Students will…"
DATA COLLECTION AND REPRESENTATION
Grade 3
Grade 4
Grade 5
6. Organize data to answer a question, using a variety of computing and data visualization methods.
7. Collect and organize data to answer a question, using a variety of computing and data visualization methods.
8. Explain how AI systems use data to make predictions or decisions. [AI]
Example: machine learning
5. Create clear and accurate data visualizations using digital tools to communicate findings to an audience, including labels and titles.
6. Evaluate how AI uses data to create representations of the world as a basis for making predictions or decisions. [AI]
Standard Number
Standard
Examples
AI-related Standard

COURSE OF STUDY OVERVIEW

Standards in the 2025 *Alabama Course of Study: Digital Literacy and Computer Science* outline what students should know or be able to do at the completion of each grade. Standards are organized into the following grade bands: Kindergarten-Grade 2, Grades 3-5, Grades 6-8, and Grades 9-12. In the first three grade bands (covering Kindergarten through Grade 8), each grade level has its own specific standards. Standards for Grades 9-12 are universal for all four grade levels.

This document concludes with a glossary of terms which may be necessary for understanding the standards.

Within each grade level, the standards are organized into five conceptual themes. The conceptual themes are further subdivided into focus areas, which contain specific content standards. The chart below lists the conceptual themes and their respective focus areas.

Computational Thinking	Data Science	Computing Systems	Impact of Computing	Digital Proficiency
• Algorithms, Abstraction, and Decomposition • Programming	• Data Collection and Representation • Data Analysis • Modeling and Simulation	• Networks and Internet • Cybersecurity • Hardware • Software	• Career Paths • Ethics • Society • Emerging Technology • Accessibility	• Information Literacy • Digital Life • Digital Tools

Standards related to the increasingly important field of artificial intelligence are indicated with this symbol: [AI]. These standards aid students in developing an understanding of how AI works, but do not require the use of AI to teach. Because AI impacts all areas of digital literacy and computer science, standards related to AI have been integrated throughout the conceptual framework themes and focus areas, rather than being isolated in a separate section. Standards related to AI in Computational Thinking and Data Science themes require students to explore how AI works and utilizes data. AI-related standards in Impact of Computing direct students to focus on the ethical use and possible biases of AI and to examine its impact on the world around them. In Digital Proficiency, standards focus on the safety and usage of AI tools.

The 2025 *Alabama Course of Study: Digital Literacy and Computer Science* standards represent the minimum required content and are not intended to be the course curriculum. Each LEA and local school should use these standards to select or create a curriculum that meets the specific needs and interests of the local community, using the resources available in the community. LEAs may add standards, but may not omit any. LEAs and schools should also develop pacing guides and other resources to implement the curriculum.

OVERVIEW
Kindergarten-Grade 2

Standards from Kindergarten through Grade 2 are designed to help students gain foundational knowledge of how computers and digital tools help individuals think, solve problems, and connect with others. At this level, learning is hands-on and exploratory, and instruction focuses on helping students become confident users of technology and thinkers in a digital world.

Standards for Kindergarten through Grade 2 are designed to enable students to meet the following learning goals.

- **Computational Thinking:** Students will dissect problems into steps, recognize patterns, and use logical thinking to create simple plans or solutions.
- **Data Science:** Students will explore how information can help make decisions and solve problems in everyday situations.
- **Computing Systems:** Students will identify types and functions of basic computing devices, investigate how hardware and software work together, and practice using these devices responsibly and correctly.
- **Impact of Computing:** Students will describe how computers are used in many places (including homes, schools, hospitals, and more), explain how technology helps people, and discuss their obligation to be responsible, safe, and kind when using technology.
- **Digital Proficiency:** Students will become comfortable using age-appropriate digital tools and develop skills to create, communicate, and explore as they begin to become an integral part of society in a digital world.

Some Kindergarten-Grade 2 standards include the phrase “with guidance and support,” which acknowledges that the youngest students will need some assistance in meeting the standards. This scaffold disappears in later standards, as students become more confident and proficient. They are designed to enable students to develop the confidence to explore new tools, work with others on shared digital projects, and reflect on how technology supports learning, problem-solving, and creativity. Students begin to demonstrate perseverance, curiosity, and responsible digital behavior as they plan, construct, and analyze information using technology.

Computational Thinking

Each content standard completes the stem, "Students will…"

ALGORITHMS, ABSTRACTION, AND DECOMPOSITION		
Kindergarten	**Grade 1**	**Grade 2**
1. Create a plan that outlines the steps needed to complete a task, with guidance and support. 2. Identify information in a given problem as essential or non-essential.	1. Create an algorithm to complete a task. 2. Identify a bug in a given program and debug the program, with guidance and support. 3. Organize essential information to solve a problem, with or without digital tools. [AI]	1. Create an algorithm to solve a problem collaboratively and explain alternative ways to solve the same problem. 2. Test and debug a given program. 3. Classify, evaluate, and represent essential information to solve a problem, using digital tools. [AI]

PROGRAMMING		
Kindergarten	**Grade 1**	**Grade 2**
3. Model a simple algorithm using unplugged or plugged activities, with guidance and support.	4. Construct elements of a simple program in collaboration with others.	4. Construct or modify a simple program, using basic commands.

