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OFFICE OF PUBLIC INSTRUCTION
STATE OF MONTANA

Putting Montana Students First

Computer Science, Library Media and Technology Content Standards Negotiated Rulemaking Committee Agenda

When:	December 5, 2019
Time:	10 a.m. to 4 p.m.
Where:	Capitol Building, Rm 152 Helena, MT 59601
Lunch:	On your own

Committee members are welcome to arrive at 9 a.m. to check computer or device connectivity.

Lunch break, on your own, at approximately 12:00 p.m.

The Committee will move through the agenda as needed.

10 a.m.	Introductions
	Call to Order
	Facilitator Confirmation
	Establish Committee Membership
	Review Negotiated Rulemaking roles, responsibilities, and process
	Establish Committee's consensus definition
	OPI provides background and context behind rule recommendations
	Proposed rule changes
	Overview of Economic Impact Survey Questionnaire
	Next NR Committee meeting date: January 2020
	Public comment
4 p.m.	Adjourn

All comments received become part of the official public record of the Negotiated Rulemaking Committee proceedings in accordance with §2-3-212, MCA.

COMPUTER SCIENCE STANDARDS DRAFT FOR NRC 12.5.19

STANDARDS FOR COMPUTER SCIENCE FOR GRADES K-12

1. The content areas covered by the computer science standards include:
    a. algorithms and programming;
    b. computing systems;
    c. data and analysis;
    d. impacts of computing; and,
    e. computer science networks and the internet
2. When a district incorporates or integrates computer science content into district curriculum or offers a course in computer science, the following skills at each grade level apply:
    a. fostering an inclusive computing culture
    b. collaborating around computing
    c. recognizing and defining computational problems
    d. developing and using abstractions
    e. creating computational artifacts
    f. testing and refining computational artifacts
    g. communicating about computing

COMPUTER SCIENCE CONTENT STANDARDS FOR KINDERGARTEN

1. Computer science algorithms and programming standards for kindergarten are:
    a. follow step-by-step instructions
    b. recognize that numbers and symbols represent information
2. Computer science computing systems standards for kindergarten are:
    a. identify computing devices
    b. identify examples of common hardware and software
3. Computer science data and analysis standards for kindergarten are:
    a. collect and categorize data
    b. retrieve information
    c. identify patterns in data
4. Computer science impacts of computing standards for kindergarten are:
    a. work respectfully and responsibly in groups
    b. keep login information private and log off devices appropriately

THE COMPUTER SCIENCE CONTENT STANDARDS FOR FIRST GRADE

1. Computer science algorithms and programming standards for first grade are:
    a. retell step-by-step instructions to complete a task
    b. use numbers and symbols to represent information
    c. arrange sequences and simple loops in correct order
2. Computer science computing systems standards for first grade are:
    a. identify tasks that can be performed by computing devices
    b. use appropriate terminology in identifying common hardware and software
    c. identify simple hardware and software problems
3. Computer science data and analysis standards for first grade are:
    a. collect and categorize data in up to three categories
    b. retrieve, arrange, and modify information
    c. identify patterns in data
4. Computer science impacts of computing standards for first grade are:
    a. work respectfully and responsibly in groups
    b. keep login information private and log off devices appropriately

THE COMPUTER SCIENCE CONTENT STANDARDS FOR SECOND GRADE

1. Computer science algorithms and programming standards for second grade are:
    a. model daily processes by creating and following sets of step-by-step instructions to complete tasks
    b. model the way programs store and manipulate data by using numbers or other symbols to represent information
    c. develop programs with sequences and simple loops, to express ideas or address a problem
    d. break down the steps needed to solve a problem into a precise sequence of instructions
2. Computer science computing systems standards for second grade are:
    a. select and operate appropriate devices to perform a variety of tasks
    b. use appropriate terminology in identifying and describing the function of common hardware and software
    c. describe basic hardware and software problems using accurate terminology
3. Computer science data and analysis standards for second grade are:
    a. collect and present the data in various visual formats
    b. define data as gathered and stored information
    c. identify and describe patterns in data visualizations, such as charts or graphs, to make predictions
4. Computer science impacts of computing standards for second grade are:
    a. identify how people live and work differently after the implementation of new computing technology, including American Indians
    b. work respectfully and responsibly online
    c. keep login information private and log off devices appropriately
5. Computer science networks and the internet standards for second grade are:
    a. explain what passwords are and why we use them
    b. recognize that computing devices and the internet enable us to connect with other people, places, information, and ideas

THE COMPUTER SCIENCE CONTENT STANDARDS FOR THIRD GRADE

1. Computer science algorithms and programming standards for third grade are:
    a. compare and contrast multiple algorithms to complete the same task
    b. break down problems into smaller, manageable subproblems to facilitate the program development process
    c. describe steps taken and choices made during the process of program development
    d. identify intellectual property rights and give appropriate credit when creating or remixing programs
2. Computer science computing systems standards for third grade are:
    a. identify the internal and external parts of computing devices
    b. determine potential solutions to solve simple hardware and software problems using common troubleshooting strategies
3. Computer science data and analysis standards for third grade are:
    a. collect data from multiple sources and display the data in graphs
    b. describe multiple types of data
    c. understand the accuracy of predictions and how they are influenced by the amount of data collected
4. Computer science impacts of computing standards for third grade are:
    a. seek diverse perspectives for the purpose of improving computational artifacts
    b. apply laws associated with digital information
    c. describe ethical issues that relate to computing devices and networks
5. Computer science networks and the internet standards for third grade are:
    a. identify real-world cybersecurity problems and how personal information can be protected

THE COMPUTER SCIENCE CONTENT STANDARDS FOR FOURTH GRADE

1. Computer science algorithms and programming standards for fourth grade are:
    a. compare and refine multiple algorithms for the same task and determine which is the most appropriate
    b. decompose problems into smaller, manageable subproblems to facilitate the program development process
    c. test and debug a program or algorithm to ensure it runs as intended
2. Computer science computing systems standards for fourth grade are:
    a. explain the function of individual internal and external parts
    b. determine potential solutions to solve simple hardware and software problems using common troubleshooting strategies
3. Computer science data and analysis standards for fourth grade are:
    a. select and use appropriate non-digital and digital tools to collect and represent data
    b. identify and use multiple types of data to complete a task
    c. evaluate the validity of data based on accuracy and relevance
4. Computer science impacts of computing standards for fourth grade are:
    a. seek diverse perspectives for the purpose of improving computational artifacts
    b. apply laws associated with digital information
    c. describe ethical issues that relate to computing devices and networks
5. Computer science networks and the internet standards for fourth grade are:
    a. identify real-world cybersecurity problems and how personal information can be protected

THE COMPUTER SCIENCE CONTENT STANDARDS FOR FIFTH GRADE

1. Computer science algorithms and programming standards for fifth grade are:
    a. compare and refine multiple algorithms for the same task and determine which is the most appropriate
    b. create programs that use variables to store and modify data
    c. create programs that include sequences, events, loops, and conditionals
    d. modify, remix, or incorporate portions of an existing program into one's own work, to develop something new or add more advanced features
    e. describe choices made during program development
2. Computer science computing systems standards for fifth grade are:
    a. describe how internal and external parts of computing devices function to form a system
    b. model how computer hardware and software work together as a system to accomplish tasks
    c. determine potential solutions to solve simple hardware and software problems using common troubleshooting strategies
3. Computer science data and analysis standards for fifth grade are:
    a. organize and present collected data visually to highlight relationships and support a claim
    b. demonstrate how to store, copy, search, retrieve, modify, and delete information using a computing device
    c. use accurate and relevant data to highlight or propose cause-and-effect relationships, predict outcomes, or communicate an idea
4. Computer science impacts of computing standards for fifth grade are:
    a. explain how computing technologies have changed Montana and the world, and express how those technologies influence, and are influenced by, cultural practices, including American Indians
    b. identify ways to improve the accessibility and usability of technology products for the diverse needs and wants of users
    c. utilize diverse perspectives for the purpose of improving computational artifacts
    d. apply laws associated with digital information and intellectual property
    e. describe ethical issues that relate to computing devices and networks
5. Computer science networks and the internet standards for fifth grade are:
    a. explain real-world cybersecurity problems and how personal information can be protected
    b. model how information is broken down and transmitted through multiple devices over networks and the internet and reassembled at the destination

