


# Montana K-12 Technology Content Standards Framework



**opi.mt.gov**

Adopted by the Montana Board of Public Education  
January 2010

This publication is in the public domain. Authorization to reproduce it in whole or in part is granted. While permission to reprint this publication is not necessary, the citation should be: Montana Office of Public Instruction. Accreditation Division. Curriculum and Instruction Unit. *Technology Content Standards Framework*. Helena, MT, 2010.

|   |   |
|---|---|
|  <p>Montana<br/><b>Office of Public Instruction</b><br/>Denise Juneau, State Superintendent<br/><a href="http://opi.mt.gov">opi.mt.gov</a></p> | <p><b>Montana K-12 Technology<br/>Content Standards Framework</b></p> |
|---|---|

## Table of Contents

Introduction .....pg 4

Preface to Technology Content Standards .....pg 6

Technology Standard 1 (ARM 10.54.7510-7513) .....pg 7

Technology Standard 2 (ARM 10.54.7520-7523) .....pg 8

Technology Standard 3 (ARM 10.54.7530-7533) .....pg 9

Technology Standard 4 (ARM 10.54.7540-7543) .....pg 10

Performance Descriptors “A Profile of Four Levels” (ARM 10.54.7601-7648) ...pg 11

Glossary.....pg 22

Works Cited .....pg 25

## Introduction

In 2005 the Montana Board of Public Education initiated the Standards Revision Project to assure Montana citizens that its public schools are providing **all** children of our great state with challenging academic expectations. The Montana Board of Public Education is charged with the responsibility of leading a process of standards revision that meets the following guiding principles.

Revised learning standards which are academic in focus, rigorous but attainable, readily understandable, and designed to measure the progress of students toward meeting them, will lead to the improvement of Montana's schools and a brighter future for our people.

Revised standards must clearly and consistently identify what students should know, understand and be able to do. Parents, educators, and the greater Montana community must be involved in the revision process. Revised standards will provide a framework to help guide local curriculum and instruction, encouraging school districts and teachers to place emphasis on critical areas of learning. In addition, standards should be measured and made known to the Montana public.

With the vital purpose of improving Montana's schools as our goal, the Montana Board of Public Education sets forth the following criteria to guide Standards Revision:

1. Standards will be academic in nature and content specific.
2. Standards will be challenging and rigorous.
3. Standards will be clear, understandable and free of jargon.
4. Standards will be measurable.
5. Standards will address diversity specifically fulfilling the commitment to implementing MCA 20-1-501, Indian Education for All.

With the purpose of developing a successful and useful product, the Montana Board of Public Education sets forth the following process to guide the Montana Standards Revision:

1. Use the existing Montana Standards Framework – current accreditation program delivery and foundation standards, content and performance standards and benchmarks, and existing structure (4<sup>th</sup>, 8<sup>th</sup>, and upon graduation);
2. Use proven practices from Montana classrooms;
3. Consider international, national and other states' standards;
4. Consider entrance expectations for workplace and postsecondary education;
5. Consider achievement and other related data;
6. Consider other research e.g., Education Northwest, School Redesign Network, National Study of School Evaluation, etc.;
7. Consider comments from professional education associations;
8. Consider comments from tribal and school district educators;
9. Consider recommendations from the Montana Advisory Council for Indian Education; and
10. Involve the Montana public.

**Pursuant to Article X Sect 1(2) of the Constitution of the state of Montana and statutes §20-1-501 and §20-9-309 2(c) MCA, the implementation of these standards must incorporate the distinct and unique cultural heritage of Montana American Indians.**

## Components of the Technology Content Standards Framework

The Technology Content Standards Framework is a set of agreements, rationales, and rules that provides the foundation for standards-based Technology education in Montana. This framework is the blueprint for further development of key components, such as Essential Learning Expectations, Performance Rubrics, and curriculum. The content standards framework contains:

- K-12 content standards;
- rationale for each content standard;
- benchmarks at the end of grade 4, end of grade 8, and upon graduation;
- performance descriptors at the levels of novice, nearing proficiency, proficient and advanced;
- a glossary; and
- works cited.

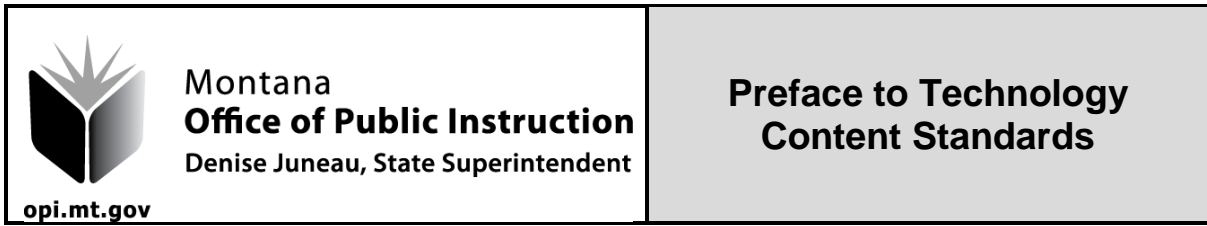
In order to use this framework effectively, it is essential to understand the distinctions between and the intended purpose of its various components.

