Computing and Society

Literature Review

SUGGESTED CITATION: Computer Science Teachers Association. (2026). *Computing and society: Literature review.* https://csteachers.org/k12standards/research

This review focuses on a new subconcept of the K–12 Computer Science standards: the history of computing. Given its emerging nature, we explore existing methodologies for teaching social studies, which includes a focus on history, in K–12 settings and provide examples of current K–12 history standards. We also identify key historical topics in computing that should be considered for inclusion in the standards, and provide recommendations for standards by grade bands.

Design Recommendations

1. CS standards should prioritize historical content over historical thinking.

- Most states have social studies standards that address how students engage with history (see the Historical Thinking section). An alternative approach to historical thinking could lead to standards requiring students to engage in ways of thinking that they have not yet learned.
- K–12 CS standards can highlight CS-specific historical content, because it is not extensively covered in social studies standards (see the Historical Content of Computing section). The standards should address the impact of computing on the social, political, scientific and technological, economic, and cultural spheres of history (see Table 8).
- Where possible, connections to other K–12 CS standard topic areas can be made through examples in clarifying statements. Providing examples across concepts can support students in valuing all aspects of computing and can lessen the past emphasis on algorithms and programming.

2. The history standards should progress from a small/local scope at lower grades to a larger/global scope at higher grades.

- Traditional K–12 history standards progress from a small/local scope (e.g., history around me) to a larger/global scope (e.g., history of the state, country, and world). Examples are provided in Table 2.
- Computing history standards should follow a similar progression, where elementary students focus on their daily lives and comparisons with the recent past, middle school students focus on the influence of computing on society, and high school students focus on consequences, ethics, and socially responsible computing (see Table 1).

3. History standards should focus on historical topics and not specific facts.

- Standards should be written broadly so that teachers and curriculum developers have the flexibility to choose which specific facts to include in their lessons.
- Specific examples can be useful in clarifying statements.

Table 1 provides guidance on developing computing history standards that draw on common historical topics and on the National Curriculum Standards for Social Studies' (NCSS, n.d.) theme of Science, Technology, and Society to identify the appropriate scope of topics based on grade band.

Table 1. *Recommendations for Computing History Standards by Grade Band*

Grade Band	Scope for Students	Focal Topics for Computing History Standards
K–5	Focus on their daily lives and comparisons with the recent past	• Computing and computer scientists in my daily life and community • Comparison of daily life with computing today and in the past • Notable computer scientists from a range of backgrounds, eras, industries, and areas of computing
6–8	Focus on the influence of computing on society	• Five generations of computing and related themes, turning points, and consequences • Notable computer scientists and organizations related to each generation of computing • Notable impacts of computing on social, cultural, political, and economic spheres
9–12	Focus on the consequences from advances in computing; focus on ensuring that computing benefits all	• Deeper dive into the five generations of computing and notable computer scientists and organizations • Beneficial and harmful consequences of past advances in computing on social, cultural, political, and economic spheres • Ethical and socially responsible computing for the present, based on lessons learned from computing's influence on the past

K–12 Social Studies Education

Social studies is divided into four subjects: civics, history, geography, and economics. All 50 states and the District of Columbia feature the first three of these subjects in their social studies standards. All but two states also feature economics in their standards. The standards underscore the importance of both skill development and content knowledge. Specifically in terms of history, these standards emphasize historical thinking (i.e., the skills to critically analyze and make sense of history) and historical content (e.g., pivotal events, influential figures, and societies). A foundational influence is the National Curriculum Standards for Social Studies (NCSS, n.d.), which proposed ten thematic strands for social studies inquiry:

- **a.** culture;
- **b.** time, continuity, and change;
- **c.** people, places, and environments;
- **d.** individual development and identity;
- **e.** individuals, groups, and institutions;
- **f.** power, authority, and governance;
- **g.** production, distribution, and consumption;
- **h.** science, technology, and society;
- **i.** global connections; and
- **j.** civic ideals and practices.