THE COMPUTER SCIENCE CONTENT STANDARDS FOR SIXTH THROUGH EIGHTH GRADE

1. Computer science algorithms and programming standards for sixth through eighth grades are:
    a. use algorithms to address complex problems
    b. create clearly named variables that represent different data types and perform operations on their values
    c. develop programs that combine control structures, including nested loops and compound conditionals
    d. decompose problems and subproblems into parts to facilitate the design, implementation, and review of programs
    e. create procedures with parameters to organize code and make it easier to reuse
    f. seek and incorporate feedback from team members and users to refine a solution that meets user needs
    g. incorporate existing code, media, and libraries into original programs, and give attribution
    h. systematically test and refine programs using a range of test cases
    i. distribute tasks and maintain a project timeline when collaboratively developing computational artifacts
    j. document programs in order to make them easier to follow, test, and debug
2. Computer science computing systems standards for sixth through eighth grades are:
    a. recommend improvements to the design of computing devices, based on an analysis of how users interact with the devices
    b. design projects that combine hardware and software components to collect and exchange data
    c. systematically identify and fix problems with computing devices and their components
3. Computer science data and analysis standards for sixth through eighth grades are:
    a. collect data using computational tools and transform the data to make it more useful and reliable
    b. represent data using multiple formats
    c. refine computational models based on the data they have generated
4. Computer science impacts of computing standards for sixth through eighth grades are:
    a. compare tradeoffs associated with computing technologies that affect people's everyday activities and career options in Montana and the world, including American Indians
    b. discuss issues of bias and accessibility in the design of existing technologies
    c. collaborate with many contributors when creating a computational artifact
    d. describe tradeoffs between allowing information, personal or intellectual, to be public and keeping information private and secure

5. Computer science networks and the internet standards for sixth through eighth grades are:
    a. explain how physical and digital security measures protect electronic information
    b. apply multiple methods of encryption to model the secure transmission of information
    c. model the role of packets and protocols in transmitting data across networks and the internet

THE COMPUTER SCIENCE CONTENT STANDARDS FOR NINTH THROUGH TWELFTH GRADES

1. Computer science algorithms and programming standards for ninth through twelfth grades are:
    a. create prototypes that use algorithms to solve computational problems by leveraging prior student knowledge and personal interests
    b. describe how artificial intelligence drives many software and physical systems
    c. implement an artificial intelligence algorithm to play a game against a human opponent or solve a problem
    d. use and adapt classic algorithms to solve computational problems
    e. evaluate algorithms in terms of their efficiency, correctness, and clarity
    f. use lists to simplify solutions, generalizing computational problems instead of repeatedly using simple variables
    g. compare and contrast fundamental data structures and their uses
    h. justify the selection of specific control structures when tradeoffs involve implementation, readability, and program performance, and explain the benefits and drawbacks of choices made
    i. design and iteratively develop computational artifacts for practical intent, personal expression, or to address a societal issue by using events to initiate instructions
    j. decompose problems into smaller components through systematic analysis, using constructs such as procedures, modules, or objects
    k. create artifacts by using procedures within a program, combinations of data and procedures, or independent but interrelated programs
    l. construct solutions to problems using student-created components, such as procedures, modules or objects
    m. analyze a large-scale computational problem and identify generalizable patterns that can be applied to a solution
    n. demonstrate code reuse by creating programming solutions using libraries and application programming interfaces
    o. systematically design and develop programs for broad audiences by incorporating feedback from users
    p. evaluate and refine computational artifacts to make them more usable and accessible
    q. design and develop computational artifacts working in team roles using collaborative tools
    r. document design decisions using text, graphics, presentations, or demonstrations in the development of complex programs
    s. plan and develop programs for broad audiences using a software life cycle process

t. explain security issues that might lead to compromised computer programs
u. develop programs for multiple computing platforms
v. use version control systems, integrated development environments, and collaborative tools and practices in a group software project
w. develop and use a series of test cases to verify that a program performs according to its design specifications
x. modify an existing program to add additional functionality and discuss intended and unintended implications
y. evaluate key qualities of a program through a process such as a code review
z. compare multiple programming languages and discuss how their features make them suitable for solving different types of problems

2. Computer science computing systems standards for ninth through twelfth grades are:
   a. explain how abstractions hide the underlying implementation details of computing systems embedded in everyday objects
   b. compare levels of abstraction and interactions between application software, system software, and hardware layers
   c. categorize the roles of operating system software
   d. develop guidelines that convey systematic troubleshooting strategies that others can use to identify and fix errors
   e. illustrate ways computing systems implement logic, input, and output through hardware components
3. Computer science data and analysis standards for ninth through twelfth grades are:
   a. create interactive data visualizations using software tools to help others better understand real-world phenomena
   b. use data analysis tools and techniques to identify patterns in data representing complex systems
   c. select data collection tools and techniques to generate data sets that support a claim or communicate information
   d. translate between different bit representations of real-world phenomena, such as characters, numbers, and images
   e. evaluate the tradeoffs in how data elements are organized and where data is stored
   f. create computational models that represent the relationships among different elements of data collected from a phenomenon or process
   g. evaluate the ability of models and simulations to test and support the refinement of hypotheses
4. Computer science impacts of computing standards for ninth through twelfth grades are:
   a. evaluate the ways computing technologies, globally and locally, impact personal, ethical, social, economic, and cultural practices, including American Indians
   b. test and refine computational artifacts to reduce bias and equity deficits

c. demonstrate ways a given algorithm applies to problems across disciplines
d. evaluate computational artifacts to maximize their beneficial effects and minimize harmful effects on society
e. evaluate the impact of equity, access, and influence on the distribution of computing resources in a global society
f. predict how computational innovations that have revolutionized aspects of our culture might evolve
g. use tools and methods for collaboration on a project to increase connectivity of people in different cultures and career fields
h. explain the beneficial and harmful effects that intellectual property laws can have on innovation
i. explain the privacy concerns related to the collection and generation of data through automated processes that may not be evident to users
j. evaluate the social and economic implications of privacy in the context of safety, law, or ethics
k. debate laws and regulations that impact the development and use of software

5. Computer science networks and the internet standards for ninth through twelfth grades are:
    a. recommend security measures to address various scenarios based on factors such as efficiency, feasibility, and ethical impacts
    b. explain tradeoffs when selecting and implementing cybersecurity recommendations
    c. compare ways software developers protect devices and information from unauthorized access
    d. evaluate the scalability and reliability of networks, by describing the relationship between routers, switches, servers, topology, and addressing
    e. give examples to illustrate how sensitive data can be affected by malware and other attacks
    f. compare various security measures, considering tradeoffs between the usability and security of a computing system
    g. discuss the issues that impact functionality

COMPUTER SCIENCE STANDARDS DRAFT FOR NRC 12.5.19

Administrative Rules of Montana Chapter 55 – NEW RULE PROPOSAL

Computer Science Program Delivery Standards

1. In general, a basic program in computer science education shall:
    a. meet the following conditions:
        i. provide a well-articulated integrated curriculum that challenges students to learn increasingly more sophisticated computer science concepts
        ii. foster a collaborative environment that embraces creativity, communication, and problem solving
    b. include the following practices:
        i. ensures students become informed citizens who can critically engage in public discussion on computer science related topics
        ii. ensures students develop as learners, users, and creators of computer science knowledge and artifacts
        iii. ensures students understand the role of computing in the world around them, leveraging computer technology to create solutions
        iv. increase career and college readiness

INFORMATION LITERACY/LIBRARY MEDIA STANDARDS DRAFT FOR NRC 12.5.19

LIBRARY MEDIA AND INFORMATION LITERACY CONTENT STANDARDS

1. When a district incorporates or integrates library media and information literacy content into district curriculum or offers an elective course in library media and information literacy, the following standards apply:
    a. Students must identify the task and determine resources needed
    b. Students will locate sources, use information, and present findings
    c. Students will evaluate learning products and learning process
    d. Students will use information safely, ethically, and legally