**Content Standards:** The four technology content standards indicate what all students should know, understand, and be able to do in Technology. Their purpose is to guide the technology curriculum and to communicate the breadth of the technology to be taught to all students. A district's mathematics curriculum should be designed so that learning encompasses all four standards.

**Rationales:** Outlines the fundamental reasons for each of the content standards and provides the basis for the knowledge and skills included in the benchmarks.

**Benchmarks:** The benchmarks define expectations for students' scientific knowledge and skills along a developmental continuum. They define expectations for proficient students at the end of grade 4, end of grade 8, and upon graduation. Their purpose is to state clearly and specifically what the students should know and be able to do within each content standard. A district's curriculum should include the entire progression of knowledge contained in the benchmarks.

**Performance Descriptors:** Performance descriptors define how well students apply the knowledge and skills they have acquired. They gauge the level to which benchmarks have been attained in terms of range, frequency, facility, depth, creativity and quality. Achievement of curricular goals is assessed by the performance descriptors.



Today's learners—teachers 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**

---

The student will use digital tools and resources for problem solving and decision making.

### **Rationale**

As personal and global problems become more complex, digital tools are powerful vehicles for data collection and analysis, collaboration, and presentation of solutions. Therefore, all learners must select and use digital tools to make sound, accurate, data-supported decisions and presentations.

### **Benchmarks**

A proficient student will:

| <b>End of Grade 4</b>   | <b>End of Grade 8</b>   | <b>Upon Graduation</b>  |
|---|---|---|
| <b>1.1</b> identify and investigate a problem and generate possible solutions   | <b>1.1</b> use multiple approaches to explore alternative solutions   | <b>1.1</b> use multiple approaches and diverse perspectives, including Montana American Indians, to explore alternative solutions |
| <b>1.2</b> collect data and information using digital tools   | <b>1.2</b> collect relevant data and information on a subject from a variety of digital resources                               | <b>1.2</b> collect relevant data and information on a subject from a variety of digital resources                                 |
| <b>1.3</b> organize collected data and information using a variety of digital tools                                       | <b>1.3</b> analyze and ethically use data and information from digital resources  | <b>1.3</b> select from an array of digital tools to organize and analyze data from a variety of resources                         |
| <b>1.4</b> identify the accuracy, diversity and point of view, including Montana American Indians, of digital information | <b>1.4</b> compare accuracy, diversity, relevance and point of view, including Montana American Indians, of digital information | <b>1.4</b> evaluate and synthesize data and information   |
| <b>1.5</b> share information ethically and note sources   | <b>1.5</b> share data and information ethically and appropriately cite sources  | <b>1.5</b> share data and information ethically and appropriately cite sources  |

---

## **Technology Content Standard 2**

---

The student will collaborate and communicate globally in a digital environment.

**Rationale**

Digital tools can facilitate collaboration and communication by opening pathways to a global learning environment. All learners share the responsibility to practice and advocate the safe and responsible use of these digital tools.

**Benchmarks**

A proficient student will:

| <b>End of Grade 4</b>   | <b>End of Grade 8</b>   | <b>Upon Graduation</b>  |
|---|---|---|
| <b>2.1</b> identify and explore online collaboration and communication tools                                      | <b>2.1</b> select and use online collaboration and communication tools                                | <b>2.1</b> evaluate and apply online collaboration and communication tools to exchange ideas and information and participate in projects  |
| <b>2.2</b> identify and explore safe, legal, and responsible use of digital collaboration and communication tools | <b>2.2</b> use digital collaboration and communication tools in a safe, legal, and responsible manner | <b>2.2</b> use digital collaboration and communication tools in a safe, legal, and responsible manner and advocate for such use by others |
| <b>2.3</b> communicate the results of research and learning with others using digital tools                       | <b>2.3</b> communicate the results of research and learning with others using digital tools           | <b>2.3</b> synthesize and communicate the results of research and learning with others using various digital tools                        |
| <b>2.4</b> explore how technology has expanded the learning environment beyond the traditional classroom          | <b>2.4</b> use technology in a global learning environment  | <b>2.4</b> apply technology that supports collaboration, learning and productivity in a global environment                                |



---

## **Technology Content Standard 3**

---

The student will apply digital tools and skills with creativity and innovation to express his/herself, construct knowledge and develop products and processes.

### **Rationale**

Digital tools can support creative and innovative expression, which is increasingly necessary in our changing world. The use of these tools can also facilitate the realization and fulfillment of one's talents and interests. The education community has the responsibility to provide access to the new avenues for creation and require nuanced understandings of digital citizenship and ownership.