Data Science

Each content standard completes the stem, "Students will…"

DATA COLLECTION AND REPRESENTATION		
Kindergarten	**Grade 1**	**Grade 2**
4. Collect and organize data in a logical way, with guidance and support. *Examples: chart, graph* 5. Sort objects into groups and label them to help a computer find patterns and make predictions. [AI]	5. Collect data and organize data into categories using a variety of tools, with guidance and support. 6. Create a simple chart with labels and features to help a computer sort items by recognizing patterns. [AI]	5. Collect, create, and logically organize data in a digital format. 6. Create a labeled dataset that includes features to help a computer classify items. [AI] *Examples: color, size, type*

Computing Systems

Each content standard completes the stem, "Students will…"

NETWORKS AND INTERNET		
Kindergarten	**Grade 1**	**Grade 2**
6. Explain what it means to be connected to the Internet.	7. Describe how devices connect and interact with other devices to perform specific functions.	7. Explain that information on the Internet comes from many different computers (servers).

CYBERSECURITY		
Kindergarten	**Grade 1**	**Grade 2**
7. Distinguish between personal and public information and identify ways to keep personal information secure. 8. Identify ways to use online resources safely.	8. Demonstrate age-appropriate methods for keeping personal information secure. 9. Demonstrate safe use of online resources, with guidance and support.	8. Explain the need for secure passwords and create one that meets simple criteria. 9. Use online resources safely in individual and collaborative settings.

HARDWARE AND SOFTWARE		
Kindergarten	**Grade 1**	**Grade 2**
9. Identify the functions of basic hardware	10. Locate and identify sensors on electronic	

components of a digital device, including input and output devices.	devices. 11. Describe and attempt troubleshooting steps to solve a technology problem, with guidance and support.	10. Use basic software features within familiar applications. 11. Describe and attempt troubleshooting steps to solve a technology problem.

Impact of Computing

Each content standard completes the stem, "Students will…"

SOCIETY		
Kindergarten	**Grade 1**	**Grade 2**
Standards for this focus area are developmentally appropriate beginning in Grade 2.		12. Explain how technology impacts the way people live and work.

EMERGING TECHNOLOGY		
Kindergarten	**Grade 1**	**Grade 2**
10. Explore examples of emerging technologies and their purposes. [AI]	12. Identify ways that new technology is designed to solve problems and make tasks easier or more efficient. [AI]	13. Describe the types of tasks emerging technology can and cannot perform. [AI]

ACCESSIBILITY		
Kindergarten	**Grade 1**	**Grade 2**
Standards for this focus area are developmentally appropriate beginning in Grade 2.		14. Identify tools that make technology more accessible for everyone.

Digital Proficiency

Each content standard completes the stem, "Students will…"

INFORMATION LITERACY		
Kindergarten	**Grade 1**	**Grade 2**
11. Use age-appropriate online sources to find answers to simple questions, with guidance and support.	13. Identify keywords from a question or topic and use age-appropriate digital resources to conduct research, with guidance and support.	15. Perform an Internet search within a search engine or website to conduct research.

DIGITAL LIFE		
Kindergarten	**Grade 1**	**Grade 2**
12. Identify ways people communicate using technology.	14. Differentiate between appropriate and inappropriate behaviors for communicating with others in a digital environment.	16. Explain how sharing information online contributes to a user's digital footprint.

DIGITAL TOOLS		
Kindergarten	**Grade 1**	**Grade 2**
	15. Independently use basic input and output devices to interact with digital platforms.	17. Explain the purposes of input and output components of digital devices.

13. Use basic input and output devices to interact with digital platforms, with guidance and support. 14. Identify an appropriate digital tool to complete a given task, with guidance and support. 15. Compare intelligent and non-intelligent machines, and discuss what makes a machine intelligent, with guidance and support. [AI] *Examples: self-driving car vs. pencil sharpener; robot vacuum vs. toaster*	16. Use online digital tools to create a collaborative product, with guidance and support. 17. Locate letters and numbers on the keyboard.	18. Identify and use multiple digital tools to complete a project, with guidance and support. 19. Explain that AI uses data to find patterns but can make a mistake if the data is biased, incomplete, or incorrect. [AI] 20. Type five words per minute, using efficient keyboarding techniques.

OVERVIEW
Grades 3-5

From Grade 3 through Grade 5, standards require students to build on their early digital experiences by engaging with a range of computing systems and digital tools. At this stage, students strengthen their problem-solving abilities and begin to think computationally, approaching challenges in both logical and creative ways. Their growing confidence and increasing academic ability allow them to design, innovate, and collaborate more independently, applying skills learned in earlier grades to new, increasingly complex tasks.

Standards for Grades 3 through 5 are designed to enable students to meet the following learning goals:

- **Computational Thinking:** Students will apply structured problem-solving strategies to write and debug algorithms, and evaluate and create representations of information that help reframe and clarify real-world challenges.
- **Data Science:** Students will begin to collect, organize, and interpret data as they develop the ability to draw conclusions and make informed decisions based on their analyses.
- **Computing Systems:** Students will develop deeper insights into how devices and software interact and learn to use a variety of computing tools strategically to solve problems and complete tasks efficiently.
- **Impact of Computing:** Students will demonstrate growing awareness of how technology shapes behavior, communication, and society, and reflect on ethical use, digital security, and the responsibilities that come with being part of a digital world.
- **Digital Proficiency:** Students will use research and communication tools effectively as they collaborate with others to create digital artifacts and responsibly exchange information in digital spaces.