THE LIBRARY MEDIA AND INFORMATION LITERACY STANDARDS FOR KINDERGARTEN

1. Identify the task and determine resources content standards for kindergarten are that each student will:
    a. retell the problem or task
    b. explore possible resources from a limited selection
2. Locate sources, use information, and present findings content standards for kindergarten are that each student will:
    a. recognize the library personnel as a resource
    b. locate fiction and nonfiction resources
    c. identify parts of a book
    d. view and listen for information
    e. identify relevant information
    f. sequence information
    g. present original work
3. Evaluate learning products and learning process content standards for kindergarten are that each student will:
    a. compare products to criteria
    b. explore ideas for improvement of the product
    c. retell the steps that were used
    d. discuss how well the process worked
4. Use information safely, ethically, and legally content standards for kindergarten are that each student will:
    a. explain internet safety and appropriate online behavior
    b. connect ideas and information with their owners or source

THE LIBRARY MEDIA AND INFORMATION LITERACY STANDARD CONTENT STANDARDS FOR FIRST GRADE

1. Identify the task and determine resources content standards for first grade are that each student will:
    a. retell problem or task and topic
    b. identify the steps needed to solve the problem or task
    c. discuss possible resources
    d. choose resources from a limited selection
2. Locate sources, use information, and present findings content standards for first grade are that each student will:
    a. locate major sections in the library
    b. locate library resources using call numbers
    c. explore fiction and nonfiction resources including those by and about Montana Indians
    d. identify relevant information
    e. identify and credit sources
    f. sequence and sort information
    g. present original work
3. Evaluate the product and learning process content standards for first grade are that each student will:
    a. compare products to criteria
    b. identify an idea for improvement of the product
    c. retell the steps that were used
    d. discuss how well the process worked
4. Use information safely, ethically, and legally content standards for first grade are that each student will:
    a. explain internet safety and appropriate online behavior
    b. connect ideas and information with their owners or source

THE LIBRARY MEDIA AND INFORMATION LITERACY CONTENT STANDARDS FOR SECOND GRADE

1. Identify the task and determine resources content standards for second grade are that each student will
    a. identify a topic
    b. describe the problem or task
    c. follow the steps needed to solve the problem or task
    d. discuss possible resources
    e. choose resources from a limited selection
2. Locate sources, use information, and present findings content standards for second grade are that each student will:
    a. locate major sections in the library
    b. locate resources using a library catalog or databases
    c. compare fiction and nonfiction resources including those by and about Montana Indians
    d. identify relevant information
    e. summarize information
    f. identify and credit sources
    g. sequence and sort information
    h. present original work
3. Evaluate the product and learning process content standards for third grade are that each student will:
    a. compare product to criteria
    b. generate ideas for improvement of the product
    c. retell the steps that were used
    d. describe how well the process worked
4. Use information safely, ethically, and legally content standards for third grade are that each student will:
    a. explain internet safety and appropriate online behavior
    b. describe criteria to determine safe and unsafe internet sites
    c. connect ideas and information with their owners or source
    d. credit sources

THE LIBRARY MEDIA AND INFORMATION LITERACY CONTENT STANDARDS FOR THIRD GRADE

1. Identify the task and determine resources content standards for third grade are that each student will:
    a. identify a topic
    b. describe the problem or task
    c. follow the steps needed to solve the problem or task
    d. discuss and identify possible resources
    e. determine relevant resources to solve the problem or task
2. Locate sources, use information, and present findings content standards for third grade are that each student will:
    a. locate resources using search techniques
    b. locate resources using a library catalog or database
    c. evaluate resources for relevance, appropriateness, detail, currency, authority, and bias including those by and about Montana Indians
    d. locate index, table of contents, and glossary
    e. recognize and utilize context clues to locate information
    f. identify relevant information
    g. summarize information
    h. cite sources
    i. organize information
    j. present original work
3. Evaluate learning products and learning process content standards for third grade are that each student will:
    a. compare product to criteria
    b. generate ideas for improvement of the product
    c. summarize the steps of the process
    d. describe how well the process worked
4. Use information safely, ethically, and legally content standards for third grade are that each student will:
    a. practice internet safety and appropriate online behavior
    b. use criteria to determine safe and unsafe internet sites
    c. connect ideas and information with their owners or source
    d. credit sources

THE LIBRARY MEDIA AND INFORMATION LITERACY STANDARDS FOR FOURTH GRADE

1. Identify the task and determine resources content standards for fourth grade are that each student will:
    a. identify the topic
    b. define a problem or task in their own words
    c. determine questions and steps needed to solve the problem or task
    d. identify possible resources
    e. determine relevant resources to solve the problem or task
2. Locate sources, use information, and present findings content standards for fourth grade are that each student will:
    a. locate resources using search techniques
    b. locate resources using a library catalog or database
    c. evaluate resources for relevance, appropriateness, detail, currency, authority, and bias including those by and about Montana Indians
    d. use index, table of contents, or glossary to locate information within a resource
    e. recognize and utilize context clues to locate information
    f. identify relevant information
    g. summarize information
    h. cite sources
    i. organize and refine relevant information
    j. design and present original work
3. Evaluate learning products and learning process content standards for fourth grade are that each student will:
    a. compare product to criteria
    b. generate ideas for improvement of the product
    c. summarize the steps of the process
    d. describe how well the process worked
4. Use information safely, ethically, and legally content standards for fourth grade are that each student will:
    a. practice internet safety and appropriate online behavior
    b. use criteria to determine safe and unsafe internet sites
    c. connect ideas and information with their owners or source
    d. credit sources by following copyright and fair use guidelines
    e. recognize plagiarism

THE LIBRARY MEDIA AND INFORMATION LITERACY STANDARDS FOR FIFTH GRADE

1. Identify the task and determine resources content standards for fifth grade are that each student will:
    a. identify topic-related keywords
    b. summarize task to broaden or narrow topic
    c. identify questions and steps needed to solve a problem or task
    d. identify possible resources
    e. determine relevant resources to solve the problem or task
2. Locate sources, use information, and present findings content standards for fifth grade are that each student will:
    a. locate resources using advanced search techniques
    b. use search techniques to locate resources
    c. identify point of view in resources
    d. evaluate resources for relevance, currency, and authority, including those by and about Montana Indians
    e. use index, table of contents, or glossary to locate information within a resource
    f. identify topic keywords
    g. record location of information within resources
    h. locate and summarize relevant information
    i. cite each source
    j. use a note taking method to record relevant information
    k. design and present original work that meets task criteria
3. Evaluate the product and learning process content standards for fifth grade are that each student will:
    a. identify product's strengths and weaknesses according to task criteria
    b. critique final product
    c. identify areas for improvement of the product
    d. summarize the steps of the process
    e. describe how well the process worked
    f. identify areas for improvement in the process
4. Use information safely, ethically, and legally content standards for fifth grade are that each student will:
    a. practice internet safety and appropriate online behavior
    b. use criteria to determine safe and unsafe internet sites
    c. connect ideas and information with their owners or source
    d. credit sources by following copyright, licensing, and fair use guidelines
    e. recognize plagiarism

THE LIBRARY MEDIA AND INFORMATION LITERACY STANDARDS FOR SIXTH THROUGH EIGHTH GRADE

1. Identify the task and determine resources content standards for sixth through eighth grade are that each student will:
    a. identify topic-related keywords
    b. summarize task to broaden or narrow topic
    c. define questions and steps needed to solve a problem or task
    d. identify relevant resources
    e. identify point of view in resources
    f. identify authority of resources
2. Locate sources, use information, and present findings content standards for sixth through eighth grade are that each student will:
    a. locate resources using advanced search techniques
    b. identify point of view in resources
    c. evaluate resources for relevance, currency, authority, and bias including those by and about Montana Indians
    d. identify keywords and keyword phrases by skimming and scanning
    e. use index, table of contents, or glossary to locate information within a resource
    f. record location of information within resources
    g. locate, summarize and paraphrase relevant information
    h. cite each source
    i. use note taking methods to record relevant information
    j. organize information
    k. design and present original work that meets task criteria
3. Evaluate learning products and learning process content standards for sixth through eighth grade are that each student will:
    a. describe product's strengths and weaknesses according to task criteria
    b. critique final product
    c. identify areas for improvement in the product
    d. summarize the steps of the process
    e. describe how well the process worked
    f. identify areas for improvement in the process
4. Use information safely, ethically, and legally content standards for sixth through eighth grade are that each student will:
    a. practice internet safety and appropriate online behavior
    b. use criteria to determine safe and unsafe internet sites
    c. participate safely, ethically, and legally in online activities
    d. connect ideas and information with their owners or source
    e. credit sources by following copyright, licensing, and fair use guidelines
    f. recognize plagiarism and its consequences