### **Benchmarks**

A proficient student will:

| <b>End of Grade 4</b>  | <b>End of Grade 8</b>  | <b>Upon Graduation</b>   |
|--|--|--|
| <b>3.1</b> use digital tools for personal expression                             | <b>3.1</b> apply a variety of digital tools for personal and group expression    | <b>3.1</b> develop projects combining multiple digital tools to suit a variety of audiences and purposes                         |
| <b>3.2</b> use various digital media to share information and tell stories       | <b>3.2</b> use a variety of digital tools to create a product                    | <b>3.2</b> evaluate and employ a variety of digital tools to effectively produce an original work                                |
| <b>3.3</b> use technology to discover connections between facts                  | <b>3.3</b> use technology to recognize trends and possible outcomes              | <b>3.3</b> use models and simulations to identify trends, predict outcomes, and investigate information                          |
| <b>3.4</b> understand ownership of digital media                                 | <b>3.4</b> examine the relationship of copyright to ownership of digital media   | <b>3.4</b> evaluate legal protections for intellectual property and apply that understanding to personally created digital media |
| <b>3.5</b> use digital tools and skills to construct new personal understandings | <b>3.5</b> use digital tools and skills to construct new personal understandings | <b>3.5</b> use digital tools and skills to construct new personal understandings   |

---

## **Technology Content Standard 4**

---

The student will possess a functional understanding of technology concepts and operations.


### **Rationale**

Solely teaching application- and device-specific skills is no longer sufficient. While core computer skills are required to harness the power of digital tools, these skills need to be adaptable to the quickly changing technological landscape.

### **Benchmarks**

A proficient student will:

| <b>End of Grade 4</b>   | <b>End of Grade 8</b>   | <b>Upon Graduation</b>  |
|---|---|---|
| <b>4.1</b> show skills needed to use communication, information and processing technologies | <b>4.1</b> apply and refine the skills needed to use communication, information and processing technologies | <b>4.1</b> apply and refine the skills needed to use communication, information and processing technologies |
| <b>4.2</b> use appropriate terminology when communicating about current technology          | <b>4.2</b> use appropriate terminology when communicating about current technology                          | <b>4.2</b> use appropriate terminology when communicating about current technology                          |
| <b>4.3</b> transfer current knowledge to learning of new technology skills                  | <b>4.3</b> transfer current knowledge to learning of new technology skills                                  | <b>4.3</b> transfer current knowledge to learning of new technology skills                                  |

|  |   |
|--|---|
|  <p><b>Montana<br/>Office of Public Instruction</b><br/>Denise Juneau, State Superintendent</p> <p><a href="http://opi.mt.gov">opi.mt.gov</a></p> | <p align="center"><b>Montana K-12 Technology<br/>Performance Descriptors<br/>A Profile of Four Levels</b></p> |
|--|---|

The Technology Performance Descriptors define how well students perform at four performance levels: advanced, proficient, nearing proficiency, and novice. These profiles describe students as they apply the knowledge and skills defined in the benchmarks for the End of Grade 4, End of Grade 8, and Upon Graduation.

| Advanced  | Proficient  | Nearing Proficiency  | Novice  |
|---|---|--|---|
| <p>A student at the advanced level demonstrates superior performance.<br/>He/she:</p> | <p>A student at the proficient level demonstrates solid academic performance. Students reaching this level have demonstrated competency over challenging subject matter, including subject-matter knowledge, application of such knowledge to real-world situations, and analytical skills appropriate to the subject matter.<br/>He/she:</p> | <p>A student at the nearing proficiency level demonstrates partial mastery of the prerequisite knowledge and skills fundamental for proficiency.<br/>He/she:</p> | <p>A student at the novice level is beginning to attain the prerequisite knowledge and skills that are fundamental for proficiency.<br/>He/she:</p> |

| <b>Technology Content Standard 1: End of Grade 4</b>                                  |  |   |   |
|---|--|---|---|
| Advanced  | Proficient   | Nearing Proficiency   | Novice  |
| consistently uses digital tools and resources for problem solving and decision making | uses digital tools and resources for problem solving and decision making | with guidance, examines digital tools and resources for problem solving and decision making | demonstrates limited understanding of digital tools and resources for problem solving and decision making |
| effectively uses assigned digital tools to identify a problem                         | effectively uses assigned digital tools to identify a problem            | with guidance, uses digital tools to identify a problem                                     | has limited understanding of digital tools used to identify a problem                                     |
| brainstorms ways to generate possible solutions                                       | uses guided brainstorming to generate possible solutions                 | chooses a solution from a teacher-provided list   | with assistance, chooses a solution from a teacher-provided list  |

