

SOUTH DAKOTA EDUCATIONAL TECHNOLOGY STANDARDS

9-12

Ninth-Twelfth Grade Nature, Concepts and Systems (systems thinking, interactions, and design) Grade Standards, Supporting Skills, and Examples

Indicator 1: Students understand the history and progression of technology in relation to the development and design of future technology

Bloom's Taxonomy Level	Standard, Supporting Skills, and Examples
(Evaluation)	<p>9-12.NC.1.1 Compare and contrast how societal changes mirror innovations and emerging technologies.</p> <p>Example: Emerging technology effects on future legal issues</p> <p>Example: How downloading music has affected the music industry</p> <p>Example: Compare how people responded to emergencies in the past as compared to today.</p> <p>Example: Science 9-12.S.5.2</p> <p>Example: Science9-12.S.2.1</p>
(Evaluation)	<p>9-12.NC.1.2 Predict how the evolution of technology will influence the design and development of future technology.—</p> <p>Example: Relate how historical and current events affect the design of new technologies</p> <p>-View the Connections video series or read Pinball Effect by James Burke</p> <p>Example: Reference the Technological Method that provides a standard structure for development of products and/or technologies</p> <p>Example: The more we e-mail or create electronic documents, the more need there is for digital storage</p> <p>Example: The FAX machine is an example of the convergence of the telephone, a scanner and a printer</p> <p>Example: Read magazines such as Business 2.0 and Business Week</p> <p>Example: Science 9-12.S.2.2</p>

Indicator 2: Students analyze the parts of a technological system in terms of input, process, output, and feedback.

Bloom's Taxonomy Level	Standard, Supporting Skills, and Examples
(Analysis)	<p>9-12.NC.2.1 Analyze technology systems to make informed choices.</p> <ul style="list-style-type: none"><li>• Analyze a system to describe the interrelationship between its inputs, process, and output Example: Analyze a production process in terms of its product Example: Analyze e-mail in terms of its inputs, process, and output Example: Analyze the relationship between electronic resources, infrastructure, and connectivity Example: Writing 10.W.1.1<li>• Analyze how changes in inputs and process affect output Example: Landline vs. mobile phone, hardwire vs. wireless Example: Changes in hardware and software

Indicator 3: Students analyze the relationships and the connections between technologies in different fields of study and how they apply to communities.

Bloom's Taxonomy Level	Standard, Supporting Skills, and Examples
(Analysis)	<p>9-12.NC.3.1 Analyze intended and unintended impacts of a system.</p> <p>Example: Social networks (MySpace, FaceBook) impact on society</p> <p>Example: Cell phones and text messaging in schools</p> <p>Example: Chat and Blogging</p>
(Synthesis)	<p>9-12.NC.3.2 Integrate technology into school, home and community.</p> <p>Example: Incorporate academic knowledge into a Technology project</p> <p>Example: Incorporate on-line financial information into a Community Action program</p> <p>Example: Include gps coordinates to map community manhole covers on streets being resurfaced</p> <p>Example: Use on-line credit reports, on-line credit applications, and on-line research tools (ie, carfax, Consumer Reports, Kelly's On-line, on-line surveys, Epinions (epinions.com) to make a home purchasing decision (home purchase, loan, student loan, appliance, etc</p> <p>Example: Social Science 9-12.G.1.1</p> <p>Example: Social Science 9-12.G.1.2</p> <p>Example: Social Science 9-12.E.1.5</p> <p>Example: Writing 9.LVS.1.4</p> <p>Example: Writing 12.LVS.1.3</p>
(Evaluation)	<p>9-12.NC.3.3 Evaluate technologies that increase educational and workplace opportunities</p> <p>Example: Existing technology; positive and negative aspects of assistive technology</p> <p>Example: Internet job searches</p> <p>Example: On-line learning (free tutorials to expand personal knowledge)</p>

Indicator 4: Students understand the purpose and demonstrate the use of the design process in problem solving.

Bloom's Taxonomy Level	Standard, Supporting Skills, and Examples
(Evaluation)	<p>9-12.NC.4.1 Compare and contrast other problem-solving and decision-making methods.</p> <p>Example: Scientific vs. Technological</p> <p>Example: Compare simplified problem solving methods</p> <p>Example: Math 9-12.S.2.1</p> <p>Example: Math 9-12.S.2.2</p>
(Synthesis)	<p>9-12.NC.4.2 Formulate a technological solution using data-driven decision making.</p> <p>Example: Marzano's Decision-Making Model</p> <p>Example: Math 9-12.S.1.1</p>