Table 2. *Themes of Iowa and Michigan Social Studies Standards by Grade Level*

Grade	Themes of K–12 Iowa Core in Social Studies Standards	Themes of Michigan K–12 Social Studies Standards
K	Spaces and Places	Myself and Others
1	Communities and Culture	Families and Schools
2	Choices and Consequences	The Local Community
3	Immigration and Migration	Michigan Studies
4	Change and Continuity	United States Studies
5	Rights and Responsibilities	Integrated United States History
6	World Regions and Cultures	World Geography
7	Contemporary Global Studies	World History and Geography
8	U.S. History and Civic Ideals	Integrated United States History
9–12	Behavioral Sciences Civics and Government Economics Financial Literacy Geography United States History World History	World History and Geography U.S. History and Geography Civics Economics

An analysis by the American Institutes for Research (AIR) reveals that more than half of the states incorporate similar themes in their standards and that there is some consistency in the use of themes by grade levels. Table 2 gives examples of how themes appear across grades in the social studies standards in the states of Iowa and Michigan.

Both the thematic strands and the standards themselves illustrate a progression in focus, transitioning from a narrow, local perspective in the earlier grades to a broader, more global outlook in the later grades. This developmental approach allows students to build strong foundations in their immediate environments before expanding their understanding to encompass national and international contexts.

Examples of K–12 Standards Related to the History of Computing

On the following pages are history standards from Texas, focused on science, technology, and society (Table 3); social studies standards from Washington, focused on technology (Table 4); and history standards from Kentucky, focused on the history of the state (Tables 5 and 6). These three examples reflect the varied ways in which states integrate both local and broader thematic content, guiding students from familiar contexts to a grasp of wider historical narratives. Examples from Maine and Minnesota (Table 7) are also included to demonstrate how standards can be defined around key historical periods.

Table 3. *Texas K–8 History Standards in the Science, Technology, and Society Strand*

Grade	Standards
K	**The student understands ways technology is used in the home and school and how technology affects people's lives.** The student is expected to: **a.** identify examples of technology used in the home and school; **b.** describe how technology helps accomplish specific tasks and meet people's needs; and **c.** describe how his or her life might be different without modern technology.
1	**The student identifies individuals who created or invented new technology and understands how technology affects daily life, past and present.** The student is expected to: **a.** describe how technology has affected the ways families live; **b.** describe how technology has affected communication, transportation, and recreation; and **c.** identify the contributions of scientists and inventors such as Alexander Graham Bell, Thomas Edison, and Garrett Morgan.
2	**The student understands how science and technology have affected life, past and present.** The student is expected to: **a.** describe how science and technology have affected communication, transportation, and recreation; and **b.** explain how science and technology have affected the ways in which people meet basic needs.
	The student identifies individuals who exhibited individualism and inventiveness. The student is expected to identify individuals who have exhibited individualism and inventiveness such as Amelia Earhart and George Washington Carver.

Grade	Standards
3	**The student understands how individuals have created or invented new technology and affected life in various communities, past and present.** The student is expected to: **a.** identify individuals who have discovered scientific breakthroughs or created or invented new technology such as Jonas Salk, Cyrus McCormick, Bill Gates, Louis Pasteur, and others; and **b.** describe the impact of scientific breakthroughs and new technology in computers, pasteurization, and medical vaccines on various communities.
4	**The student understands the impact of science and technology on life in Texas.** The student is expected to: **a.** identify famous inventors and scientists such as Gail Borden, Joseph Glidden, Michael DeBakey, and Millie Hughes-Fulford and their contributions; and **b.** describe how scientific discoveries and innovations such as in aerospace, agriculture, energy, and technology have benefited individuals, businesses, and society in Texas.
5	**The student understands the impact of science and technology on society in the United States.** The student is expected to: **a.** identify the accomplishments of notable individuals in the fields of science and technology such as Benjamin Franklin, Eli Whitney, John Deere, Thomas Edison, Alexander Graham Bell, George Washington Carver, the Wright Brothers, and Neil Armstrong; **b.** identify how scientific discoveries, technological innovations, and the rapid growth of technology industries have advanced the economic development of the United States, including the transcontinental railroad and the space program; and **c.** explain how scientific discoveries and technological innovations in the fields of medicine, communication, and transportation have benefited individuals and society in the United States.
6	**The student understands the influences of science and technology on contemporary societies.** The student is expected to: **a.** identify examples of scientific discoveries, technological innovations, and scientists and inventors that have shaped the world; **b.** explain how resources, economic factors, and political decisions affect the use of technology; and **c.** make predictions about future social, political, economic, cultural, and environmental impacts that may result from future scientific discoveries and technological innovations.