Montana K-12 Technology Content Standards Framework

| <b>Technology Content Standard 1: End of Grade 4</b>                                    |   |  |   |
|---|---|--|---|
| <b>Advanced</b>   | <b>Proficient</b>   | <b>Nearing Proficiency</b>   | <b>Novice</b>   |
| uses assigned digital tools to collect data and information from a variety of resources | explores assigned digital tools to collect data and information from a variety of resources | with guidance, explores assigned digital tools to collect data and information from a variety of resources | with assistance, uses a basic digital tool to collect data and information          |
| uses assigned digital tools to organize data and information                            | uses assigned digital tools to organize data and information                                | uses an assigned digital template to organize data and information   | with assistance, uses an assigned digital template to organize data and information |
| effectively identifies accurate and inaccurate information                              | differentiates between accurate and inaccurate information                                  | with guidance, differentiates between accurate and inaccurate information                                  | has limited understanding of accurate and inaccurate information                    |
| understands diversity and point of view, including Montana American Indians             | recognizes diversity and point of view, including Montana American Indians                  | with guidance, recognizes diversity and point of view, including Montana American Indians                  | has limited understanding of diversity and point of view                            |
| identifies and notes the work of others   | recognizes that using the work of others needs to be noted                                  | with guidance, recognizes that using the work of others needs to be noted                                  | has limited recognition of the concept of using the work of others                  |
| understands the concept of digital media ownership                                      | explores the concept of digital media ownership   | with guidance, explores the concept of digital media ownership   | has limited understanding of the concept of digital media ownership                 |

Montana K-12 Technology Content Standards Framework

| <b>Technology Content Standard 1: End of Grade 8</b>   |  |  |  |
|--|--|--|--|
| <b>Advanced</b>  | <b>Proficient</b>  | <b>Nearing Proficiency</b>   | <b>Novice</b>  |
| independently uses multiple approaches to explore alternative solutions  | demonstrates a clear understanding of multiple approaches to explore alternative solutions   | with guidance, explores multiple approaches to explore alternative solutions   | has difficulty selecting approaches to explore alternative solutions   |
| thoughtfully collects relevant data and information on a subject from a variety of digital resources                       | collects relevant data and information on a subject from a variety of digital resources  | with guidance, collects relevant data and information on a subject from a variety of digital resources                                   | has limited success collecting relevant data and information on a subject from digital resources                             |
|  |  |  | has difficulty analyzing data and information from digital resources   |
| clearly demonstrates analysis and ethical use of data and information from digital resources                               | analyzes and ethically uses data and information from digital resources  | with guidance, understands the analysis and ethical use of data and information from digital resources                                   | has difficulty understanding ethical use of data and information from digital resources                                      |
| evaluates the accuracy, diversity, relevance and point of view, including Montana American Indians, of digital information | understands the concepts of accuracy, diversity, relevance and point of view, including Montana American Indians, of digital information | with guidance, occasionally recognizes accuracy, relevance and point of view, including Montana American Indians, of digital information | has difficulty identifying accuracy, relevance and point of view, including Montana American Indians, of digital information |
| consistently demonstrates ethical practices when sharing data and information  | demonstrates ethical practices when sharing data and information   | with guidance, demonstrates ethical practices when sharing data and information  | has limited success sharing data and information ethically   |
| appropriately cites sources using multiple styles  | correctly cites digital sources  | with guidance, cites digital sources   | has difficulty citing sources appropriately  |

Montana K-12 Technology Content Standards Framework

| <b>Technology Content Standard 1: Upon Graduation</b>  |  |  |  |
|--|--|--|--|
| <b>Advanced</b>  | <b>Proficient</b>  | <b>Nearing Proficiency</b>   | <b>Novice</b>  |
| independently applies multiple approaches and diverse perspectives, including Montana American Indians, to explore alternative solutions | applies multiple approaches and diverse perspectives, including Montana American Indians, to explore alternative solutions | with guidance, uses multiple approaches and diverse perspectives, including Montana American Indians, to explore alternative solutions | has limited success using multiple approaches and diverse perspectives, including Montana American Indians, and difficulty exploring alternative solutions |
| independently and effectively collects relevant data and information on a subject from a variety of digital resources                    | consistently collects relevant data and information on a subject from a variety of digital resources                       | with guidance, collects relevant data and information on a subject from a variety of digital resources                                 | has difficulty finding relevant data and information on a subject from a variety of digital resources  |
| independently explores and implements an appropriate digital tool to organize and analyze data from a variety of resources               | successfully selects from an array of digital tools to organize and analyze data from a variety of resources               | with guidance, selects from a designated set of digital tools to organize and analyze data from a variety of resources                 | has difficulty selecting digital tools to organize and analyze data from a variety of resources  |
| routinely evaluates and synthesizes data and information   | effectively evaluates and synthesizes data and information   | with guidance, evaluates and synthesizes data and information  | can seldom evaluate and synthesize data and information  |
| consistently shares data and information ethically   | shares data and information ethically  | with guidance, shares data and information ethically   | can seldom share data and information ethically  |
| independently cites sources in the appropriate style   | cites sources in the appropriate style   | with guidance, appropriately cites sources   | has difficulty citing sources  |