**Ninth-Twelfth Grade Nature, Concepts and Systems
(systems thinking, interactions, and design)**

Performance Descriptors

Advanced	<p>9-12th grade students performing at the advanced level:</p> <ul style="list-style-type: none"> • Predict how the evolution of technology will influence the development of future technology • Analyze how changes in inputs and process produce different output • Evaluate an example of an intended and unintended impact in a changed system • Incorporate knowledge from several subjects and incorporate data resources from school, home or community into a technology project • Apply knowledge gained from a tutorial or external resource to complete a technology project and enhance life-long learning • Defend and Justify a technological solution using a decision making method
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<p style="text-align: center;">Proficient</p>	<p>9-12th grade students performing at the proficient level:</p> <ul style="list-style-type: none"> • Compare and contrast how an emerging technology changes society • Relate how the convergence of technologies affect industries/businesses • Analyze technology systems and how the parts of the system work together • Analyze an example of an intended and unintended impact in a system • Incorporate knowledge from a subject and real-time data into a technology project • Compare and contrast external sources for additional knowledge to complete a technology project • Compare and contrast other problem-solving and decision-making methods and choose a method to solve a given problem.
<p style="text-align: center;">Basic</p>	<p>9-12th grade students performing at the basic level:</p> <ul style="list-style-type: none"> • Research and report on an emerging technology within a career cluster • Identify a system and determine its parts • Identify an example of an intended and unintended impact in a system • Incorporate knowledge from a subject into a technology project • Compare external sources needed for additional knowledge to complete a technology project • Formulate a solution given a specific problem-solving and decision-making model

**Ninth-Twelfth Grade Social Interactions
Grade Standards, Supporting Skills, and Examples**

Indicator 1: Students understand the safe, ethical, legal, and societal issues related to technology.

Bloom's Taxonomy Level	Standard, Supporting Skills, and Examples
(Evaluation)	<p>9-12.SI.1.1 Evaluate the need for acceptable use policies.</p> <ul style="list-style-type: none"> • Identify different types of policies • Critique common elements of policies <p style="padding-left: 40px;">Example: (compare the bill of rights with acceptable AUP and discuss the correlation to freedom of speech)</p> <p style="padding-left: 40px;">Example: (compare the schools policy with a business policy)</p> <p style="padding-left: 40px;">Example: compare HS to college</p>
(Synthesis)	<p>9-12.SI.1.2 Compile a list of immediate and long-range effects of ethical and unethical uses of technology on individual and society.</p> <ul style="list-style-type: none"> • Personal protection through establishing legal ownership of a creative work <p style="padding-left: 40px;">Example: Copyright of work</p> <ul style="list-style-type: none"> • Cost (\$, emotional, criminal) <p style="padding-left: 40px;">Example: Research different types of penalties and consequences for misuse or stealing of copyrighted work</p> <ul style="list-style-type: none"> • Consequences of virus spreading, file pirating, hacking, packet sniffing, identity theft, encryption <p style="padding-left: 40px;">Example: Research how the lives of victims and perpetrators (i.e. Kevin Mitnick) are changed due to the above practices.</p> <p style="padding-left: 40px;">Example: Analyze how business (i.e. banking, financial) practices have changed to protect information</p>

Indicator 2: Students investigate the advantages and disadvantages of technology.

Bloom's Taxonomy Level	Standard, Supporting Skills, and Examples
(Analysis)	<p>9-12.SI.2.1 Analyze advantages and disadvantages of widespread use and reliance on technology in the workplace and in society as a whole.</p> <p>Example: discuss what happens when emergency 911 response computers go down,</p> <p style="padding-left: 40px;">How do power outage effects society.</p> <p style="padding-left: 40px;">Private company outages vs. publicly controlled power outages</p>
(Evaluation)	<p>9-12.SI.2.2 compare and contrast society's influence on technology and technology's influence on society.</p> <ul style="list-style-type: none"> • Informational technology vs. production technology • Identify Cultural factors: age, religion, sex, political <p>Example: Ads on identify theft</p> <p>Example: Training for businesses, workplaces</p> <p>Example: Discuss the emergence of new "11" numbers as a result of influence of technology, i.e. 211,511,411</p> <p>Example: Science 9-12.S.2.1</p>

**Ninth-Twelfth Grade Social Interactions
Performance Descriptors**

Advanced	<p>9-12th grade students performing at the advanced level:</p> <ul style="list-style-type: none"> • Design an appropriate and legal AUP • Advocate the ethical use of technology in home, school, and community • Predict how technology could transform business processes and relationships
Proficient	<p>9-12th grade students performing at the proficient level:</p> <ul style="list-style-type: none"> • Critique and evaluate an AUP • Model ethical use of technology at home, in school, and in the community • Outline the process to establish legal ownership of personal work. • Analyze and evaluate technological developments that have changed the way humans do their work • Evaluate the advantages and disadvantages of reliance of technology in the workplace and in society
Basic	<p>9-12th grade students performing at the basic level:</p> <ul style="list-style-type: none"> • Explain the legal consequences of breaking acceptable use policies (Hacking, sniffing) • Recognize the ethical use of technology (Licensing, copyright, plagiarism, ownership, security, responsibility privacy issues, (CIPA)) • Identify the effects of unethical use of technology • Still function as a human being when the power goes out & they lose their Internet connection • Describe how technology has changed social mores including attitudes toward work, family, school, and other cultures • Describe the impact of technology on the skills needed in the workplace • Describe an advantage and a disadvantage of the reliance on technology in the workplace and in society

**Ninth-Twelfth Grade Information and Communication Tools
Grade Standards, Supporting Skills, and Examples**

Indicator 1: Students recognize and demonstrate skills in operating technological systems.