Grade	Standards
7	**The student understands the impact of scientific discoveries and technological innovations on the political, economic, and social development of Texas.** The student is expected to: **a.** compare types and uses of technology, past and present; **b.** identify Texas leaders in science and technology such as Walter Cunningham, Michael DeBakey, Denton Cooley, Benjy Brooks, Michael Dell, and Howard Hughes Sr.; **c.** analyze the effects of various scientific discoveries and technological innovations on the development of Texas such as advancements in the agricultural, energy, medical, computer, and aerospace industries; **d.** evaluate the effects of scientific discoveries and technological innovations on the use of resources such as fossil fuels, water, and land; and **e.** analyze how scientific discoveries and technological innovations have resulted in an interdependence among Texas, the United States, and the world.
8	**The student understands the impact of science and technology on the economic development of the United States.** The student is expected to: **a.** explain the effects of technological and scientific innovations such as the steamboat, the cotton gin, the telegraph, and interchangeable parts; **b.** analyze how technological innovations changed the way goods were manufactured and distributed, nationally and internationally; and **c.** analyze how technological innovations brought about economic growth such as the development of the factory system and the construction of the Transcontinental Railroad.
	The student understands the impact of scientific discoveries and technological innovations on daily life in the United States. The student is expected to: **a.** compare the effects of scientific discoveries and technological innovations that have influenced daily life in different periods in U.S. history; and **b.** identify examples of how industrialization changed life in the United States.

The Washington standards also include a focus on the impact of technology broadly. This appears explicitly in three out of the four branches of social studies: economics, geography, and history. Table 4 provides examples of these standards, spanning grades 4 through 12. Similar to other standards, the standards progress from a focus on the local state level to a focus on the national level, and then to a focus on the global level. It is at the high school level that students interrogate the ethical implications of technology.

Table 4. *Washington Social Studies Standards Focused on Technology*

Grade	Discipline	Standards
4	History	**H2.4.3** Analyze and explain how technology and ideas have affected the way people live and change their values, beliefs, and attitudes in Washington.
5	History	**H2.5.3** Analyze and explain how technology and ideas have affected the way people live and change their values, beliefs, and attitudes in the United States.
6	History	**H2.6-8.1** Explain and analyze how individuals, movements, cultural and ethnic groups, and technology from past civilizations have shaped world history.
7	History	**H2.6-8.4** Explain and analyze how technology and ideas have impacted Washington state history since statehood.
8	History	**H2.6-8.7** Explain and analyze how technology and ideas have impacted United States history (1763–1877).
9/10	Economics	**E2.9-10.2** Describe the effects of specialization, availability of resources, and technology on a variety of economies. **E3.9-10.2** Explain the role of government in advancing technology and investing in capital goods and human capital to increase economic growth and standards of living.
9/10	Geography	**G2.9-10.2** Explain how humans modify the environment with technology.
9/10	History	**H2.9-10.3** Define and evaluate how technology and ideas have shaped world history (1450–present).
11/12	Economics	**E2.11-12.5** Evaluate the effects of specialization, availability of resources, and technology on a variety of economies.
11/12	Geography	**G2.11-12.5** Evaluate how technology can create environmental problems and solutions.
11/12	History	**H2.11-12.1** Analyze how technology and ideas have shaped United States history (1877–present). **H2.11-12.5** Evaluate the ethics of current and future uses of technology based on how technology has shaped history.

Several states include substrands of standards focused on a specific context or specific time periods. Table 5 shows a progression for standards focused on the history of the state of Kentucky. Similar to the Texas standards, these standards also include disciplinary clarification statements that provide example ideas of content and concepts that could be covered to achieve mastery of the standards. Table 6 provides examples of disciplinary clarification statements for three standards.