Montana K-12 Technology Content Standards Framework

| <b>Technology Content Standard 2: End of Grade 4</b>   |  |  |   |
|--|--|--|---|
| <b>Advanced</b>  | <b>Proficient</b>  | <b>Nearing Proficiency</b>   | <b>Novice</b>   |
| independently uses digital tools to synchronously and asynchronously communicate with other age-level students outside their classroom environment; independently uses digital tools to collaborate with peers on projects and assignments outside their classroom environment | uses digital tools to synchronously and asynchronously communicate with other age-level students in their classroom environment; uses digital tools to collaborate with peers on projects and assignments in their classroom environment | with guidance, uses digital tools to synchronously and asynchronously communicate with other age-level students in their classroom environment; with guidance, uses digital tools to collaborate with peers on projects and assignments in their classroom environment | with assistance, uses simple digital tools to synchronously or asynchronously communicate with other age-level students in their classroom environment; with assistance, uses simple digital tools to collaborate with peers on projects and assignments in their classroom environment |
| identifies and consistently uses safe, legal and responsible practices in using communication and collaboration technologies   | identifies safe, legal and responsible practices in using communication and collaboration technologies   | with guidance, identifies safe, legal and responsible practices in using communication and collaboration technologies  | with assistance, identifies core safe, legal and responsible practices in using communication and collaboration technologies  |
| shares the results of research with peers using digital presentation tools both online and in person   | shares the results of research with peers using digital presentation tools either online or in person  | with guidance, shares the results of research with peers using digital presentation tools either online or in person   | with assistance, shares the results of research with peers using digital presentation tools either online or in person  |
| independently identifies and uses technologies that provide learning opportunities beyond the traditional classroom  | identifies technologies that provide learning opportunities beyond the traditional classroom   | with guidance, identifies technologies that provide learning opportunities beyond the traditional classroom  | with assistance, identifies basic technologies that provide learning opportunities beyond the traditional classroom   |

Montana K-12 Technology Content Standards Framework

| <b>Technology Content Standard 2: End of Grade 8</b>   |   |  |  |
|--|---|--|--|
| <b>Advanced</b>  | <b>Proficient</b>   | <b>Nearing Proficiency</b>   | <b>Novice</b>  |
| independently selects the most effective digital tools to synchronously and asynchronously communicate with other age-level students in and out of their classroom environment | selects appropriate digital tools to synchronously and asynchronously communicate with other age-level students in and out of their classroom environment | with guidance, selects appropriate digital tools to synchronously and asynchronously communicate with other age-level students in and out of their classroom environment | with assistance, uses digital tools to synchronously and asynchronously communicate with other age-level students in their classroom environment |
| independently selects the most effective digital tools to collaborate with peers on projects and assignments in and out of their classroom environment                         | selects appropriate digital tools to collaborate with peers on projects and assignments in and out of their classroom environment                         | with guidance, selects appropriate digital tools to collaborate with peers on projects and assignments in and out of their classroom environment                         | with assistance, uses digital tools to collaborate with peers on projects and assignments in their classroom environment                         |
| independently uses safe, legal and responsible practices in using communication and collaboration technologies   | consistently uses safe, legal and responsible practices in using communication and collaboration technologies   | with guidance, consistently uses safe, legal and responsible practices in using communication and collaboration technologies   | with assistance, identifies safe, legal and responsible practices in using communication and collaboration technologies                          |
| independently and effectively shares the results of research with peers using a variety of digital presentation tools both online and in person                                | effectively shares the results of research with peers using digital presentation tools both online and in person  | with guidance, effectively shares the results of research with peers using digital presentation tools both online and in person  | with assistance, shares the results of research with peers using digital presentation tools either online or in person                           |
| independently and effectively uses a variety of technologies to learn beyond the scope of the traditional classroom  | effectively uses technology to learn beyond the scope of the traditional classroom  | with guidance, effectively uses technology to learn beyond the scope of the traditional classroom  | with assistance, identifies technologies to learn beyond the scope of the traditional classroom  |