Bloom's Taxonomy Level	Standard, Supporting Skills, and Examples
(Synthesis)	<p>9-12.CT.1.1 Incorporate knowledge and enhanced usage skills to create a product.</p> <p>Example: Include a data table in a science lab report</p> <p>Example: Math 9-12.S.1.3</p> <p>Example: Writing 9.LVS.1.2</p> <p>Example: Science 9-12.N.2.1</p>
(Application)	<p>9-12.CT.1.2 Apply strategies for identifying and solving routine hardware and software issues.</p> <ul style="list-style-type: none"> • Online help menu <p>Examples: Voice call lines –tech support</p>

Indicator 2: Students use technology to enhance learning, extend capability, and promote creativity.

Bloom's Taxonomy Level	Standard, Supporting Skills, and Examples
(Application)	<p>9-12.CT.2.1 Utilize a virtual learning environment as a strategy to build 21st century learning skills.</p> <ul style="list-style-type: none"> • critical thinking skills • collaboration • information and literacy skills • decision making <p>Example: Enroll in an online learning class</p>
(Application)	<p>9-12.CT. 2.2 Investigate to apply expert systems, intelligent agents, and simulations in real-world situations.</p> <p>Example: Using a virtual chemistry laboratory</p> <p>Example: Dissect a frog on the computer</p> <p>Example: Using context sensitive help system with computer software</p>
(Application)	<p>9-12.CT.2.3 Utilize online information resources routinely and efficiently to meet needs for collaboration, research, publication, communication, and productivity.</p> <p>Example: Utilize online reservation systems and ticket booking</p> <p>Example: Plan a trip using online airline schedules</p> <p>Example: Writing 9.LVS.1.4</p> <p>Example: Writing 11.W.1.2</p>

Indicator 3: Students evaluate and select information tools based on the appropriateness to specific tasks.

Bloom's Taxonomy Level	Standard, Supporting Skills, and Examples
(Application)	<p>9-12.CT.3.1 Select and apply technology tools for research, information analysis, problem solving, and decision making in content learning.</p> <p>Examples: Decide which type of software (slide presentation, interactive whiteboard) can best communicate classroom information</p> <p>Example: Science 9-12.N.2.1</p> <p>Example: Writing 12.W.1.1</p> <p>Example: Social Science 9-12.G.1.1A</p> <p>Example: Social Science 9-12.G.1.2</p>
(Analysis)	<p>9-12.CT.3.2 Organize and manage personal/professional information using technology tools. (e.g., finances, schedules, addresses, purchases, correspondence).</p> <p>Examples: Certification in use of defibrillator; MOUS certification; CNA certification; CISCO certification; A+ certification</p> <p>Example: Writing 10.LVS.1.8</p> <p>Example: Writing 10.W.1.3</p> <p>Example: Writing 11.W.1.2</p>

**Ninth-Twelfth Grade Information and Communication Tools
Performance Descriptors**

Advanced	<p>9-12th grade students performing at the advanced level:</p> <ul style="list-style-type: none"> • Recommend strategies in order to assist others in solving technical issues. • Create a virtual environment to build 21st century learning skills. • Investigate and apply expert systems, intelligent agents, and simulations in real-world situations • Utilize online information resources routinely and efficiently to meet needs for collaboration, research, publication, communication, and productivity. • Develop a plan for completing industry certifications
Proficient	<p>9-12th grade students performing at the proficient level:</p> <ul style="list-style-type: none"> • Incorporate knowledge and enhanced usage skills to create a product, • Apply strategies for identifying and solving routine hardware and software issues, • Utilize a virtual learning environment as a strategy to build 21st century learning skills. • Investigate and apply expert systems, intelligent agents, and simulations in real-world situations • Utilize online information resources routinely and efficiently to meet needs for collaboration, research, publication, communication, and productivity. • Select and apply technology tools for research, information analysis, problem solving, and decision making in content learning • Organize and manage personal/professional information using multiple technology tools. (spreadsheets, databases, calendars)
Basic	<p>9-12th grade students performing at the basic level:</p> <ul style="list-style-type: none"> • Recognize a problem and request help in solving the issue. • Incorporate knowledge and enhanced usage skills to create a product with assistance. • Utilize a virtual environment with assistance. • Organize and manage personal/professional information using a technology tool.