When students engage with the content standards in environments that encourage curiosity, collaboration, and creativity, they move closer to becoming an integral part of society in a digital world. They become equipped to analyze problems, apply design thinking, and develop innovative solutions that make a positive impact locally and globally. They apply logic, intuition, imagination, and systematic reasoning to explore possibilities and bring meaningful ideas to fruition.

Computational Thinking

Each content standard completes the stem, "Students will…"

ALGORITHMS, ABSTRACTION, AND DECOMPOSITION		
Grade 3	**Grade 4**	**Grade 5**
1. Develop and document an algorithm that outlines specific steps to complete a project for other learners to follow. 2. Use numbers or letters to represent information in another form. 3. Demonstrate how a larger problem can be broken into sub-problems. 4. Explain the function of a flowchart.	1. Build and revise an algorithm and defend the choices made during the process. 2. Construct a system of numbers, letters, or symbols to represent information. 3. Analyze given sub-problems while addressing a larger problem. 4. Use flowcharts to create a plan or algorithm. 5. Describe the structure and function of a simple pseudocode.	1. Compare two or more algorithms and discuss each one's advantages and disadvantages for a specific task. 2. Create and use a system of representative letters, numbers, or symbols, including binary numbers, to identify patterns in related data. 3. Create pseudocode using sequencing and a simple IF/THEN selection.

PROGRAMMING		
Grade 3	**Grade 4**	**Grade 5**
5. Create a working program using sequencing and events in a visual programming environment, working in collaboration with others.	6. Create a working program using conditional statements and loops in a visual programming environment, working in collaboration with others.	4. Create a working program using variables in a visual programming environment, independently or collaboratively.

Data Science

Each content standard completes the stem, "Students will…"

DATA COLLECTION AND REPRESENTATION		
Grade 3	**Grade 4**	**Grade 5**
6. Organize data to answer a question, using a variety of computing and data visualization methods.	7. Collect and organize data to answer a question, using a variety of computing and data visualization methods. 8. Explain how AI systems use data to make predictions or decisions. [AI] *Example: machine learning*	5. Create clear and accurate data visualizations using digital tools to communicate findings to an audience, including labels and titles. 6. Evaluate how AI uses data to create representations of the world as a basis for making predictions or decisions. [AI]

Computing Systems

Each content standard completes the stem, "Students will…"

NETWORKS AND INTERNET		
Grade 3	**Grade 4**	**Grade 5**
7. Explain what makes the Internet a global network.	9. Explain how cloud computing allows users to access files and programs over the Internet. 10. Identify the domain name and protocol in a URL.	7. Explain how devices connect and communicate in a simple network.

CYBERSECURITY		
Grade 3	**Grade 4**	**Grade 5**
8. Apply strategies to create and manage passwords. 9. Identify examples of suspicious activity of applications and devices that should be reported. *Examples: phishing, malware, privacy settings*	11. Describe various forms of suspicious online activity. *Examples: phishing, malware, privacy settings* 12. Discuss possible strategies to protect themselves from malicious online activity.	8. Research and discuss the purposes and potential privacy implications of online tracking methods. 9. Discuss possible defenses against forms of online manipulation and impersonation. *Examples: phishing, baiting*

HARDWARE AND SOFTWARE		
Grade 3	**Grade 4**	**Grade 5**

10. Describe the differences between hardware and software.	13. Describe how hardware and software work together as a system to accomplish tasks.	10. Explain the purpose and importance of regular software updates.

Impact of Computing

Each content standard completes the stem, "Students will…"

ETHICS		
Grade 3	**Grade 4**	**Grade 5**
Standards for this focus area are developmentally appropriate beginning in Grade 4.	14. Explain the potential consequences of inappropriate online behavior and identify strategies for prevention and response.	11. Analyze scenarios involving online ethical dilemmas and propose responsible actions based on ethical principles and the school or district's acceptable use policy.

SOCIETY		
Grade 3	**Grade 4**	**Grade 5**
11. Identify technological inventions and contributions that have impacted society.	15. Explain how technology has changed the ways people communicate and interact, and describe the positive and negative effects of these changes.	12. Explain how technology can be used to raise awareness, help others, or solve a problem in society. [AI]

EMERGING TECHNOLOGY		
Grade 3	**Grade 4**	**Grade 5**
12. Explore and describe how emerging technologies can be used for learning and in daily life. [AI]	16. Analyze and discuss the benefits and challenges of using emerging technologies in learning and daily life. [AI]	13. Evaluate the positive and negative impacts of emerging technologies on society. [AI]

ACCESSIBILITY		
Grade 3	**Grade 4**	**Grade 5**
13. Explain how technology can be designed to support people with different needs.	17. Explain how creating digital content with accessibility in mind (Universal Design Principles) can benefit all users.	14. Identify basic accessibility features in websites and digital tools and explain how they support users with different needs.

Digital Proficiency

Each content standard completes the stem, "Students will…"

INFORMATION LITERACY		
Grade 3	**Grade 4**	**Grade 5**
14. Use keywords in an Internet search to find accurate and relevant information to a specific question. [AI]	18. Utilize search strategies to find accurate and relevant online information. [AI] 19. Evaluate the credibility of an online source based on given criteria.	15. Develop search queries and refine them based on results. 16. Compare and evaluate multiple sources of online information to determine whether the information is factual. [AI] 17. Differentiate among quoting, paraphrasing, and plagiarizing, and demonstrate responsible use of information obtained from other sources.