Montana K-12 Technology Content Standards Framework

| <b>Technology Content Standard 2: Upon Graduation</b>   |   |  |   |
|---|---|--|---|
| <b>Advanced</b>   | <b>Proficient</b>   | <b>Nearing Proficiency</b>   | <b>Novice</b>   |
| evaluates and independently selects digital tools to synchronously and asynchronously communicate with others outside of the formal classroom environment   | evaluates and independently selects digital tools to synchronously and asynchronously communicate with others in and out of their classroom environment | with guidance, evaluates and selects digital tools to synchronously and asynchronously communicate with others in and out of their classroom environment | with assistance, selects digital tools to synchronously and asynchronously communicate with others in their classroom environment |
| evaluates and independently selects digital tools to collaborate with others on projects and assignments outside of the formal classroom environment  | evaluates and independently selects digital tools to collaborate with others on projects and assignments in and out of their classroom environment      | with guidance, evaluates and selects digital tools to collaborate with others on projects and assignments in and out of their classroom environment      | with assistance, selects digital tools to collaborate with others on projects and assignments in their classroom environment      |
| independently uses and advocates to others safe, legal and responsible practices in using communication and collaboration technologies  | consistently uses and advocates to others safe, legal and responsible practices in using communication and collaboration technologies                   | consistently uses, and with direction, advocates to others safe, legal and responsible practices in using communication and collaboration technologies   | with assistance, uses safe, legal and responsible practices in using communication and collaboration technologies                 |
| independently and effectively synthesizes and communicates the results of research with others using digital presentation tools both online and in person outside of the formal classroom environment | effectively synthesizes and communicates the results of research with others using digital presentation tools both online and in person                 | with guidance, communicates the results of research with others using digital presentation tools both online and in person                               | with assistance, communicates the results of research with others using digital presentation tools either online or in person     |
| independently and effectively uses technology to learn and teach beyond the scope of the traditional classroom  | effectively uses technology to learn and teach beyond the scope of the traditional classroom  | with guidance, uses technology to learn and teach beyond the scope of the traditional classroom  | with assistance, uses technology to learn beyond the scope of the traditional classroom   |

Montana K-12 Technology Content Standards Framework

| <b>Technology Content Standard 3: End of Grade 4</b>  |   |   |   |
|---|---|---|---|
| Advanced  | Proficient  | Nearing Proficiency   | Novice  |
| effectively applies digital tools and skills to create and share personal expressions in a variety of media | applies digital tools and skills to create and share personal expressions in a variety of media | with guidance attempts to apply digital tools and skills to create and share personal expressions in a variety of media | with assistance attempts to apply digital tools and skills to create and share personal expressions in a variety of media |
| independently uses digital tools creatively to produce original works uncommon for this grade level         |   |   |   |
| applies basic rules of ownership of digital media to their own personal use                                 | understands basic rules of ownership of digital media   | with guidance, acknowledges basic rules of ownership of digital media   | with assistance, recognizes basic rules of ownership of digital media   |
| uses digital tools to develop new understandings by discovering the connections between facts               | uses digital tools to discover connections between facts  | with guidance, uses digital tools to discover connections between facts   | with assistance, attempts to use digital tools to discover connections between facts                                      |

| <b>Technology Content Standard 3: End of Grade 8</b>  |  |   |  |
|---|--|---|--|
| Advanced  | Proficient   | Nearing Proficiency   | Novice   |
| effectively applies a variety of digital tools to create a multimedia product for personal and group expression | applies a variety of digital tools to create a product for personal and group expression | uses a digital tool to create a product for personal and group expression | with assistance, uses a digital tool to create a product for personal and group expression |
| independently combines digital tools creatively to produce original works that exceed expectations              |  |   |  |
| effectively uses technology to predict reasonable trends and outcomes   | uses technology to predict reasonable trends and outcomes                                | with guidance, uses technology to predict reasonable trends and outcomes  | with assistance, uses technology to predict trends and outcomes                            |

Montana K-12 Technology Content Standards Framework

| <b>Technology Content Standard 3: End of Grade 8</b>                                      |   |  |   |
|---|---|--|---|
| Advanced  | Proficient  | Nearing Proficiency  | Novice  |
| independently applies basic rules of ownership of digital media to their own personal use | understands the relationship of copyright to ownership of digital media | explores the relationship of copyright to ownership of digital media | with assistance, begins to understand the relationship of copyright to ownership of digital media |

| <b>Technology Content Standard 3: Upon Graduation</b>   |   |   |   |
|---|---|---|---|
| Advanced  | Proficient  | Nearing Proficiency   | Novice  |
| initiates distinguished multimedia projects combining image, text and sound to suit a variety of audiences and purposes | develops multimedia projects combining image, text and sound to suit a variety of audiences and purposes                        | with guidance, develops multimedia projects combining image, text and sound to suit a variety of audiences and purposes | develops, with assistance, a multimedia project combining image, text and sound to suit a specific audience and purpose |
| adapts digital tools to create products of a professional quality   |   |   |   |
| independently evaluates and employs a variety of digital tools to effectively create innovative work                    | evaluates and employs a variety of digital tools to effectively produce an original work  | with guidance, evaluates and employs a variety of digital tools to produce an original work                             | with assistance, evaluates and employs a variety of digital tools to produce an original work                           |
| creates models and simulations to identify trends, predict reasonable outcomes, and effectively investigate information | uses models and simulations to accurately identify trends, predict reasonable outcomes, and effectively investigate information | with guidance, uses models and simulations to identify trends, predict outcomes, and investigate information            | with assistance, begins to use models and simulations to identify trends, predict outcomes, and investigate information |
| independently selects the appropriate legal protections for personally created digital media                            | selects, with support, the appropriate legal protections for personally created digital media                                   | explores the appropriate legal protections for personally created digital media   | with assistance, begins to understand appropriate legal protections for personally created digital media                |