THE LIBRARY MEDIA AND INFORMATION LITERACY STANDARDS FOR NINTH THROUGH TWELFTH GRADE

1. Identify the task and determine resources content standards for ninth through twelfth grade are that each student will:
    a. identify topic-specific keywords
    b. assess whether the topic is too narrow or broad and adjust accordingly
    c. interpret prior and background knowledge
    d. develop and refine a range of questions to solve the problem or task
    e. Propose relevant resources
    f. identify point of view in resources
    g. identify authority of resources
    h. identify primary and secondary sources
2. Locate sources, use information, and present findings content standards for ninth through twelfth grade are that each student will:
    a. locate resources using advanced search techniques
    b. evaluate resources for accuracy, relevance, authority, detail, currency, and bias, including those by and about Montana Indians
    c. perform advanced searches within digital resources
    d. use keywords to locate and cross-reference information to match the task
    e. document location of information within resources
    f. read, view and listen to make inferences
    g. summarize, paraphrase, or directly quote relevant details
    h. cite each source
    i. use note taking methods to record relevant information
    j. organize information
    k. design and present original work that meets task criteria
3. Evaluate the product and learning process content standards for ninth through twelfth grade are that each student will:
    a. describe product's strengths and weaknesses according to task criteria
    b. compare self- assessment to teacher and peer feedback
    c. revise and edit based on feedback
    d. evaluate time management throughout the process
    e. evaluate the strengths and weaknesses of the process
4. Use information safely, ethically, and legally content standards for ninth through twelfth grade are that each student will:
    a. practice internet safety and appropriate online behavior
    b. use criteria to determine safe and unsafe internet sites
    c. participate safely, ethically, and legally in online activities
    d. connect ideas and information with their owners or source
    e. credit sources by following copyright, licensing, and fair use guidelines
    f. recognize plagiarism and its consequences

Administrative Rules of Montana Chapter 55

LIBRARY MEDIA SERVICES, K-12 10.55.709

Current ARM	Recommendation	Modification
(1) The school library shall be housed in a central location, and each school shall have a licensed and endorsed library media specialist at the following ratio:	keep as is	
(a) 5 FTE for schools with 126-250 students;	keep as is	
(b) 1 FTE for schools with 251-500 students;	keep as is	
(c) 1 5 FTE for schools with 501-1000 students;	keep as is	
(d) 2 FTE for schools with 1001-1500 students;	keep as is	
(e) 2 5 FTE for schools with 1501-2000 students;	keep as is	
(f) 3 FTE for schools with 2001 or more students	keep as is	
(2) Schools of fewer than 126 students shall employ or contract with a licensed and endorsed school library media specialist	keep as is	
(3) If a district has fewer than 126 students, the district may utilize a consortium, multidistrict agreement, or interlocal cooperative to secure these services	keep as is	

Administrative Rules of Montana Chapter 55

LIBRARY MEDIA PROGRAM DELIVERY STANDARDS 10.55.1801

Current ARM	Recommendation	Modification
(1) In general, a basic program in library media shall:		
(a) meet the following conditions:		
(i) establish flexible scheduling to ensure that libraries respond to information needs, foster intellectual curiosity, and support learning;	modify	(i) establish ~~flexible~~ appropriate scheduling, fixed or flexible, to ensure that libraries respond to information needs, foster intellectual curiosity, and support learning;
(ii) ensure collaboration with classroom teachers of all disciplines to implement content area standards and to assist students in engaging in the inquiry/research process;	keep as is	
(iii) model and support the ethical use of information, adherence to copyright laws, and respect for intellectual property; and	keep as is	
(iv) advise the board of trustees on policy and rule pertaining to:	keep as is	
(A) developing and maintaining a library collection that is current, balanced, and reflects authentic historical and cultural contributions of Montana's American Indians and other minority and ethnic groups;	modify	(A) develop~~ing~~ and maintain~~ing~~ a physical and digital library collection that is current, balanced, and reflects authentic historical and cultural contributions of Montana's American Indians and other minority and ethnic groups;
(B) engaging in comprehensive long range planning to administer and manage, in a secure area, the human, financial, and physical resources of the library to locate, access, and use on-site resources that are organized and cataloged; and	modify	(B) engage~~ing~~ in comprehensive long range planning to administer and manage, in a secure area, the human, financial, digital, and physical resources of the library to locate, access, and use ~~on-site~~ resources that are organized and cataloged; and
(C) implementing a viable collection development policy which includes the following components:	modify	(C) implement~~ing~~ a viable collection development policy which includes the following components:

Current ARM	Recommendation	Modification
(I) materials selection and de-selection;	keep as is	
(II) challenged materials procedure;	keep as is	
(III) intellectual/academic freedom statement;	keep as is	
(IV) confidentiality assurance;	keep as is	
(V) copyright guidelines; and	keep as is	
(VI) gifts and donations	keep as is	
(b) include the following practices:		
(i) collaborate with classroom teachers of all disciplines to highlight and reinforce the commonalities and links between and among the curricular areas;	keep as is	
(ii) cooperate and join with other libraries, information agencies, and community resources in the sharing of materials;	keep as is	
(iii) encourage partnerships with information centers that use electronic information systems; and	modify	(iii) encourage partnerships with ~~information centers that use~~ providers of digital ~~electronic~~ content and information systems; and
(iv) participate in school-wide technology and telecommunications planning and promote its integration into all instructional programs	modify	(iv) participate in school-wide ~~technology and telecommunications~~ digital service and content planning and promote its integration into all instructional programs

Montana Content Standards for Information Literacy-Library Media

Adopted July 2008

Montana
Office of Public Instruction
opi.mt.gov Elsie Arntzen, Superintendent

Contents

Introduction

Information literacy is the ability to recognize when information is needed and then locate, evaluate, and effectively use the information. (Adapted from Association College and Research Libraries “Information Literacy Competency Standards for Higher Education”)

All Montana students require equitable access to a variety of resources, encompassing the breadth of human conversations and creations for academic achievement and personal growth. By learning to access and evaluate information they gain an appreciation and respect for diverse ideas and creative expressions. By using information literacy skills in all aspects of learning, students become empowered and engaged lifelong learners. To thrive in the 21st Century, students must employ a process of inquiry that can be adapted to any information need. By learning strategies to manage and ethically use information, Montana students open the door to the world in all its diversity. Teacher librarians, in collaboration with other classroom and content area teachers, empower all students to become information literate.

Content Standard 1: Students will identify the task and determine the resources needed.

Content Standard 2: Students will locate sources, use information and present findings.

Content Standard 3: Students will evaluate the product and learning process.

Content Standard 4: Students will use information safely, ethically and legally.

Content Standard 5: Students will pursue personal interests through literature and other creative expressions.

INFORMATION LITERACY/LIBRARY MEDIA CONTENT STANDARD 1

(1) To satisfy the requirements of information literacy/library media content standard 1, a student must identify the task and determine the resources needed.

BENCHMARK FOR INFORMATION LITERACY/LIBRARY MEDIA CONTENT STANDARD 1 FOR THE END OF GRADE 4

(1) The benchmark for information literacy/library media content standard 1 for a student at the end of grade 4 is the ability to:

(a) define the problem;

(b) identify types of information needed; and

(c) choose from a range of resources.

BENCHMARK FOR INFORMATION LITERACY/LIBRARY MEDIA CONTENT STANDARD 1 FOR THE END OF GRADE 8

(1) The benchmark for information literacy/library media content standard 1 for a student at the end of grade 8 is the ability to:

(a) analyze the parts of the problem to be solved;

(b) identify information resources needed; and

(c) evaluate and select appropriate resources.