DIGITAL LIFE		
Grade 3	**Grade 4**	**Grade 5**
15. Describe ways digital platforms collect personal information. 16. Demonstrate appropriate behaviors that reflect a positive and responsible digital	20. Explain why digital platforms may include advertisements and collect personal information.	18. Describe how communicating and sharing information online can affect individuals, families, and communities in both positive and negative ways.

footprint when communicating in a digital environment.	21. Create and share digital content that reflects respectful communication to demonstrate responsible online interactions. 22. Describe the user's responsibilities for digital footprints, both their own and those of others.	19. Discuss the long-term implications of online actions for reputation and safety. 20. Evaluate the appropriateness of using AI versus seeking human support. [AI]

DIGITAL TOOLS		
Grade 3	**Grade 4**	**Grade 5**
17. Select and use multiple digital tools to complete a project. [AI] 18. Write a prompt to guide AI tools in generating useful responses, and explain how different prompts affect the results. [AI] 19. Type ten words per minute using efficient keyboarding techniques.	23. Use digital tools to create images, audio files, or videos to complete assignments or share ideas. 24. Explain the ways users save information in an organized manner on digital devices. 25. Craft a process for creating prompts which includes testing them, getting feedback, and refining them over time based on how well the AI performs. [AI] 26. Type 15 words per minute using efficient keyboarding techniques.	21. Use digital tools to work with peers, provide feedback, and manage shared projects. 22. Organize and manage digital files and folders, using file system navigation and naming conventions. 23. Collaborate on projects that use digital tools for creative problem-solving by applying appropriate prompting strategies. [AI] 24. Type 20 words per minute using efficient keyboarding techniques.

OVERVIEW
Grades 6-8

In Grades 6, 7, and 8, students develop greater independence as they integrate themselves into the increasingly digital and global society around them. Many will begin constructing their global online presence for the first time. In these grades, students are becoming proficient digital citizens, while continuing to build on a strong foundation in computer science principles. The goals of the content strands at this level demonstrate this balance.

Standards are designed to enable students in Grades 6, 7, and 8 to address the following learning goals:

- **Computational Thinking:** Students will strengthen their problem-solving skills using decomposition, abstraction, and debugging. They will modify, write, and improve their own algorithms using pseudocode, flowcharts, and programming languages.
- **Data Science:** Students will utilize effective and appropriate means to collect, organize, and analyze data. They will connect what they learn about data and its patterns to make informed decisions and gain a deeper understanding of AI. Through modeling and simulation, students will test how inputs affect outcomes and modify models.
- **Computing Systems:** Students will deepen their understanding of how networks operate, including how devices communicate, as well as how software and hardware work together. They will explore cybersecurity by identifying threats, practicing safe online behavior, and developing strategies to protect data and devices.
- **Impact of Computing:** Students will analyze how technology affects and shapes society, including careers, culture, and communication. They will learn to evaluate emerging technologies and understand the legal and ethical responsibilities involved in using them.
- **Digital Proficiency:** Students will evaluate digital content for credibility and cite sources to strengthen the reliability of their work. Students will also reflect on their own digital lives to understand how technology affects their foundational wellness.

Through engagement with the content standards for Grades 6 through 8, students apply analysis, synthesis, and evaluation in digital literacy and computer science in conjunction with other areas of academic studies. Students in these grades work collaboratively to explore, employ, and develop digital tools, acquiring and demonstrating skills needed for success in a digital world.

Computational Thinking

Each content standard completes the stem, "Students will…"

ALGORITHMS, ABSTRACTION, AND DECOMPOSITION		
Grade 6	**Grade 7**	**Grade 8**
1. Create pseudocode using sequencing, selection, and iteration applying relational and logical operators to control program flow. 2. Differentiate between flowcharts and pseudocode and create both to solve a task. 3. Trace and debug pseudocode to identify outcomes and correct logic errors. 4. Break a task into smaller steps and evaluate the purpose and effectiveness of each step to solve a problem. 5. Explain how abstraction simplifies tasks, using real-life examples.	1. Design and test algorithms using pseudocode with sequencing, selection, and iteration applying relational and logical operators to control program flow and produce appropriate outcomes. 2. Create a flowchart and corresponding pseudocode to plan and explain a process. 3. Debug algorithms containing selection and iteration and explain improvements. 4. Analyze a multi-step problem by dividing it into its key components that can be completed collaboratively. 5. Create functions to reduce complexity in programming.	1. Utilize a programming language to create algorithms that include sequencing, selection, and iteration. 2. Design multi-branched flowcharts and corresponding pseudocode. 3. Evaluate programs containing nested logic by applying relational and logical operators to trace conditions, and debug when those conditions do not behave as expected. 4. Decompose a problem into multiple parts to identify each part's functionality and support maintenance and future improvements. 5. Create reusable functions that include inputs to change how the function works and explain how using functions makes code easier to reuse and understand.

PROGRAMMING		
Grade 6	**Grade 7**	**Grade 8**
6. Create a program that includes sequencing, selection, and iteration. 7. Create an interactive program using sequential commands and user input to control basic program actions, like movement or responses.	6. Design and implement a program that solves a problem, using sequencing, selection, and iteration, and user input to control the program's behavior.	6. Improve an existing program by adding new features or increase its efficiency. 7. Explain how software is developed, tested, and maintained to ensure quality.