Table 5. *Progression of Standards for Kentucky History*

Grade	Concepts and Practices	Standards
K	**H: Kentucky History**	**K.H.KH.1** Compare life in the past to life today in communities.
1	**H: Kentucky History**	**1.H.KH.1** Compare life in Kentucky in the past to life in Kentucky today. **1.H.KH.2** Identify Kentucky symbols, songs and traditions.
2	**H: Kentucky History**	**2.H.KH.1** Explain how events in North America impacted Kentucky.
3	**H: Kentucky History**	**3.H.KH.1** Explain how world events impact Kentucky, both in the past and today.
4	**H: Kentucky History**	**4.H.KH.1** Identify and describe the significance of diverse groups of people in Kentucky from European Exploration to the Thirteen Colonies.
5	**H: Kentucky History**	**5.H.KH.1** Describe the role of Kentucky settlers in the American Revolution.
6	**H: Kentucky History**	**6.H.KH.1** Determine the influences of Classical Greece and Rome on the structures of Kentucky's state government.
7	**H: Kentucky History**	N/A
8	**H: Kentucky History**	**8.H.KH.1** Articulate Kentucky's role in early American history from the earliest colonial settlement to 1877. **8.H.KH.2** Examine patterns of collaboration and conflict between immigrants to Kentucky and those already in residence from 1775 to 1877.
HS (UH)	**H: Kentucky History**	**HS.UH.KH.1** Examine how Kentuckians influence and are influenced by major national developments in U.S. history from 1877–present.
HS (WH)	**H: Kentucky History**	**HS.WH.KH.1** Describe the impact of world history on Kentuckians and how Kentucky impacted the world.

Table 6. *Disciplinary Clarification Statements for History of Kentucky Standards*

Standard	Disciplinary Clarification Statement
1.H.KH.2	Kentucky symbols, songs and traditions may include, but are not limited to, the state flag, the state bird, the state song and the Kentucky Derby.
4.H.KH.1	Many different groups of people contributed to the history of the colonies and Kentucky during this time period. This includes, but is not limited to, American Indians, European colonists, indentured servants and enslaved people.
HS.UH.KH.1	Throughout U.S. history, Kentuckians have played a role in influencing national developments, such as, but not limited to, the following examples: Justice John Marshall Harlan was the dissenting opinion in the Berea College v. Kentucky and the United States Supreme Court opinion in Plessy v. Ferguson, 163 U.S. 537 (1896) cases setting a precedent that segregation was inherently unequal; Governor Breathitt was instrumental in the Civil Rights Movement nationally and in Kentucky and in the implementation of the Civil Rights Act of 1964; Madeline McDowell Breckinridge fought for child labor laws and was critical in the women's suffrage movement on a national scale; Sophia Alcorn was an advocate for people with disabilities and invented the Tadoma method for people who are deaf and blind to communicate; Willa Beatrice Brown was the first African American woman in the United States to earn a pilot's license and was a lifelong civil rights advocate; Alice Allison Dunnigan was the first African American journalist to receive White House credentials.

When structuring historical content within educational standards, several states designated specific historical eras as focal points. This approach allows students to gain a comprehensive understanding of the significant events, cultural shifts, and influential figures of each period. Using historical eras as structural elements in standards can also facilitate cross-disciplinary connections, linking historical developments to literature, science, and the arts during the same time frame. Table 7 provides examples of historical eras used in the standards for Maine and Minnesota.

Table 7. *Historical Eras in U.S. History and World History used in Maine and Minnesota Social Studies Standards*