Montana K-12 Technology Content Standards Framework

| <b>Technology Content Standard 4: End of Grade 4</b>                                   |  |   |  |
|--|--|---|--|
| Advanced   | Proficient   | Nearing Proficiency   | Novice   |
| independently demonstrates ability to input commands and data into digital devices     | demonstrates ability to input commands and data into digital devices     | with guidance, demonstrates ability to input commands and data into digital devices     | with assistance, demonstrates ability to input commands and data into digital devices  |
| independently identifies the appropriate digital tool to complete tasks                | identifies the appropriate digital tool to complete tasks                | with guidance, identifies the appropriate digital tool to complete tasks                |  |
| independently uses proper terminology when communicating about technology              | uses proper terminology when communicating about technology              | with guidance, uses proper terminology when communicating about technology              | with assistance, identifies the appropriate digital tool to complete tasks             |
| independently adapts current technology skills to additional and emerging technologies | adapts current technology skills to additional and emerging technologies | with guidance, adapts current technology skills to additional and emerging technologies | with assistance, attempts using proper terminology when communicating about technology |

| <b>Technology Content Standard 4: End of Grade 8</b>  |   |  |  |
|---|---|--|--|
| Advanced  | Proficient  | Nearing Proficiency  | Novice   |
| independently demonstrates a consistent ability to input commands and data into digital devices | demonstrates a consistent ability to input commands and data into digital devices | with guidance, demonstrates a consistent ability to input commands and data into digital devices | with assistance, demonstrates an ability to input commands and data into digital devices |
| independently identifies the best appropriate digital tool to complete tasks                    | identifies the best digital tool to complete tasks                                | with guidance, identifies the best digital tool to complete tasks                                |  |
| independently adapts current technology skills to additional and emerging technologies          |   |  |  |

Montana K-12 Technology Content Standards Framework

| <b>Technology Content Standard 4: End of Grade 8</b>                      |  |   |  |
|---|--|---|--|
| Advanced  | Proficient   | Nearing Proficiency   | Novice   |
| independently uses proper terminology when communicating about technology | uses proper terminology when communicating about technology              | with guidance, uses proper terminology when communicating about technology              | with assistance, identifies the appropriate digital tool to complete tasks             |
| teaches others proper usage and core technology skills                    | adapts current technology skills to additional and emerging technologies | with guidance, adapts current technology skills to additional and emerging technologies | with assistance, attempts using proper terminology when communicating about technology |

| <b>Technology Content Standard 4: Upon Graduation</b>   |   |  |  |
|---|---|--|--|
| Advanced  | Proficient  | Nearing Proficiency  | Novice   |
| independently demonstrates a consistent ability to input commands and data into digital devices | demonstrates a consistent ability to input commands and data into digital devices | with guidance, demonstrates a consistent ability to input commands and data into digital devices | with assistance, demonstrates an ability to input commands and data into digital devices |
| independently identifies the best appropriate digital tool to complete tasks                    | identifies the best digital tool to complete tasks                                | with guidance, identifies the best digital tool to complete tasks                                | with assistance, identifies the appropriate digital tool to complete tasks               |
| independently uses proper terminology when communicating about technology                       | uses proper terminology when communicating about technology                       | with guidance, uses proper terminology when communicating about technology                       | with assistance, attempts using proper terminology when communicating about technology   |
| independently adapts current technology skills to additional and emerging technologies          | adapts current technology skills to additional and emerging technologies          | with guidance, adapts current technology skills to additional and emerging technologies          |  |
| teaches others advanced usage and core technology skills  | teaches others proper usage and core technology skills                            |  |  |
| adapts existing digital tools to create and process data in innovative ways                     |   |  |  |



Montana  
**Office of Public Instruction**  
Denise Juneau, State Superintendent

[opi.mt.gov](http://opi.mt.gov)

## Montana K-12 Technology Content Standards Glossary

The glossary identifies and describes key terms within the content standards, benchmarks, and performance descriptors. The purpose of the glossary is to help educators better understand and implement the technology content standards, benchmarks and performance descriptors. It is not intended to be a study guide for students and is not a comprehensive list of all technology terms.

**Asynchronous Communication** - Asynchronous means not occurring at the same time. Asynchronous refers to content, instruction, and communication between participants (e.g., students and teachers) that occurs at different times, the period of which may vary by circumstance (e.g., e-mail, threaded discussions, homework, message boards).

**Broad Perspective** - becoming a global thinker, including consideration and possible adaptation of other's views.

**Collaborate** - to work together in small groups or through collaboration tools, to exchange ideas, to develop understandings

**Collaboration Tools** - Any digital tool that allows for shared input both synchronous and asynchronous (e.g., social networks, wikis, blogs, social bookmarking, forums, video-conferencing, online productivity tools).

**Communication Tools** - Any digital tool that allows for exchange of information and ideas both synchronous and asynchronous (e.g., e-mail, instant messaging, forums).