Data Science

Each content standard completes the stem, "Students will…"

DATA COLLECTION AND REPRESENTATION		
Grade 6	**Grade 7**	**Grade 8**
8. Differentiate between numeric and text data types and construct simple data structures. *Examples: strings, lists, arrays, dictionaries* 9. Explain why computers use a binary system.	7. Write a program that utilizes multiple data types and structures. *Examples: numbers vs text, true/false Booleans* 8. Convert simple text and numbers into binary, manually or using digital tools.	8. Design a data store and apply validation techniques. *Examples: forms, spreadsheets, databases* 9. Explain how binary data is used in computing systems to represent and process different types of information. 10. Explain how data size and format affect storage and performance.

DATA ANALYSIS		
Grade 6	**Grade 7**	**Grade 8**
10. Create graphs or charts from simple datasets to identify patterns, and describe key findings.	9. Apply basic data analysis techniques to draw conclusions from structured datasets. *Examples: charts, graphs, statistical measures (mean, median, and mode)*	11. Use digital tools or visualizations to analyze datasets, detect anomalies, and develop narratives based on findings. 12. Explain how AI systems use data to make decisions and predictions. [AI]

11. Generate and interpret descriptive statistics, including mean, median, and mode, to summarize data.	10. Use evidence from multiple data sources to support claims or decisions related to real-world problems.	

MODELING AND SIMULATION		
Grade 6	**Grade 7**	**Grade 8**
12. Use basic models or simulations to test how changes in input affect outcomes.	11. Modify a model or simulation to improve its accuracy and describe how changes in input affect the results.	13. Develop a model or simulation and evaluate its accuracy and limitations.

Computing Systems

Each content standard completes the stem, "Students will…"

NETWORKS AND INTERNET		
Grade 6	**Grade 7**	**Grade 8**
13. Explain the basic roles of routers, IP addresses, domain names, and servers in network communication. 14. Differentiate between the Internet and the World Wide Web.	12. Compare and contrast different types of networks, including LAN, WAN, and wireless. 13. Describe how data travels between devices using basic protocols. *Examples: IP, HTTP* 14. Identify Internet of Things (IoT) devices and explain how they communicate with other devices over a network.	14. Create a diagram of a network to meet specific needs, including modems, routers, and servers. 15. Explain how data is broken into packets, sent across the Internet, and reassembled, including how multiple protocols work together for communication. 16. Explain how cloud computing enables data access, including the advantages and limitations of technologies that enable data access. *Examples: cloud storage, IoT*

CYBERSECURITY		
Grade 6	**Grade 7**	**Grade 8**
15. Identify common online threats, including social engineering, and describe safe practices to protect personal information.	15. Explain how sensitive data can be compromised by threats and analyze how strong security practices can reduce these risks.	17. Dissect a previously occurred cybersecurity breach, identify failure points, and explain

Examples: phishing, scams 16. Explain how strong passwords and multi-factor authentication help protect data. 17. Compare safe and unsafe online behaviors related to social media use, personal identifiable information, and cyberbullying.	*Examples: viruses, malware, cyberattacks* 16. Outline cybersecurity practices, including firewalls, antivirus software, and secure passwords, and explain how to identify and reduce system vulnerabilities. 17. Demonstrate strategies for protecting personal information and digital identity.	how better safeguards could have prevented the attack. 18. Evaluate cybersecurity risks across networks, applications, and cloud-based systems and recommend improvements. 19. Create a personal cybersecurity plan which includes identifying online risks, evaluating their own digital footprint, adjusting privacy settings, and describing steps to protect their accounts and personal information.

HARDWARE AND SOFTWARE		
Grade 6	**Grade 7**	**Grade 8**
18. Perform basic troubleshooting to solve hardware problems. 19. Identify examples of system and application software, and match common applications to appropriate tasks. *Examples: word processing, photo editing, coding* 20. Explain the purpose of an operating system and describe how it manages hardware and software resources.	18. Evaluate the benefits and limitations of hardware components for different users and computing needs. *Examples: processor, memory, storage, input and output devices* 19. Complete a specific task using appropriate application software. 20. Analyze how different operating systems work for various types of devices.	20. Demonstrate how hardware components work together in the data processing cycle to perform computing tasks. *Examples: processor, memory, storage, input and output devices* 21. Complete a project by combining multiple software applications. 22. Evaluate the advantages and disadvantages of open-source and proprietary software in different scenarios.

Impact of Computing

Each content standard completes the stem, "Students will…"

CAREER PATHS		
Grade 6	**Grade 7**	**Grade 8**
21. Identify a variety of careers that relate to or utilize computer science skills.	21. Investigate various careers in computer science and related fields, and identify the skills commonly required for those roles.	23. Research and report on the responsibilities of various careers that use computer science expertise.

ETHICS		
Grade 6	**Grade 7**	**Grade 8**
22. Summarize major state and federal laws related to technology use, including those regulating copyright and intellectual property. 23. Describe how AI systems are used in everyday life and examine the ethical considerations they raise. [AI] *Examples: decision-making, privacy, bias*	22. Explain the importance of intellectual property, copyright, and fair use in digital media. 23. Analyze ethical dilemmas involving the use of technology or data, including AI bias and misuse. [AI]	24. Demonstrate safe, legal, and ethical habits when creating and sharing digital content. 25. Evaluate ethical dimensions and societal impacts of AI technologies. [AI]

SOCIETY		
Grade 6	**Grade 7**	**Grade 8**
24. Explain how computing technologies have changed and will continue to change the way people communicate, learn, and work in their daily lives and communities.	24. Describe ways computing technologies can transform and impact the environment, culture, economies, and society.	26. Analyze how computing technologies impact laws and influence social structures over time.