	Maine Social Studies Standards	Minnesota High School Social Studies Standards
U.S. History	**1. Beginnings to 1607:** Migration, contact, and exchange between Native Americans, Africans, and Europeans. **2. 1607 to 1754:** Conflict and competition — Europeans and Native Americans; emergence of distinctive Colonial and Native societies. **3. 1754 to 1800:** Social, political, and economic tensions — Revolution and the Early National Period. **4. 1800 to 1848**: Defining and extending democratic ideals during rapid economic, territorial, and demographic changes. **5. 1844 to 1877:** Regional tensions and civil war. **6. 1865 to 1898:** Move from agricultural to industrialized society. **7. 1890 to 1945:** Domestic and global challenges; debate over Government's role and the role of the US in the world. **8. 1945 to 1980:** Challenges with prosperity, living up to ideals, and unfamiliar international responsibilities. **9. 1980 to present:** Cultural debates, adaptation to economic globalization and revolutionary changes in science and technology.	**1.** Indigenous Histories **2.** Settler Colonialism and Atlantic Slavery **3.** Freedom, Unfreedom and Revolution **4.** Imperial Expansion and Native Dispossession **5.** Slavery, Civil War and Reconstruction **6.** Migration, Imperialism and Inequality **7.** U.S. and the World **8.** Civil Rights Struggles **9.** Contested Freedoms
World History	**1. Beginnings to 600 BCE:** Technological and environmental transformations. **2. 600 BCE to 600 CE:** Organization and reorganization of human societies. **3. 600 to 1450:** Regional and interregional interactions. **4. 1450 to 1750:** Political, social, economic and global interactions led to revolutions. **5. 1750 to 1900:** Industrialization and global integration. **6. 1900 to present:** Accelerating global change and realignments.	**1.** Early Human History (250,000 BCE–2,000 BCE) **2.** Cities, Societies, and Empires **3.** Interregional Networks and Exchange (700–1500) **4.** The First Global Age (1400–1800) **5.** Revolutions, Empires and Nations (1750–1900) **6.** The New Global Era (1900–Present)

Historical Thinking

Historical thinking is the ability to critically analyze and interpret historical events and processes, using skills such as evaluating primary sources, identifying patterns of continuity and change, understanding cause and consequence, taking historical perspectives, and recognizing the ethical dimensions of historical interpretations. Most social studies standards address historical thinking either through explicit standards or through dispositions statements intended to supplement standards focused on historical content. The Historical Thinking Project (n.d.) outlines a framework that defines the skills necessary for this analytical approach, which include:

- **Establishing Historical Significance:** Understanding what makes certain events, figures, or phenomena stand out in history and why they are remembered or forgotten.
- **Using Primary Source Evidence:** Developing the ability to evaluate and interpret original documents, artifacts, and other sources from the past to construct an understanding of historical events.
- **Identifying Continuity and Change:** Recognizing what has changed over time and what has remained the same, helping students understand the dynamic nature of history.
- **Analyzing Cause and Consequence:** Exploring the causes behind events and their subsequent consequences, encouraging students to think about the complexity of historical causation.
- **Taking Historical Perspectives:** Viewing the past through the lenses of those who lived it, fostering empathy and a deeper understanding of differing viewpoints and contexts.
- **Understanding the Ethical Dimension of Historical Interpretations:** Considering the moral implications of historical events and interpretations, leading to discussions about historical responsibility and judgment.

The following pages show how historical thinking is woven into the standards for Rhode Island and Illinois.

***Historical thinking* is the ability to critically analyze and interpret historical events and processes, using skills such as evaluating primary sources, identifying patterns of continuity and change, understanding cause and consequence, taking historical perspectives, and recognizing the ethical dimensions of historical interpretations.**

Historical Thinking as Reflected in the Rhode Island Social Studies Standards

History

Change / Continuity (H.CC)

Students act as historians as they . . .

1. *Identify* historical events that are culturally relevant to global, national, and local histories and connect to students' intersectional identities and lived experiences.
2. *Explain* multiple causes and effects of historical events, centering and representing the voices and experiences of individuals and communities who were agents of change and resistance.
3. *Analyze* multiple sources to compare and contrast historical events through the lenses of identity, power, and resistance.
4. *Argue* how social change, intersectional identities, and lived experiences are crucial to the study and practice of history.

Historical Perspectives (H.HP)

Students act as historians as they . . .

1. *Identify* key people, central ideas, and the mechanisms by which stories are told and retold regarding an event or series of events, centering the voices of historical actors and groups engaged in resistance and change.
2. *Explain* the purpose, audience, and perspective of multiple types of sources (art, music, oral histories, pamphlets, film, texts, etc.) relating to a historical event or series of events, individual, or group of people, including indications of bias toward or against the subject portrayed.
3. *Analyze* multiple types of sources, including art, music, oral histories, pamphlets, film, texts, etc., through a critical reflection of the creators' and students' intersectional identities and lived experiences.
4. *Argue*, using multiple narratives rooted in identity, power, and resistance, how history itself is an interpretation of events.