BENCHMARK FOR INFORMATION LITERACY/LIBRARY MEDIA CONTENT STANDARD 1 UPON GRADUATION

(1) The benchmark for information literacy/library media content standard 1 for a student upon graduation is the ability to:

(a) evaluate the purpose and scope of the problem;

(b) determine the nature and extent of information needed; and

(c) evaluate and select appropriate resources.

INFORMATION LITERACY/LIBRARY MEDIA CONTENT STANDARD 2

(1) To satisfy the requirements of information literacy/library media content standard 2, a student must locate sources, use information, and present findings.

BENCHMARK FOR INFORMATION LITERACY/LIBRARY MEDIA CONTENT STANDARD 2 FOR THE END OF GRADE 4

(1) The benchmark for information literacy/library media content standard 2 for a student at the end of grade 4 is the ability to:

(a) locate a resource needed to solve the problem;
(b) evaluate resources;
(c) locate information within the resource;
(d) extract information from resources needed to solve the problem;
(e) organize information to solve the problem; and
(f) create a product that presents findings.

BENCHMARK FOR INFORMATION LITERACY/LIBRARY MEDIA CONTENT STANDARD 2 FOR THE END OF GRADE 8

(1) The benchmark for information literacy/library media content standard 2 for a student at the end of grade 8 is the ability to:

(a) locate multiple resources using search tools;
(b) evaluate resources;
(c) locate information within multiple resources;
(d) extract information from multiple resources needed to solve the problem;
(e) organize and manage information to solve the problem; and
(f) create a product that presents findings.

BENCHMARK FOR INFORMATION LITERACY/LIBRARY MEDIA CONTENT STANDARD 2 UPON GRADUATION

(1) The benchmark for information literacy/library media content standard 2 for a student upon graduation is the ability to:

(a) locate multiple resources using a variety of search tools;
(b) evaluate resources;
(c) locate information within a wide variety of resources;
(d) extract information from a wide variety of resources needed to solve the problem;
(e) organize and manage information from a wide variety of sources to solve the problem; and
(f) create and defend a product that presents findings.

INFORMATION LITERACY/LIBRARY MEDIA CONTENT STANDARD 3

(1) To satisfy the requirements of information literacy/library media content standard 3, a student must evaluate the product and learning process.

BENCHMARK FOR INFORMATION LITERACY/LIBRARY MEDIA CONTENT STANDARD 3 FOR THE END OF GRADE 4

(1) The benchmark for information literacy/library media content standard 3 for a student at the end of grade 4 is the ability to:

(a) assess the quality of the product; and

(b) describe the process.

BENCHMARK FOR INFORMATION LITERACY/LIBRARY MEDIA CONTENT STANDARD 3 FOR THE END OF GRADE 8

(1) The benchmark for information literacy/library media content standard 3 for a student at the end of grade 8 is the ability to:

(a) assess the quality and effectiveness of the product; and

(b) evaluate how the process met the need for information.

BENCHMARK FOR INFORMATION LITERACY/LIBRARY MEDIA CONTENT STANDARD 3 UPON GRADUATION

(1) The benchmark for information literacy/library media content standard 3 for a student upon graduation is the ability to:

(a) assess the quality and effectiveness of the product; and

(b) evaluate the process in order to revise strategies.

INFORMATION LITERACY/LIBRARY MEDIA CONTENT STANDARD 4

(1) To satisfy the requirements of information literacy/library media content standard 4, a student must use information safely, ethically, and legally.

BENCHMARK FOR INFORMATION LITERACY/LIBRARY MEDIA CONTENT STANDARD 4 FOR THE END OF GRADE 4

(1) The benchmark for information literacy/library media content standard 4 for a student at the end of grade 4 is the ability to:

(a) legally obtain and use information;

(b) identify the owner of ideas and information; and

(c) participate and collaborate in intellectual and social networks following safe and accepted practices.

BENCHMARK FOR INFORMATION LITERACY/LIBRARY MEDIA CONTENT STANDARD 4 FOR THE END OF GRADE 8

(1) The benchmark for information literacy/library media content standard 4 for a student at the end of grade 8 is the ability to:

(a) legally obtain, store, and disseminate text, data, images, or sounds;

(b) appropriately credit ideas and works of others; and

(c) participate and collaborate in intellectual and social networks following safe and accepted practices.

BENCHMARK FOR INFORMATION LITERACY/LIBRARY MEDIA CONTENT STANDARD 4 UPON GRADUATION

(1) The benchmark for information literacy/library media content standard 4 for a student upon graduation is the ability to:

(a) legally obtain, store, and disseminate text, data, images, or sounds;

(b) follow copyright laws and fair use guidelines when using the intellectual property of others; and

(c) participate and collaborate in intellectual and social networks following safe and accepted practices.

INFORMATION LITERACY/LIBRARY MEDIA CONTENT STANDARD 5

(1) To satisfy the requirements of information literacy/library media content standard 5, a student must pursue personal interests through literature and other creative expressions.

BENCHMARK FOR INFORMATION LITERACY/LIBRARY MEDIA CONTENT STANDARD 5 FOR THE END OF GRADE 4

(1) The benchmark for information literacy/library media content standard 5 for a student at the end of grade 4 is the ability to:

(a) use a variety of print and digital formats for pleasure and personal growth;

(b) use a variety of genres for pleasure and personal growth;

(c) access and understand multiple resources from diverse cultures, including those of Montana American Indians; and

(d) access libraries to seek information for personal interest.

BENCHMARK FOR INFORMATION LITERACY/LIBRARY MEDIA CONTENT STANDARD 5 FOR THE END OF GRADE 8

(1) The benchmark for information literacy/library media content standard 5 for a student at the end of grade 8 is the ability to:

(a) use and respond to a variety of print and digital formats for pleasure and personal growth;

(b) use and respond to a variety of genres for pleasure and personal growth;

(c) analyze and respond to multiple resources and creative expressions from diverse cultures, including those of Montana American Indians; and

(d) access and use libraries and other information environments to find information for personal use and to make connections to resources beyond the school library.

BENCHMARK FOR INFORMATION LITERACY/LIBRARY MEDIA CONTENT STANDARD 5 UPON GRADUATION

(1) The benchmark for information literacy/library media content standard 5 for a student upon graduation is the ability to:

(a) use and critique a variety of print and digital formats for pleasure and personal growth;

(b) use and critique a variety of genres for pleasure and personal growth;

(c) evaluate multiple resources and other creative expressions from diverse cultures, including those of Montana American Indians; and

(d) access and use resources and information from all types of information environments to pursue personal and creative interests.

TECHNOLOGY INTEGRATION STANDARDS DRAFT FOR NRC 12.5.19

TECHNOLOGY INTEGRATION CONTENT STANDARDS FOR GRADES K-12

1. The technology integration standards may include skills for:
    a. empowered learners
    b. digital citizens
    c. knowledge constructors
    d. innovative designers
    e. computational thinkers
    f. creative communicators
    g. global collaborators
    h. reflective users

TECHNOLOGY INTEGRATION CONTENT STANDARDS FOR KINDERGARTEN

1. The empowered learner content standards for kindergarten are that each student will:
    a. explore a variety of technologies that will help them in their learning
2. The digital citizen content standards for kindergarten are that each student will:
    a. explore appropriate use of devices
    b. explore sharing of information and how to respect the work of others
    c. explore the importance of keeping their information private
3. The innovative designer content standards for kindergarten are that each student will:
    a. explore a design process with digital and non-digital tools
4. The computational thinker content standards for kindergarten are that each student will:
    a. explore how technology is used to make a task easier

THE TECHNOLOGY INTEGRATION CONTENT STANDARDS FOR FIRST GRADE

1. The empowered learner content standards for first grade are that each student will:
    a. explore a variety of technologies that will help them in their learning
2. The digital citizen content standards for first grade are that each student will:
    a. practice responsible use of technology
    b. explore appropriate use of devices and how to be safe online
    c. explore sharing of information and how to respect the work of others
    d. explore the importance of keeping their information private
3. The innovative designer content standards for first grade are that each student will:
    a. explore digital and non-digital tools to design a product
    b. explore a design process to develop ideas or creations
4. The computational thinker content standards for first grade are that each student will:
    a. explore breaking down a problem into parts and identify ways to solve the problem