EMERGING TECHNOLOGY		
Grade 6	**Grade 7**	**Grade 8**
25. Identify examples of relevant emerging technologies and describe their purposes. [AI]	25. Assess and predict the impact of emerging technologies. [AI]	27. Research the use of emerging technologies in everyday life, and report on their benefits and limitations. [AI]

ACCESSIBILITY		
Grade 6	**Grade 7**	**Grade 8**
26. Evaluate accessibility features in digital tools and explain how they improve	26. Apply basic accessibility principles when creating digital content.	28. Design and implement solutions that address specific accessibility needs,

usability for individuals with diverse abilities.	*Examples: using clear headings, providing simple alternative text for images*	considering feedback and making adjustments. 29. Research and report on provisions of the Americans with Disabilities Act (ADA) regarding the accessibility of technology.

Digital Proficiency

Each content standard completes the stem, "Students will…"

INFORMATION LITERACY		
Grade 6	**Grade 7**	**Grade 8**
27. Analyze digital content for reliability and cite sources properly.	27. Apply strategies for verifying digital information, cross-referencing sources and using digital tools to assess credibility and accuracy. [AI]	30. Synthesize information from credible sources to create an original product. 31. Explain how digital manipulation influences actions, perceptions, and public opinion. [AI]

DIGITAL LIFE		
Grade 6	**Grade 7**	**Grade 8**
28. Investigate their own digital footprints and describe the effects digital footprints can have on themselves and others.	28. Analyze their own technology use and explain the impact of online activities on their lives and well-being.	32. Develop strategies to manage screen time, handle multitasking, and balance the use of technology in daily life.

DIGITAL TOOLS		
Grade 6	**Grade 7**	**Grade 8**

29. Create and apply a structured system for organizing files, folders, and subfolders to manage and retrieve digital work efficiently. 30. Identify AI and non-AI technologies and features when using digital tools. [AI] 31. Input text at a rate of 25 words per minute via keyboard or alternative text input method.	29. Select and apply appropriate online tools and file types for a variety of tasks. 30. Collaborate with peers using online platforms to create and revise multimedia content, adjusting tone and format for audience and purpose. 31. Compare and contrast AI-generated artifacts with human-generated artifacts. [AI] 32. Input text at a rate of 30 words per minute via keyboard or alternative text input method.	33. Evaluate the effectiveness of digital tools for communication and project-based collaboration. 34. Compose professional emails and presentations, demonstrating clear purpose, tone, and etiquette across digital platforms. 35. Produce new content through guided collaboration with AI systems. [AI] 36. Input text at a rate of 35 words per minute via keyboard or alternative text input method.

OVERVIEW
Grades 9-12

In Grades 9 through 12, students undergo significant personal and academic growth as they prepare for post-secondary education and future careers. They refine their skills, make important decisions about their paths, and take greater ownership of their learning. As they face more complex academic challenges and learn to balance independence with collaboration, high school students develop essential skills in problem-solving, leadership, and communication. Through both academic and extracurricular experiences, they gain a deeper understanding of their roles in local and global communities while exploring potential career paths, college options, and civic responsibilities.

With access to a global network of perspectives, students engage with peers from different backgrounds and cultures through technology. As digital platforms continue to transform how people work, learn, and communicate, being able to navigate this interconnected world becomes increasingly important. The demand for skills in digital literacy, computer science, and cross-cultural collaboration will continue to grow in the coming years. Developing these skills equips students to thrive in a rapidly changing global economy, and empowers them to solve complex challenges, innovate across fields, and engage as responsible digital citizens.

Standards are designed to enable high school students to address the following learning goals.

- **Computational Thinking**: Students will dissect complex problems, design algorithmic solutions, and apply programming concepts to simulate and solve real-world challenges.
- **Data Science:** Students will collect, organize, and interpret data using appropriate tools to generate meaningful insights and make informed decisions.
- **Computing Systems:** Students will analyze how hardware, software, and networks work together, evaluate system performance, and troubleshoot issues in current digital environments.
- **Impact of Computing:** Students will examine the ethical, legal, and societal implications of computing technologies and explore how these innovations shape access, fairness, and global interaction.
- **Digital Proficiency:** Students will demonstrate responsible, adaptive, and secure use of digital tools to communicate, collaborate, and create effectively in dynamic digital contexts.

When the content standards are mastered in a student-centered environment, students gain a deeper understanding of technology's role in shaping the modern world. They develop critical skills in computational thinking, computing systems, data science, and digital proficiency, while analyzing the societal impact of computing. These skills empower students to thrive in a digital, interconnected future, preparing them for success in both higher education and the workforce.