**Copyright** - The idea that the authors of ideas, designs, and products may register their intellectual property with the government, thereby limiting the extent to which others may use and profit from, modify, or perform the protected creation. In the United States, the doctrine of Fair Use allows others to review, comment on, parody, and study copy-written materials with proper citation.

**Digital Citizenship** - The norms of behavior with regard to technology use. It includes online etiquette, responsible use of technology systems, information and software, safety and security.

**Digital Collaboration** - Using digital tools for the purpose of collaboration.

**Digital Environment** - A virtual space that is created using digital tools for collaboration and communication.

**Digital Information** - written language, audio, or video, accessed through digital means.

**Digital Media** - Any type of information in digital format, including computer-generated text, graphics, audio and animations.

## Montana K-12 Technology Content Standards Framework

**Digital Presentation Tools** - Tools that facilitate the sharing of information with others, either locally or in a virtual environment.

**Digital Sources** - Information gathered (written, audio, video) online and noted.

**Digital Tools** - Inclusive of all hardware and/or software (e.g., computers, PDAs, personal video players, personal music players, word processors, spreadsheets, instant messaging, Web browsers, Web 2.0 tools).

**Ethical Use** - Respecting the hardware, ownership, privacy, and use of digital tools (e.g., respecting ownership of intellectual property, being mindful of security and passwords, giving credit to cited sources, exhibiting appropriate behavior online, and acknowledging boundaries of privacy).

**Flexible Networks** - A network environment which adapts with changing and emerging technologies and allows the users to explore interests safely and expediently.

**Functional Understanding** - Understanding usage sufficiently to perform day-to-day classroom tasks using digital tools.

**Global Communication** - Refers to student communication outside the traditional classroom to learn collaboratively with other students from around the world.

**Global Learning Environment** – The digital environment that extends the learning beyond the classroom walls.

**Information and Communication Technology** - "This term is used throughout much of the WORLD (added emphasis) in place of the word *technology*."

### **Information and Processing Technologies**

- Data - data is raw. It simply exists and has no significance beyond its existence (in and of itself). It can exist in any form, usable or not. It does not have meaning of itself.
- Knowledge - knowledge is the appropriate collection of information, such that its intent is to be useful. Knowledge is a deterministic process.
- Understanding - understanding is an interpolative and probabilistic process. It is cognitive and analytical. It is the process by which I can take knowledge and synthesize new knowledge from the previously held knowledge.
- Wisdom - wisdom is an extrapolative and non-deterministic, non-probabilistic process. It beckons to give us understanding about which there has previously been no understanding, and in doing so, goes far beyond understanding itself.

**Input Commands** - Transferring information to a device with an expected performance result.

**Intellectual Property** - refers to a range of creations such as music, literature, artistic

## Montana K-12 Technology Content Standards Framework

works, symbols, names, images or designs. Intellectual property law grants owners of such property exclusive rights to govern its use.

**Inquiry** - "Inquiry is any process that has the aim of augmenting knowledge, resolving doubt, or solving a problem."

### **Language Hierarchy** for Performance Descriptors

- With Assistance – One-to-one help with step-by-step learning
- With Guidance - Walk away ... less impact ... limited input
- At proficient - no language used
- Independently - Students work on their own without guidance

**Personal Responsibility** - Understanding that personal actions have effects and that individuals are responsible for choices they make.

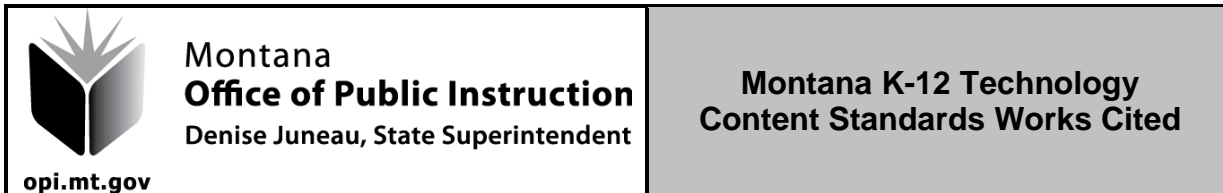
**Synchronous Communication** - "Synchronous" means occurring at the same time. "Synchronous" refers to content, instruction, and communication between participants (e.g., students and teachers) that occurs at the same time even though they may be in different physical locations. For example, instruction in which students and teachers are online at the same time so that a question can be immediately answered (e.g., telephone calls, face-to-face meetings, physical classrooms, chat rooms, and videoconferencing).

**Technology Operations** - basic skills needed to operate digital hardware and software

**Web 2.0** - an emerging set of technologies occurring in the World Wide Web that aims to facilitate creativity, information sharing, and, most notably, collaboration among users.



## Montana K-12 Technology Content Standards Framework



International Society for Technology in Education. National Educational Technology Standards for Students. 2<sup>nd</sup> Ed. Eugene, Oregon: ISTE, 2007.

Montana Office of Public Instruction. "Montana Content and Performance Standards for Technology." Administrative Rules of Montana (10.54.7501). Helena, Mont.: OPI, 2000.