**Ninth-Twelfth Grade Information and Communication Processes
Grade Standards, Supporting Skills, and Examples**

Indicator 1: Students understand the purpose of information technologies to communicate with a variety of collaborators.

Bloom's Taxonomy Level	Standard, Supporting Skills, and Examples
(Synthesis)	<p>9-12.CP.1.1 collaborate with external peers, experts, and others by using technology to compile, synthesize, produce, and disseminate information, models, and other creative works.</p> <p>Examples: Think quest, online project, Course ware, Wiki</p> <p>Example: Writing 12.W.1.1</p>

Indicator 2: Students exchange information and ideas for an identified purpose through Information Technologies.

Bloom's Taxonomy Level	Standard, Supporting Skills, and Examples
(Application)	<p>9-12.CP.2.1 Adapt delivery of communication based on available information technologies.</p> <p>Examples: WebCT, Blackboard, Wiki, Blog, Share drives/Share Points, Tracking changes in documents, Create a tutorial using Flash, Camtasia, or other recording technology</p> <p>Example: Social Science 9-12.G.1.1</p> <p>Example: Social Science 9-12.G.1.2</p> <p>Example: Social Science 9-12.G.1.2A</p> <p>Example: Writing 10.W.1.3</p> <p>Example: Writing 12.W.1.1</p>

**Ninth-Twelfth Grade Information and Communication Processes
Performance Descriptors**

Advanced	<p>9-12th grade students performing at the advanced level:</p> <ul style="list-style-type: none"> • Teach others how to use a collaborative workspace • Consider several methods and choose the best for building group collaboration in research, communication and presentation among students in physically separated locations • Teach others to use technology tools for communicating information.
Proficient	<p>9-12th grade students performing at the proficient level:</p> <ul style="list-style-type: none"> • Collaborate to create a product to disseminate information by utilizing a collaborate workspace (such as WebCT) • Contribute digitized material (e.g., video interviews, scanned pictures, text, and graphic information) to a project archive and create links to resource material • Utilize three or more technology tools for communicating information.
Basic	<p>9-12th grade students performing at the basic level:</p> <ul style="list-style-type: none"> • Recognize the value of collaboration • Utilize one or two technology tools for communicating information.

**Ninth-Twelfth Grade Information Literacy and Decision Making
Grade Standards, Supporting Skills, and Examples**

Indicator 1: Students use technology to locate and acquire information.

Bloom's Taxonomy Level	Standard, Supporting Skills, and Examples
(Synthesis)	<p>9-12.II.1.1 Design a research project using a variety of technologies to find information to solve a real-world problem.</p> <p>Example: Use GIS (Geographic Information System) mapping to locate a proposed railroad track</p> <p>Example: Math 9-12.S.1.1</p> <p>Example: Writing 9.LVS.1.3</p> <p>Example: Writing 10.LVS.1.4</p>

Indicator 2: Students determine the reliability and relevancy of information.

Bloom's Taxonomy Level	Standard, Supporting Skills, and Examples
(Evaluation)	<p>9-12.II.2.1 Independently evaluates the accuracy, relevance, appropriateness, comprehensiveness, and bias of electronic information sources.</p> <ul style="list-style-type: none">• Defend the choice of sources in their bibliography (in any assigned project or paper). <p>Examples: Form a panel to discuss the results of the evaluation, debate the validity of specific electronics resources, prepare a case study and report results , keep a reflective log of research results from various resources, develop a web page or web site that publishes results of evaluations for others to use.</p> <p>Example: Reading 10.R.5.1</p> <p>Example: Reading 11.R.5.1</p> <p>Example: Reading 12.R.5.1</p> <p>Example: Writing 9.LVS.1.1</p> <p>Example: Writing 10.W.1.3</p> <p>Example: Writing 10.LVS.1.1</p> <p>Example: Writing 11.LVS.1.1</p> <p>Example: Writing 11.LVS.1.2</p> <p>Example: Social Science 9-12.G.1.1A</p> <p>Example: Social Science 9-12.C.2.4A</p>

**Ninth-Twelfth Grade Information Literacy and Decision Making
Performance Descriptors**

Advanced	9-12th grade students performing at the advanced level: <ul style="list-style-type: none">• Critique the methods used to find information to solve real-world problems.• Recommend digital sources for a research project.
Proficient	9-12th grade students performing at the proficient level: <ul style="list-style-type: none">• Design a research project using a variety of technologies to find information to solve a real-world problem.• Defend the choice of sources used for a research project.
Basic	9-12th grade students performing at the basic level: <ul style="list-style-type: none">• Compare technologies used to find information to solve an identified problem.• Cite the sources used for a research project.