Computational Thinking

Each content standard completes the stem, "Students will…"

Grades 9-12	
ALGORITHMS, ABSTRACTION, AND DECOMPOSITION	1. Compare and contrast a generalized algorithm in pseudocode and its concrete implementation in a programming language.
	2. Translate pseudocode, flowcharts, or other planning tools into multiple programming languages.
	3. Explain the characteristics of algorithms, including speed, accuracy, and storage requirements.
	4. Model and adapt classic algorithms, including sorting and searching, to solve computational problems.
	5. Decompose problems into component parts, extract key information, and model levels of abstraction in complex systems.
	6. Compare different data compression algorithms by analyzing their main features, including their compression speed and whether they preserve data exactly (lossless) or reduce data quality for higher compression (lossy).
	7. Create software solutions using libraries and application programming interfaces (APIs) that demonstrate code reuse.
	8. Compare and contrast the major categories of machine learning, including supervised, unsupervised, and reinforcement learning. [AI]
PROGRAMMING	9. Compare and contrast fundamental data structures and their uses. *Examples: strings, lists, arrays, dictionaries, stacks, queues*

	10. Develop and use a series of test cases to verify that a program performs according to its design specifications.
	11. Utilize an iterative and incremental software design process, including learning from mistakes, to improve a program.
	12. Improve existing code by restructuring (refactoring) it to enhance readability and/or increase efficiency without changing its overall behavior.
	13. Select and utilize effective debugging techniques to correct problems in software.
	14. Create a complete program to solve a problem or explore personal interests, using a text-based programming language.
	15. Design and implement a program that processes user input, applies relational and logical operators within conditional logic, maintains program state, and produces appropriate responses. *Examples: chatbot, tic-tac-toe*

Data Science

Each content standard completes the stem, "Students will…"

Grades 9-12	
DATA COLLECTION AND REPRESENTATION	16. Create interactive data visualizations to help others understand real-world phenomena. [AI]
	17. Verify the validity of a dataset by identifying missing, out-of-range, inconsistent, or invalid data and distinguishing these from statistical outliers using basic measures such as range, mean, or standard deviation.
DATA ANALYSIS	18. Correct or remove entries containing missing, out-of-range, inconsistent, or invalid data from a dataset to prepare it for analysis.
	19. Utilize data analysis tools and statistical methods on a dataset to discover useful information, identify patterns, or make an informed decision.
MODELING AND SIMULATION	20. Create and utilize models and simulations to help formulate, test, and refine a hypothesis.
	21. Update an existing model to address flaws and improve precision.

Computing Systems

Each content standard completes the stem, "Students will…"

Grades 9-12	
NETWORKS AND INTERNET	22. Analyze how network infrastructure impacts the speed, reliability, and scalability of services.
	23. Explain how security protocols in networked systems protect or expose data and assess the risks associated with IoT devices and cloud services.
CYBERSECURITY	24. Explain the tradeoffs when selecting and implementing cybersecurity recommendations, balancing cost, performance, usability, and security. *Examples: multi-factor authentication, password requirements, location-based requirements*
	25. Summarize the mechanisms and purposes of various tracking technologies and identify strategies to manage them.
	26. Investigate the purpose of and relationship among various computer security measures. *Examples: firewalls, authentication, encryption*
	27. Create a personal cybersecurity plan incorporating the CIA Triad (*confidentiality, integrity, and availability*) to safeguard sensitive information and ensure its trustworthiness and accessibility.
	28. Investigate the motivations behind hacking and examine the associated ethical considerations. *Examples: white, black, and gray hat hacking*
	29. Appraise the trustworthiness of new or unfamiliar resources in order to make safe choices when downloading, installing, and using software.

HARDWARE AND SOFTWARE	30. Compare alternative computing architectures, including cluster and quantum computing, to classical computing systems.
	31. Explain the interactions between application software, operating systems, drivers, and hardware.
	32. Compare and contrast the common metadata elements of various file types.
	33. Develop and implement troubleshooting strategies to identify and correct problems with computing devices.

Impact of Computing

Each content standard completes the stem, "Students will…"

Grades 9-12	
CAREER PATHS	34. Research and explain the impact of computing technology on career pathways across different industries and career fields.
	35. Research and share information regarding current AI applications in various career fields. [AI] *Examples: healthcare, transportation, entertainment*
ETHICS	36. Analyze the implications of data privacy and consent for making informed decisions about personal data security.
	37. Identify and evaluate the consequences of technology-related laws and policies, including those addressing privacy, accessibility, and intellectual property.
SOCIETY	38. Analyze the ethical issues related to AI technologies and evaluate their societal and ecological impacts. [AI]

EMERGING TECHNOLOGY	39. Predict the transformative effects of hypothetical future technologies. [AI]
ACCESSIBILITY	40. Follow Americans with Disabilities Act (ADA) standards to design digital artifacts that reduce barriers caused by the digital divide, disability, or bias.

Digital Proficiency

Each content standard completes the stem, "Students will…"

Grades 9-12	
INFORMATION LITERACY	41. Research and report potential dangers and unintended consequences of over-reliance on AI tools. [AI] *Examples: misinformation, disinformation, implicit bias*
DIGITAL LIFE	42. Explain how systems learn user preferences and behaviors to deliver personalized content and targeted advertisements. [AI]
	43. Investigate the mental health risks associated with excessive technology use, including social isolation, anxiety, and depression, and develop strategies to mitigate them.
DIGITAL TOOLS	44. Evaluate the usability of software applications for broad audiences by considering feedback from real-world users.
	45. Identify a problem best solved through human-machine collaboration, decomposing it into tasks suited for each.