TECHNOLOGY INTEGRATION CONTENT STANDARDS FOR SECOND GRADE

1. The empowered learner content standards for second grade are that each student will:
    a. explore a variety of technologies that will help them in their learning
2. The digital citizen content standards for second grade are that each student will:
    a. practice responsible use of technology
    b. explore appropriate use of devices and how to be safe online
    c. explore ownership of information and how to respect the work of others
    d. explain the importance of keeping their information private
3. The knowledge constructor content standards for second grade are that each student will:
    a. explore a variety of tools to organize information
4. The innovative designer technology content standards for second grade are that each student will:
    a. use digital and non-digital tools to design a product
    b. use a design process to develop ideas or creations
5. The computational thinker content standards for second grade are that each student will:
    a. break down a problem into parts and identify ways to solve the problem
    b. explain how technology can make a task easier
6. The creative communicator content standards for second grade are that each student will:
    a. explore different tools for creating something new or for communicating with others

TECHNOLOGY INTEGRATION CONTENT STANDARDS FOR THIRD GRADE

1. The empowered learner content standards for third grade are that each student will:
    a. set personal learning goals and use appropriate technologies that will demonstrate knowledge
    b. recognize how knowledge can be transferred between tools
2. The digital citizen content standards for third grade are that each student will:
    a. identify and practice responsible use of technology
    b. identify appropriate use of devices and how to be safe online
    c. identify ownership of information and how to respect the work of others
    d. recognize the importance of keeping their information private
3. The knowledge constructor content standards for third grade are that each student will:
    a. identify digital tools and resources to find information on topics of interest
    b. explore sources for accuracy, credibility, and relevance
    c. identify a variety of tools to organize information
4. The innovative designer content standards for third grade are that each student will:
    a. define questions, find solutions, test ideas to solve problems and share their learning
    b. use digital and non-digital tools to design a product with a step-by-step design process
5. The computational thinker content standards for third grade are that each student will:
    a. define a problem and select appropriate technology tools to explore and find solutions
    b. evaluate data in order to identify patterns and categories
    c. break down problems into smaller parts, identify key information, and propose solutions
    d. evaluate how technology is used to make a task easier or repeatable
6. The creative communicator content standards for third grade are that each student will:
    a. use strategies for remixing or repurposing resources to create new works
    b. create digital objects to communicate ideas visually and graphically

TECHNOLOGY INTEGRATION CONTENT STANDARDS FOR FOURTH GRADE

1. The empowered learner content standards for fourth grade are that each student will:
    a. develop learning goals and choose the appropriate technology tools to achieve them
    b. explore technologies and transfer their learning to different tools or learning environments
2. The digital citizen content standards for fourth grade are that each student will:
    a. recognize the role an online identity plays in the digital world and in real life
    b. practice safe, legal and ethical behavior when using technology and interacting online
    c. define ownership of intellectual property and appropriate sharing of information
    d. identify what personal data is, the importance of keeping it private, and how it might be shared online
3. The knowledge constructor content standards for fourth grade are that each student will:
    a. use research techniques to locate digital resources
    b. evaluate sources for accuracy, perspective, cultural sensitivity, credibility, and relevance
    c. use a variety of strategies to organize information and make meaningful connections between resources
4. The innovative designer technology content standards for fourth grade are that each student will:
    a. practice using digital and non-digital tools to plan and manage a design process
    b. practice using a cyclical design process to develop prototypes and reflect on the role that trial and error play
5. The computational thinker content standards for fourth grade are that each student will:
    a. explore or solve problems by selecting technology, analyzing data, and creating models
    b. break down problems into smaller parts, identify key information, and propose solutions
    c. explore basic concepts related to automation, patterns, and algorithmic thinking
6. The creative communicator content standards for fourth grade are that each student will:
    a. identify the features and functions of a variety of creation or communication tools
    b. create original works by practicing strategies for remixing or repurposing
    c. create digital objects to communicate ideas visually and graphically
7. The global collaborator content standards for fourth grade are that each student will:
    a. identify digital tools to work with friends and people from different backgrounds or cultures
    b. identify collaborative technologies to connect with others, including peers, experts and community members, to explore different points of view on various topics
    c. practice working with others using collaborative technologies

8. The reflective user content standards for fourth grade are that each student will:
    a. evaluate personal preferences for use of technology tools for different tasks or purposes

TECHNOLOGY INTEGRATION CONTENT STANDARDS FOR FIFTH GRADE

1. The empowered learner content standards for fifth grade are that each student will:
    a. develop learning goals, select the technology tools to achieve them, and reflect on and revise the learning process as needed to achieve goals
    b. transfer their learning to different tools or learning environments
2. The digital citizen content standards for fifth grade are that each student will:
    a. demonstrate an understanding of the role an online identity plays in the digital world and permanence of their decisions when interacting online
    b. engage in safe, legal and ethical behavior when using technology and interacting online
    c. demonstrate respect for intellectual property when using and sharing the work of others
    d. explain what personal data is, how to keep it private, and how it might be shared online
3. The knowledge constructor content standards for fifth grade are that each student will:
    a. employ appropriate research techniques to locate digital resources
    b. evaluate sources for accuracy, perspective, cultural sensitivity, credibility, and relevance
    c. organize information and make meaningful connections between resources
4. The innovative designer technology content standards for fifth grade are that each student will:
    a. use a design process to generate ideas, consider solutions, solve a problem or create innovative products
    b. use digital and non-digital tools to plan and manage a design process
    c. use a cyclical design process to develop prototypes and reflect on the role that trial and error play
5. The computational thinker content standards for fifth grade are that each student will:
    a. explore or solve problems by selecting technology for data analysis, modeling and algorithmic thinking
    b. break down problems into smaller parts, identify key information, and propose solutions
    c. identify basic concepts related to automation, patterns, and algorithmic thinking
6. The creative communicator content standards for fifth grade are that each student will:
    a. identify and use the features of a variety of creation or communication tools
    b. use a variety of strategies for remixing or repurposing to create new works
    c. create digital objects to communicate ideas visually and graphically
7. The global collaborator content standards for fifth grade are that each student will:
    a. use appropriate digital tools to work with friends and people from different backgrounds or cultures
    b. perform a variety of roles within a team using age-appropriate technology to complete a project or solve a problem

8. The reflective user content standards for fifth grade are that each student will:
    a. evaluate personal preferences for use of technology tools for different tasks or purposes

TECHNOLOGY INTEGRATION CONTENT STANDARDS FOR SIXTH - EIGHTH GRADES

1. The empowered learner content standards for sixth- eighth grades are that each student will:
    a. define personal learning goals, select and manage appropriate technologies to achieve them, and reflect on their successes and areas of improvement in working toward their goals
    b. navigate a variety of technologies and transfer their knowledge and skills to learn how to use new technologies
2. The digital citizen content standards for sixth-eighth grades are that each student will:
    a. manage their digital identities and reputations, including demonstrating an understanding of how digital actions are permanent and never fully erasable
    b. demonstrate positive, safe, legal and ethical habits when using technology and when interacting with others online
    c. demonstrate and model the use of intellectual property of print and digital media, including copyright, permission and fair use, by creating a variety of media products that include appropriate citation and attribution elements
    d. demonstrate how to keep personal data secure and understand how data-collection technologies work
3. The knowledge constructor content standards for sixth-eighth grades are that each student will:
    a. use research strategies effectively to locate appropriate digital resources in support of their learning
    b. evaluate resources for accuracy, perspective, cultural sensitivity, credibility and relevance
    c. locate and collect resources from a variety of sources and organize into collections for a range of projects and purposes
4. The innovative designer technology content standards for sixth-eighth grades are that each student will:
    a. engage in design processes to generate ideas, create innovative products, or solve problems
    b. select and use digital tools to support design processes, identify constraints and trade-offs, and weigh risks
    c. engage in design processes to develop, test and revise prototypes, use the cyclical process of trial and error, and understanding problems or setbacks as potential opportunities for improvement
5. The computational thinker content standards for sixth-eighth grades are that each student will:
    a. investigate and practice solving problems by using data analysis, modeling or algorithmic thinking

b. organize data and use technology to display, analyze, solve problems, and make decisions
c. break down problems into component parts, identify key pieces and use that information to problem solve
d. demonstrate an understanding of how automation works and use algorithmic thinking to design and automate solutions