Individuals / Groups (H.IG)

Students act as historians as they . . .

1. *Identify* peoples, events, technologies, and ideas involved in historical and social change in various geographical and temporal locations.
2. *Explain* how historical and social change have been and continue to be accomplished in relation to systems of power, identity, and resistance.
3. *Analyze* historical change through the intersectional identities and lived experiences of people who have accomplished social change throughout history in relation to systems of power, identity, and resistance.
4. *Argue* how all individuals can act as local, national, and/or global agents of social change by using lessons learned from history.

Historical Thinking as Reflected in the Illinois Learning Standards for Social Science

K–12 Inquiry Skills

Inquiry skills are methods and dispositions that students need to develop in order to be equipped to meet the challenges of college, career, and civic life. Inquiry skills are used by students to construct essential and supporting questions; determine helpful sources to conduct inquiry; and take informed action while applying disciplinary concepts. These skills should be applied while teaching and learning the disciplinary concepts for a deeper understanding that allows students to take ownership of their learning.

The inquiry standards include the following areas:

Recognize Perspectives and Articulate Identities

- Recognize one's own perspectives in relation to the perspectives of others
- Articulate the construction and meaning of individual and collective identities
- Articulate unity and variation across human societies
- Evaluate the Role of Power and Systems
- Analyze power, inequality, and the impact of systems on reinforcing power and inequality
- Analyze social systems, social structures, and social institutions, and their impact on social change

Developing Questions and Planning Inquiries

- Constructing Essential Questions
- Constructing Supporting Questions
- Determining Helpful Sources

Evaluating Sources and Using Evidence

- Gathering and Evaluating Sources
- Developing Claims and Using Evidence

Communicating Conclusions and Taking Informed Action

- Communicating Conclusions
- Critiquing Conclusions
- Taking Informed Action

Historical Content of Computing

The history of computing is not consistently covered in K–12 social studies standards across different states. While some states may include elements of technology history, often focusing on significant inventions and their societal impacts (e.g., see Table 3), the specific history of computing is not commonly emphasized as a dedicated topic. The revised K–12 CS Standards have the opportunity to identify the historical content of the computing field that is important for all students to learn. Table 8 provides a list of five historical topics identified by the National History Standards and examples of these topics applied to the history of computing. These topics informed the recommendations in Table 1 for developing computing history standards. A list of resources is provided at the end of this section where readers can find additional detail on specific historical computing topics.

Table 8. *Examples of Computing Applied to Historical Topics*

Historical Topic	Examples of Computing
Social **(e.g., social roles, interactions with others)**	• Impacts of computing on how we communicate, work, and interact with others • Examining who has participated in computing and how that has changed over time
Political **(e.g., government, law, human rights, power structures)**	• Impacts of computing on elections, national security and surveillance, and diplomacy • Policies related to cybersecurity and digital rights
Scientific and Technological **(e.g., inventions, scientific advancements)**	• Five generations of computing: vacuum tubes (1940–1956), transistors (1956–1963), integrated circuits (1964–1971), microprocessors (1971–present), artificial intelligence (present and beyond) • Notable figures and companies/organizations in computing
Economic **(e.g., production, distribution, and consumption of goods and services)**	• Influence of computing on the global economy; rise in e-commerce • Rise of the tech industry and shifts in other industries due to computing
Cultural **(e.g., shared customs, practices, beliefs)**	• Impacts of computing on the arts, education, and entertainment • Rise of digital cultures

Resources Related to Historical Computing Topics

Five Generations of Computing

The history of computing is commonly divided into five generations, each marked by significant technological advancements. Each generation built on its predecessor, contributing to the rapid evolution of computing technology and its integration into daily life.