GLOSSARY

Abstraction: The process of removing unnecessary details to focus on key information when solving problems or designing programs.
Algorithm: A list of steps or instructions used to solve a problem or perform a task.
Application Programming Interface (API): A set of defined rules, protocols, and tools that enable different software applications or components to communicate and interact with each other.
Artificial Intelligence (AI): Technology that learns from data, finds patterns, and makes decisions or predictions in ways that are similar to how people solve problems.
Assistive technology: Tools that help people with varying abilities perform tasks.
Binary: A base-2 number system used to represent data in computing using only 0s and 1s.
Bug: An error in a computer program that keeps it from completing the intended task.
Cloud computing: The delivery of computing services, such as storage, software, and processing power, over the Internet, allowing users to access files and programs from any device with an Internet connection.
Code/Coding: Writing instructions in a programming language that a computer can follow.
Command: An instruction given to a computer to perform a specific action.
Compression: Reducing the size of a computational artifact (e.g., a file) using a digital tool that recognizes repetitive data and removes redundancy.
Computational thinking: A way of solving problems using steps, patterns, and logic.
Conditional statements: Statements in a program, such as *if*, *then* and *else*, that determine what statements will be executed, based on whether certain conditions are met. They help computers make decisions by checking if something is *true* or *false* before choosing what to do next.
Control structures: Fundamental programming constructs, including sequencing, selection, and iteration, that dictate the flow of execution in a program.
Cybersecurity: The practice of protecting computers, networks, and data from digital attacks or unauthorized access.
Data store: A repository that stores, manages, and safeguards information in a computer system.
Data types: The classification of data based on its format or nature, such as integers, strings, Booleans, and floats.
Data visualization: The process of simplifying complex, numerical data into graphics, such as charts or graphs, for easier understanding and viewing.
Debug: To identify and correct errors (“bugs”) in a program.
Decompose: To break down a complex problem or large system into smaller, simpler, more manageable parts.

Digital divide: The gap between people with access to technology and those without access.
Digital footprint: The record left behind by a person's digital activities, including websites visited and content shared.
Domain Name: A human-friendly, unique address on the Internet, like "example.com," which identifies the website and links to a numeric IP address.
Encryption: The process of converting information into a form that is not readable by a human.
Ethical behavior: Acting in ways that are responsible, respectful, and legally appropriate, specifically when using technology.
Event: An action or occurrence, such as a mouse click, key press, or screen tap, that a program can detect and respond to. In visual, blocks-based programming environments (VPEs), events are often represented as blocks that trigger specific behaviors when the action happens.
Flowchart: A diagram that shows the steps of a process or algorithm using symbols and arrows to represent decisions, actions, and the flow of information.
Hardware: The physical, internal and external parts of a computing device, such as the motherboard, computer, monitor, keyboard, or mouse.
Interface: A set of rules or connections that allow different parts of a computer system to communicate with each other.
Iteration: Repeating a set of instructions in a loop.
Iterative design process: A step-by-step approach to creating and improving a project by testing, making changes, and refining it multiple times based on feedback.
LAN (local area network): A group of interconnected computing devices within a small, localized area, like a home, office, or building.
Library: A collection of pre-written, reusable code modules or functions that programmers can incorporate into their projects to add specific functionalities without having to write them from scratch.
Loop: A structure in coding that allows users to repeat a set of instructions multiple times**.**
Lossless algorithms: A compression algorithm where the original data can be perfectly reconstructed.
Lossy algorithms: A compression algorithm where some of the original information is discarded to achieve a smaller compressed size.
Machine learning: A subset of AI that uses algorithms to find patterns in data to make predictions without being directly programmed. (See also "supervised, unsupervised, and reinforcement learning")
Malware: Software that is designed to cause damage to a computer or network and steal data.
Metadata: A set of data that provides information about other data.
Model: A simplified representation used to simulate, test, or understand a system or process.
Multi-factor authentication: A security enhancement that requires users to provide multiple verification steps, usually two or more, when logging in to a system or an account.
Network: A system of interconnected devices that communicate and share resources.

Operating system: Software that manages hardware resources and provides services for computer programs.
Packets: Small, manageable chunks of data used for transmitting information across digital networks, including the Internet.
Phishing: A cyberattack method that uses deceptive messages to trick users into sharing sensitive information.
Program: A set of step-by-step instructions that are given to a computer to perform a task.
Protocol: A set of rules governing how data is transmitted across a network.
Pseudocode: A method for designing algorithms using structured but human-readable language.
Refactor: To reorganize and restructure existing code without changing its functionality.
Rules-based program: A type of program that uses a set of predefined rules to make decisions or solve problems.
Selection: A programming construct that allows a program to execute different blocks of code based on whether a certain condition is *true* or *false*.
Server: A computer or system that provides resources and services (e.g., websites, files, or emails) to other computers over a network.
Simulation: A computer-based model that mimics real-world processes or systems, allowing students to explore and test scenarios in a virtual environment.
Software: The programs or applications that tell the computer what to do.
Supervised, unsupervised, and reinforcement learning: The three main paradigms in machine learning. Supervised learning uses labeled data to train models for prediction tasks, like classification or regression. Unsupervised learning explores unlabeled data to discover hidden patterns and structures, like clustering or dimensionality reduction. Reinforcement learning trains agents to make decisions in an environment to maximize a reward, often through trial and error.
Universal Design Principles: A framework of seven principles focused on creating environments, products, and systems that are usable by all people, to the greatest extent possible, without the need for specialized design or adaptation.
URL (Uniform Resource Locator): The full web address that points to a specific resource.
Variable: A labeled container value which can change during a program.
Visual programming environment: Software that allows users to create programs by arranging and connecting graphical elements (such as blocks).
White, Gray, and Black Hat Hackers: Different types of hacker classifications based on the ethical reasons for their actions.

SOURCES (DO NOT INCLUDE IN DOCUMENT)

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