6. The creative communicator content standards for sixth-eighth grades are that each student will:
    a. select appropriate platforms and tools to create, share, and communicate their work
    b. create original works or responsibly remix and repurpose other digital resources into new creative works
    c. communicate complex ideas clearly using various digital tools to convey the concepts textually, visually, or graphically
7. The global collaborator content standards for sixth-eighth grades are that each student will:
    a. identify and use collaborative technologies to connect with others, including peers, experts, and community
    b. determine their role on a team to meet goals, based on their knowledge of technology and content, as well as personal preference
8. The reflective user content standards for sixth-eighth grades are that each student will:
    a. examine historical, cultural, and social impacts of technology innovations on individuals and groups, including American Indians
    b. explain how technology innovations influence their individual technology tool and resource preferences

TECHNOLOGY INTEGRATION CONTENT STANDARDS FOR NINTH-TWELFTH GRADES

1. The empowered learner content standards for ninth-twelfth grades are that each student will:
    a. set personal learning goals, develop strategies leveraging technology to achieve them, and reflect on the learning process to improve learning outcomes
    b. build networks and customize their learning environments in ways that support their learning process
    c. use technology to seek feedback that informs and improves their practice and to demonstrate their learning in a variety of ways
    d. demonstrate the ability to choose, use, and troubleshoot current technologies, and transfer their knowledge to explore emerging technologies
2. The digital citizen content standards for ninth-twelfth grades are that each student will:
    a. cultivate and manage a positive digital identity and reputation
    b. engage in positive, safe, legal and ethical behavior when using technology, including social interactions online or when using networked devices
    c. respect the rights and obligations of creating, using, and sharing intellectual property
    d. manage their personal data to maintain digital privacy and security
3. The knowledge constructor content standards for ninth-twelfth grades are that each student will:
    a. use research strategies to locate information and resources for their intellectual or creative pursuits
    b. evaluate the accuracy, perspective, cultural sensitivity, credibility, and relevance of information, media, data, or other resources
    c. curate information from digital resources using a variety of tools and methods to create collections of artifacts that demonstrate meaningful connections or conclusions
4. The innovative designer technology content standards for ninth-twelfth grades are that each student will:
    a. initiate a deliberate design process for generating ideas, testing theories, creating innovative artifacts, or solving authentic problems
    b. select and use digital tools to plan and manage a design process that considers design constraints and calculated risks
    c. develop, test and refine prototypes as part of a cyclical design process
5. The computational thinker content standards for ninth-twelfth grades are that each student will:
    a. identify problems suited for technology-assisted methods for data analysis, abstract models, and algorithmic thinking

b. collect data or identify relevant data sets, use digital tools to analyze them, and represent data in various ways to facilitate problem-solving and decision-making
c. break down problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving
d. explain how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions

6. The creative communicator content standards for ninth-twelfth grades are that each student will:
    a. choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication
    b. create original works or responsibly repurpose or remix digital resources into new creative works
    c. communicate complex ideas clearly and effectively by creating or using a variety of digital objects such as visualizations, models or simulations
    d. publish, present, and defend content that customizes the message and medium for their intended audiences
7. The global collaborator content standards for ninth-twelfth grades are that each student will:
    a. identify and use digital tools to connect with learners from a variety of backgrounds and cultures, engaging with them in ways that broaden mutual understanding and learning
    b. identify and use collaborative technologies to work with others, including peers, experts or community members, to examine issues and problems from multiple viewpoints
    c. contribute constructively to project teams, assuming various roles and responsibilities to work effectively toward a common goal
8. The reflective user content standards for ninth-twelfth grades are that each student will:
    a. evaluate historical, cultural, and social impacts of technology innovations on individuals and groups, including American Indians
    b. explain how technology innovations influence their individual technology tool and resource preferences

TECHNOLOGY INTEGRATION STANDARDS DRAFT FOR NRC 12.5.19

Administrative Rules of Montana Chapter 55

Program Delivery Standards Recommendation - NEW

1. In general, a basic program in technology education shall:
    a. meet the following conditions:
        i. development of skills that lead to lifelong pursuits;
        ii. provide opportunities for authentic application, work experience, and articulation with postsecondary education
        iii. integrate and transfer technology skills across grade levels, content areas, and programs
        iv. provide access to emerging technology across grade levels, content areas, and programs
    b. include the following practices:
        i. full progression of skills and knowledge from basic to advanced
        ii. full integration of technology competencies with academic knowledge in a contextual setting
        iii. include whole group, teacher-led, or personalized instruction

Montana Content Standards for Technology

Adopted July 2008

Montana
Office of Public Instruction
opi.mt.gov Elsie Arntzen, Superintendent

Contents

Introduction

Today's learners – teacher and students – are continually affected by a variety of digital technologies. These technologies have altered their expectations and skills. Traditional instruction alone no longer provides students with all the skills necessary to find personal value and professional success. Therefore, education needs to play an increasing role in empowering learners to be technologically literate and to integrate digital tools into their lives.

Expectations for student learning are increasing as digital tools make basic tasks easier. We must help students meet these expectations by understanding that:

- digital technology must be in the hands of all students;
- technological literacy includes more than simple mastery of skills;
- digital citizens must use digital tools safely and responsibly;
- learning environments are no longer constrained by school walls; they are global and personal;
- digital technology skills are acquired, developed, and mastered at an individual pace and;
- access to tools and flexible networks are critical for learner success.

While digital technology tools can be used to facilitate assessment of student learning, the primary application of these tools must be used to support content area learning. Although integrated learning systems can be used to deliver curriculum, true technology integration involves dynamic interactions among learners using digital tools.

Inquiry-based learning activities, rich in relevant content and integrated with digital technology, can facilitate collaboration, critical thinking, creativity, and problem solving. Properly applied, technology enhances learning and instruction, but does not become the focus. By providing access to information and tools for expression, opening pathways to communication, and facilitating personal understanding, technology supports learning in all subjects.

TECHNOLOGY CONTENT STANDARD 1

(1) To satisfy the requirements of technology content standard 1, a student must use digital tools and resources for problem solving and decision making.

BENCHMARK FOR TECHNOLOGY CONTENT STANDARD 1 FOR END OF GRADE 4

(1) The benchmark for technology content standard 1 for a student at the end of grade 4 is the ability to:

(a) identify and investigate a problem and generate possible solutions;

(b) collect data and information using digital tools;

(c) organize collected data and information using a variety of digital tools;

(d) identify the accuracy, diversity, and points of view, including those of Montana American Indians, of digital information; and

(e) share information ethically and cite sources.

BENCHMARK FOR TECHNOLOGY CONTENT STANDARD 1 FOR END OF GRADE 8

(1) The benchmark for technology content standard 1 for a student at the end of grade 8 is the ability to:

(a) use multiple approaches to explore alternative solutions;

(b) collect relevant data and information on a subject from a variety of digital resources;

(c) analyze and ethically use data and information from digital resources;

(d) compare accuracy, diversity, relevance, and points of view, including those of Montana American Indians, of digital information; and

(e) share data and information ethically and appropriately cite sources.

BENCHMARK FOR TECHNOLOGY CONTENT STANDARD 1 UPON GRADUATION

(1) The benchmark for technology content standard 1 for a student upon graduation is the ability to:

(a) use multiple approaches and diverse perspectives, including those of Montana American Indians, to explore alternative solutions;

(b) collect relevant data and information on a subject from a variety of digital resources;

(c) select from an array of digital tools to organize and analyze data from a variety of resources;

(d) evaluate and synthesize data and information; and

(e) share data and information ethically and appropriately cite sources.

TECHNOLOGY CONTENT STANDARD 2

(1) To satisfy the requirements of technology content standard 2, a student must collaborate and communicate globally in a digital environment.

BENCHMARK FOR TECHNOLOGY CONTENT STANDARD 2 FOR END OF GRADE 4

(1) The benchmark for technology content standard 2 for a student at the end of grade 4 is the ability to:

(a) identify and explore online collaboration and communication tools;

(b) identify and explore safe, legal, and responsible use of digital collaboration and communication tools;

(c) communicate the results of research and learning with others using digital tools; and

(d) explore how technology has expanded the learning environment beyond the traditional classroom.