1. **First Generation (1940–1956): Vacuum Tubes.** This generation is characterized by the use of vacuum tubes for circuitry and magnetic drums for memory. Computers were large and expensive and used a lot of electricity. Examples include the ENIAC and UNIVAC.
2. **Second Generation (1956–1963): Transistors.** Transistors replaced vacuum tubes, making computers smaller, faster, and more reliable. This generation introduced the use of assembly language and high-level programming languages like COBOL and FORTRAN.
3. **Third Generation (1964–1971): Integrated Circuits.** Integrated circuits replaced transistors, further reducing size and cost while increasing speed and efficiency. This era saw the development of more sophisticated operating systems and the first mini-computers.
4. **Fourth Generation (1971–Present): Microprocessors.** The invention of the microprocessor, a single chip containing all the circuitry of a computer's central processing unit, revolutionized computing. This generation includes the development of personal computers and graphical user interfaces.
5. **Fifth Generation (Present and Beyond): Artificial Intelligence.** This generation is characterized by advances in artificial intelligence, machine learning, and natural language processing. It focuses on creating more intelligent machines capable of understanding and responding to human language, as well as processing large amounts of data efficiently.

Notable Figures of Computing

History standards often include a focus on historical figures, as these individuals can serve as focal points for understanding broader historical events and trends. Integrating studies of individual figures into historical standards can also help personalize history, making it more relatable and engaging for students. Over the decades, the field of computing has evolved significantly, reflecting broader societal shifts and opening up to a more diverse range of contributors. Initially dominated by a narrow demographic, the field has progressively included a growing number of people from various backgrounds, genders, and cultures, each contributing uniquely to its advancement. Today, notable figures in computing come from all corners of the globe and represent a wide array of disciplines and specialties. The following websites provide information on notable historical figures in computing across time:

- Notable Women in Tech Cards: https://notabletechnicalwomen.org
- CS Heroes: https://www.csedweek.org/heroes
- From Hidden to Modern Figures: https://www.nasa.gov/from-hidden-to-modern-figures/
- Modern Figures Podcast: https://modernfigurespodcast.com

Additional Resources

Additional details about the people and events related to the history of computing can be found in:

- Computer History Museum's Interactive Timeline of Computer History: https://www.computerhistory.org/timeline
- ACM's Computing History Resources: https://history.acm.org/acm-history/computing-history-resources-and-guides/computing-history-resources-and-guides-2
- Ko's Critical CS Education History: https://criticallyconsciouscomputing.org/history

References and Works Consulted

American Institutes for Research (AIR). (2024). *Social studies standards map*. https://www.air.org/social-studies-standards-map

Computer History Museum. (2025). *Timeline of computer history.* https://www.computerhistory.org/timeline

Computer Hope. (2025). *How many generations of computers are there?* https://www.computerhope.com/issues/ch001921.htm

Gross, C., & Imel, K. (2024). *The state of K–12 social studies education*. American Institutes for Research. https://air.org/sites/default/files/2024-03/State-of-K-12-Social-Studies-Education-Report-March-2024.pdf

Historical Thinking Project. (n.d.). *Historical thinking concepts.* Centre for the Study of Historical Consciousness. https://historicalthinking.ca/historical-thinking-concepts

National Center for History in the Schools, UCLA Public History Initiative. (2025). *History standards.* University of California, Los Angeles. https://phi.history.ucla.edu/nchs/history-standards

National Council for the Social Studies (NCSS). (n.d.). *National curriculum standards for social studies: Introduction.* https://www.socialstudies.org/standards/national-curriculum-standards-social-studies-introduction

State Standards

- Illinois: https://www.isbe.net/Documents/IL-Social-Science-Standards.pdf
- Iowa: https://educate.iowa.gov/pk-12/standards/academics/social-studies-standards
- Kentucky: https://www.education.ky.gov/curriculum/conpro/socstud/Pages/Social-Studies-Standards-.aspx
- Maine: https://www.maine.gov/doe/learning/content/socialstudies/standards
- Michigan: https://www.michigan.gov/-/media/Project/Websites/mde/Academic-Standards/Social_Studies_Standards.pdf
- Minnesota: https://education.mn.gov/MDE/dse/stds/soc/imp/
- Rhode Island: https://ride.ri.gov/instruction-assessment/social-studies
- Texas: https://tea.texas.gov/academics/subject-areas/social-studies
- Washington: https://ospi.k12.wa.us/student-success/resources-subject-area/social-studies/social-studies-learning-standards-graduation-requirements