BENCHMARK FOR TECHNOLOGY CONTENT STANDARD 2 FOR END OF GRADE 8

(1) The benchmark for technology content standard 2 for a student at the end of grade 8 is the ability to:

(a) select and use online collaboration and communication tools;

(b) use digital collaboration and communication tools in a safe, legal, and responsible manner;

(c) communicate the results of research and learning with others using digital tools; and

(d) use technology in a global learning environment.

BENCHMARK FOR TECHNOLOGY CONTENT STANDARD 2 UPON GRADUATION

(1) The benchmark for technology content standard 2 for a student upon graduation is the ability to:

(a) evaluate and apply online collaboration and communication tools to exchange ideas and information and participate in projects;

(b) use digital collaboration and communication tools in a safe, legal, and responsible manner and advocate for such use by others;

(c) synthesize and communicate the results of research and learning with others using various digital tools; and

(d) apply technology that supports collaboration, learning, and productivity in a global environment.

TECHNOLOGY CONTENT STANDARD 3

(1) To satisfy the requirements of technology content standard 3, a student must apply digital tools and skills with creativity and innovation to express him/herself, construct knowledge, and develop products and processes.

BENCHMARK FOR TECHNOLOGY CONTENT STANDARD 3 FOR END OF GRADE 4

(1) The benchmark for technology content standard 3 for a student at the end of grade 4 is the ability to:

(a) use digital tools for personal expression;

(b) use various digital media to share information and tell stories;

(c) use technology to discover connections between facts;

(d) understand ownership of digital media; and

(e) use digital tools and skills to construct new personal understandings.

BENCHMARK FOR TECHNOLOGY CONTENT STANDARD 3 FOR END OF GRADE 8

(1) The benchmark for technology content standard 3 for a student at the end of grade 8 is the ability to:

(a) apply a variety of digital tools for personal and group expression;

(b) use a variety of digital tools to create a product;

(c) use technology to recognize trends and possible outcomes; and

(d) examine the relationship of copyright to ownership of digital media.

BENCHMARK FOR TECHNOLOGY CONTENT STANDARD 3 UPON GRADUATION

(1) The benchmark for technology content standard 3 for a student upon graduation is the ability to:

(a) develop projects combining multiple digital tools to suit a variety of audiences and purposes;

(b) evaluate and employ a variety of digital tools to effectively produce an original work;

(c) use models and simulations to identify trends, predict outcomes, and investigation information; and

(d) evaluate legal protections for intellectual property and apply that understanding to personally created digital media.

TECHNOLOGY CONTENT STANDARD 4

(1) To satisfy the requirements of technology content standard 4, a student must possess a functional understanding of technology concepts and operations.

BENCHMARK FOR TECHNOLOGY CONTENT STANDARD 4 FOR END OF GRADE 4

(1) The benchmark for technology content standard 4 for a student at the end of grade 4 is the ability to:

(a) show skills needed to use communication, information, and processing technologies;

(b) use appropriate terminology when communicating about current technology; and

(c) transfer current knowledge to learning new technology skills.

BENCHMARK FOR TECHNOLOGY CONTENT STANDARD 4 FOR END OF GRADE 8

(1) The benchmark for technology content standard 4 for a student at the end of grade 8 is the ability to:

(a) apply and refine the skills needed to use communication, information, and processing technologies;

(b) use appropriate terminology when communicating about current technology; and

(c) transfer current knowledge to learning of new technology skills.

BENCHMARK FOR TECHNOLOGY CONTENT STANDARD 4 UPON GRADUATION

(1) The benchmark for technology content standard 4 for a student upon graduation is the ability to:

(a) apply and refine the skills needed to use communication, information, and processing technologies;

(b) use appropriate terminology when communicating about current technology; and

(c) transfer current knowledge to learning new technology skills.

TEMPLATE Economic Impact Survey for XXX Standards

Your email address (**cbartow@opiconnect.org**) will be recorded when you submit this form. Not **cbartow**? Sign out
* Required

1. **First and Last Name** *

_____

2. **What is your role?** *
Check all that apply.

- [ ] School Administrator
- [ ] School Business Official
- [ ] School Board Trustee
- [ ] Teacher
- [ ] Other: _____

3. **What school size/type do you represent?** *
Mark only one oval.

- ◯ Small School (fewer than 126 students)
- ◯ Class C
- ◯ Class B
- ◯ Class A
- ◯ Class AA
- ◯ Other: _____

4. **School Name and ZIP Code** *

_____

Program Delivery Standards

ARM Chapter 55

5. **Is your district able to implement the current program delivery standards for XXX?**
Mark only one oval.

- ◯ Yes
- ◯ No

6. **If no, what is the most significant barrier to implementation?**
   Mark only one oval.

   - ◯ Staffing
   - ◯ Professional Development
   - ◯ Instructional Resource Availability
   - ◯ Other: _____

Content Standards Implementation

7. **Is your district able to implement the current XXX content standards with existing staff?**
   Mark only one oval.

   - ◯ Yes
   - ◯ No

8. **Would the proposed standards, if adopted, require your district to substantially revise its current curriculum?**
   Mark only one oval.

   - ◯ Yes
   - ◯ No
   - ◯ Maybe

9. **Do you anticipate that your district will be able to meet the proposed standards with existing resources?**
   Mark only one oval.

   - ◯ Yes
   - ◯ No

Instructional Materials

10. **Would the proposed standards impose a cost for instructional materials beyond that required to implement the current standards?**
    Mark only one oval.

    - ◯ Yes
    - ◯ No

11. **Does your district have difficulty finding instructional materials to implement the current standards?**
    Mark only one oval.

    - ◯ Yes
    - ◯ No

12. **Will your district have difficulty finding instructional materials to implement the proposed standards?**
Mark only one oval.

- Yes
- No
- Maybe

13. **What increase in total dollars would be required to cover the cost associated with Instructional Materials?**

14. **If you answered "no" to any of the questions above, please provide additional feedback.**

Personnel

15. **Would the proposed standards impose a cost for personnel beyond what is required to implement the current standards?**
Mark only one oval.

- Yes
- No

16. **Does your district have a shortage of teachers endorsed in XXX?**
Mark only one oval.

- Yes
- No

17. **Will your district have a shortage of teachers endorsed to teach XXX?**
Mark only one oval.

- Yes
- No

18. **How many new hires would be needed?**

19. **What increase in total dollars would be required to cover the cost associated with Personnel?**

20. **If you answered "no" to any of the questions above, please provide additional feedback.**

Professional Learning

21. **Would the proposed standards impose a cost for professional learning beyond those expenses already required to implement the current standards?**
Mark only one oval.
- Yes
- No

22. **Does your district have difficulty in finding professional development opportunities for XXX educators?**
Mark only one oval.
- Yes
- No

23. **Will your district have difficulty finding professional development opportunities for XXX educators?**
Mark only one oval.
- Yes
- No
- Maybe

24. **What increase in total dollars would be required to cover the cost associated with Professional Development?**

25. **What professional development would be needed?**

26. **How many teachers would need this professional development?**

27. **How many hours of professional development would be needed for each teacher?**

28. **If you answered "no" to any of the questions above, please provide additional feedback.**

Curriculum Development

29. **Would the proposed standards impose a cost for curriculum development beyond what is required to implement the current standards?**
Mark only one oval.
- Yes
- No

30. **Does your district have a shortage of time and resources to support curriculum development in XXX?**
Mark only one oval.
- Yes
- No

31. **Will your district have a shortage of time and resources to support curriculum development in XXX?**
Mark only one oval.
- Yes
- No
- Maybe

32. **What new purchases would be needed?**

33. **What increase in total dollars would be required to cover the cost associated with Curriculum Development?**

34. **How many personnel would be involved in curriculum development?**

35. **How many hours of professional time would be needed in total for Curriculum Development?**

36. **If you answered "no" to any of the questions above, please provide additional feedback.**

YOUR TURN: General Feedback

Please expand on any significant issue that you have indicated in your responses.

37. **Is there anything else you believe the OPI should consider in determining a fiscal impact for implementing new program delivery and content standards?**

☐ Send me a copy of my responses.